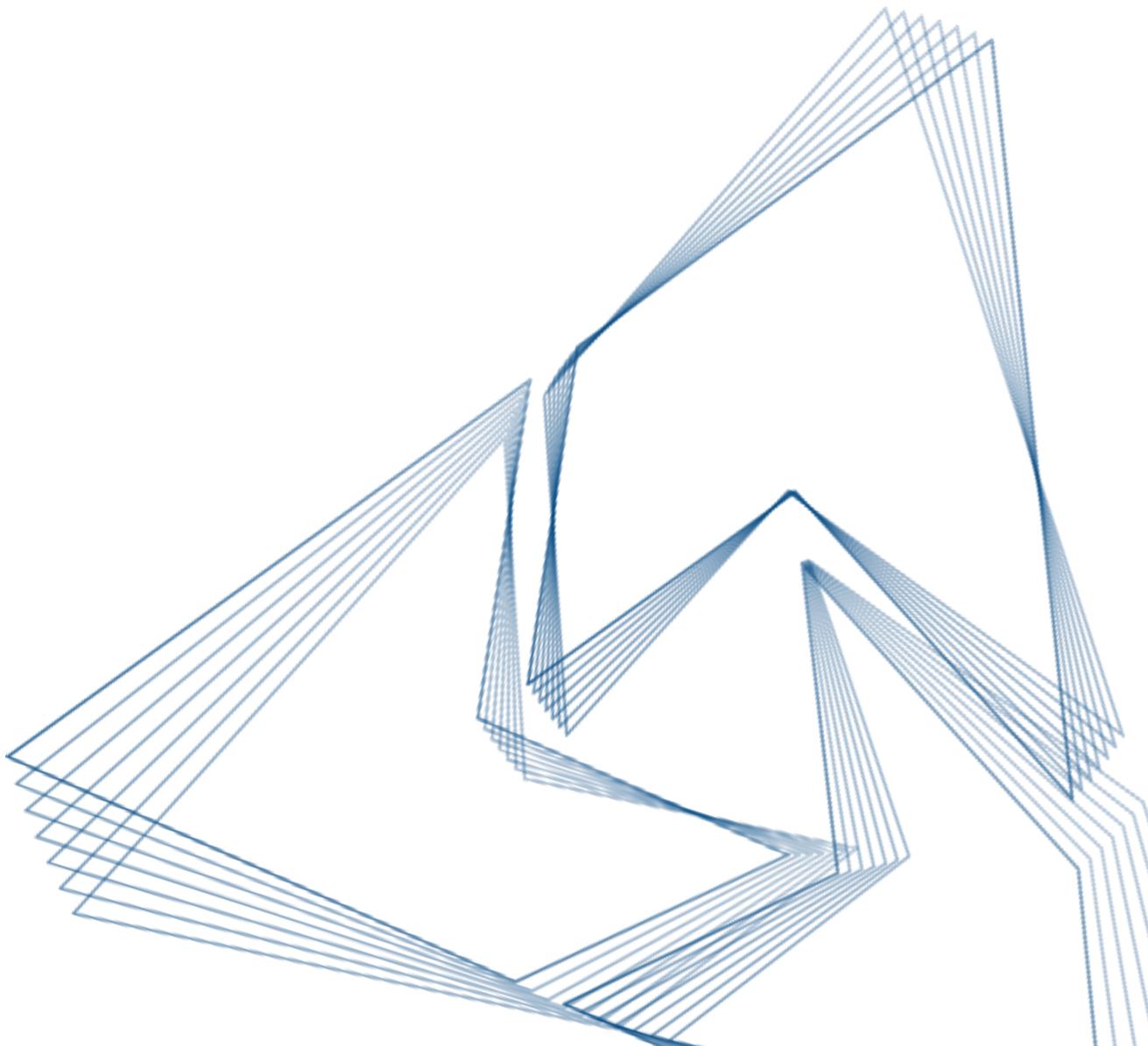


IMAGE MEDIA CENTER

USER MANUAL



ABOUT IMAGE MEDIA CENTER

IMAGE MEDIA CENTER (IMC) is an innovative software suite developed by the Russian company Innovative Centre. It provides an opportunity to perform the whole cycle of processing and analysis of images, remote sensing data, and cartographic data, combine different types of data in a single geospatial base, fill it with attributive information, store and visualize data.

IMC software suit uses radar and optical satellite imagery, including panchromatic, multi- and hyperspectral images, vector masks, and images without geo-referencing and geo-referenced images as data input for thematic RS data processing.

Innovative Centre Company was founded for the purpose of simplifying the access to the knowledge which can be crucial in various fields of activity. Our specialists use their rich experience to create geographic information systems which can provide user with the required information within seconds.

Our company is engaged in major international and national projects for commercial and state enterprises, financial companies, federal and regional structures.

Our fields of activity:

- geographic information systems creation;
- data storage and management systems creation;
- specialized software development;
- remote sensing data processing;
- software implementation and support.

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SYSTEM REQUIREMENTS

1.1. Hardware requirements for IMC operation

For sustainable operation of the Image Media Center software a workstation with the characteristics of not less than the following is required:

- quad-core processor Core 2 Quad / Core i7 / Xeon with a clock speed of 2.4 GHz;
- 8 GB of RAM,
- hard Drive 1TB, RAID 0 or RAID 5;
- monitor with a minimum screen resolution of 1280x1024 pixels;
- keyboard;
- mouse;
- optical disk drive;
- uninterruptable power supply.

1.2. Software requirements for IMC operation

For the operation of the Media Center software following software is required:
operating system (OS) Microsoft Windows XP Professional SP3 / Vista / 7/8/10,
2008/2012 Server.

SOFTWARE INSTALLATION AND SETUP

2.1. Installation order

Run “*Setup.exe*” file as an administrator, it will start the installation wizard (Fig. 1, 2).

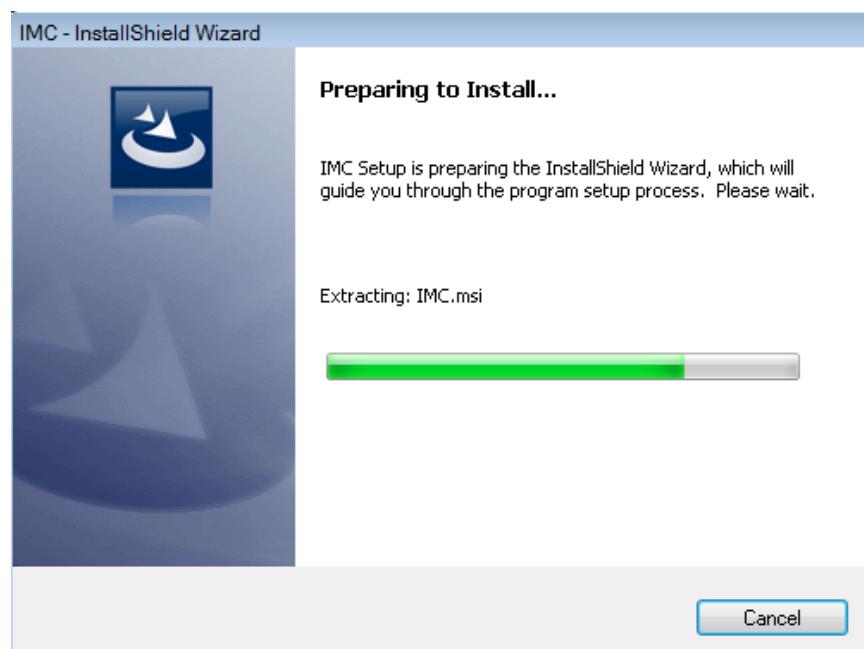


Fig. 1. *Installation wizard start window*

After that perform following steps:

Read the greeting of installation wizard and press “*Next*” (Fig. 2).



Fig. 2. *Installation wizard greeting*

Read the terms of license agreement, print if necessary (press “Print” button), accept the terms of license agreement, and then press “Next” (Fig. 3).

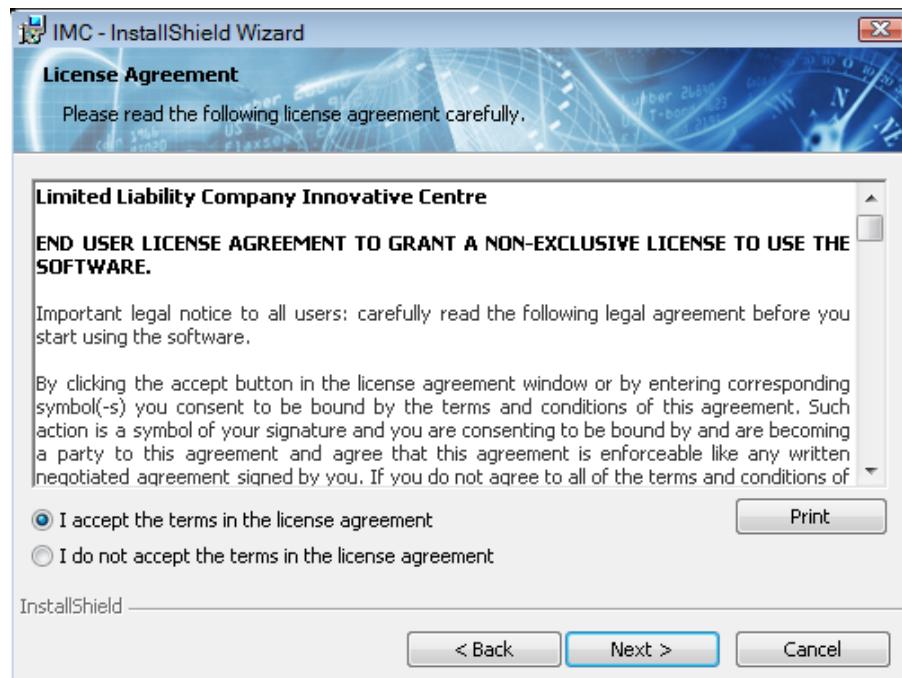


Fig. 3. *Terms of license agreement*

Fill the information about user and press “Next” (Fig. 4).

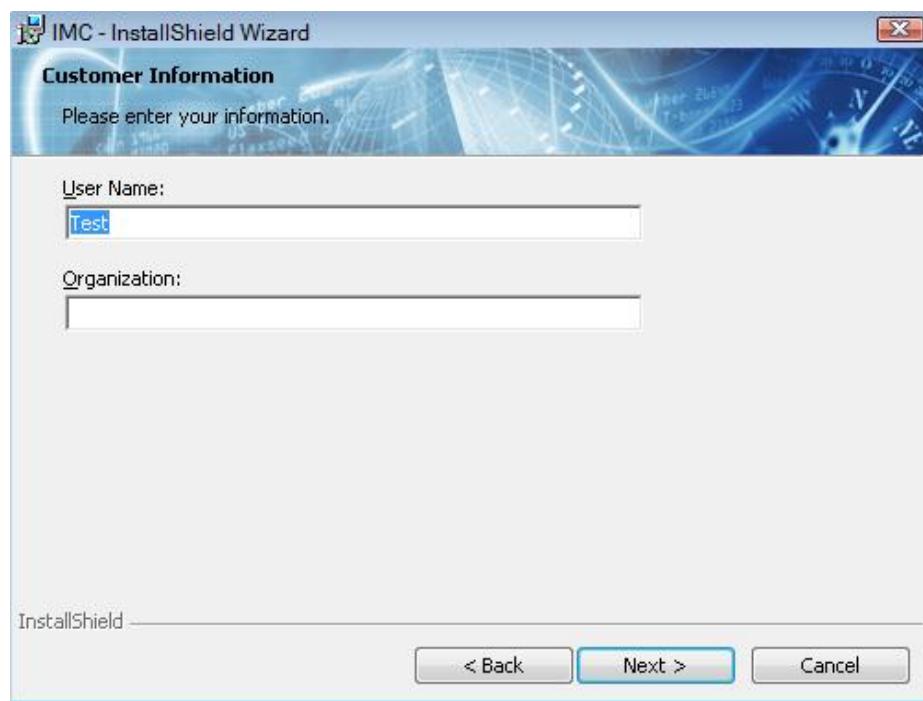


Fig. 4. *Information about the user*

Choose the path to installation directory and press “Next” (Fig. 5).



Fig. 5. *Installation directory*

Press “*Install*” button (Fig. 6).

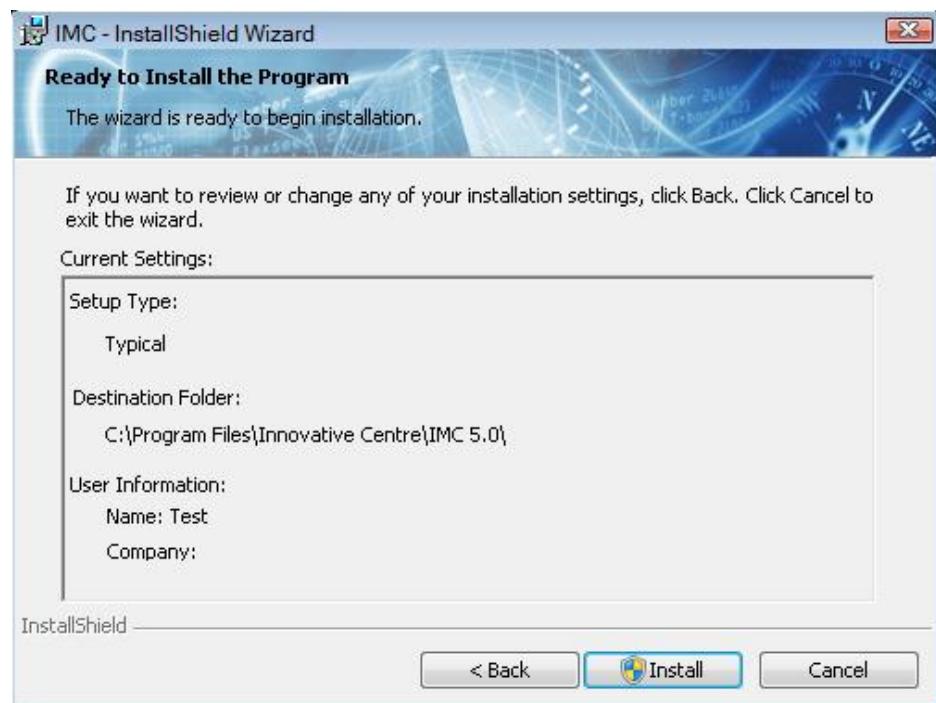


Fig. 6. *Start the installation process*

Installation process will begin (Fig. 7).

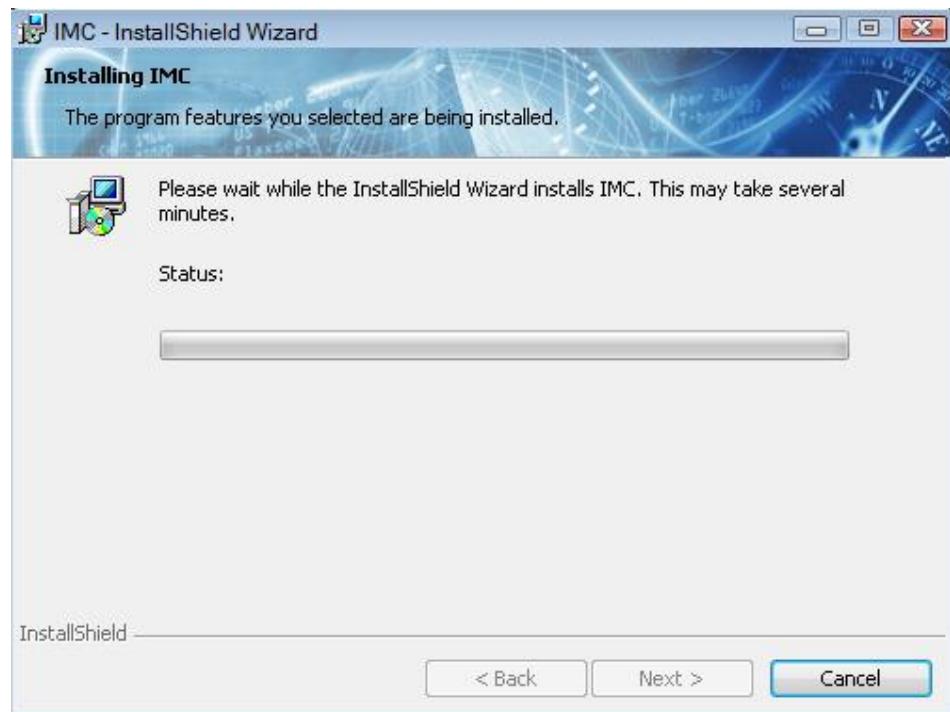


Fig. 7. Installation process

Press “Finish” to exit installation wizard (Fig. 8).

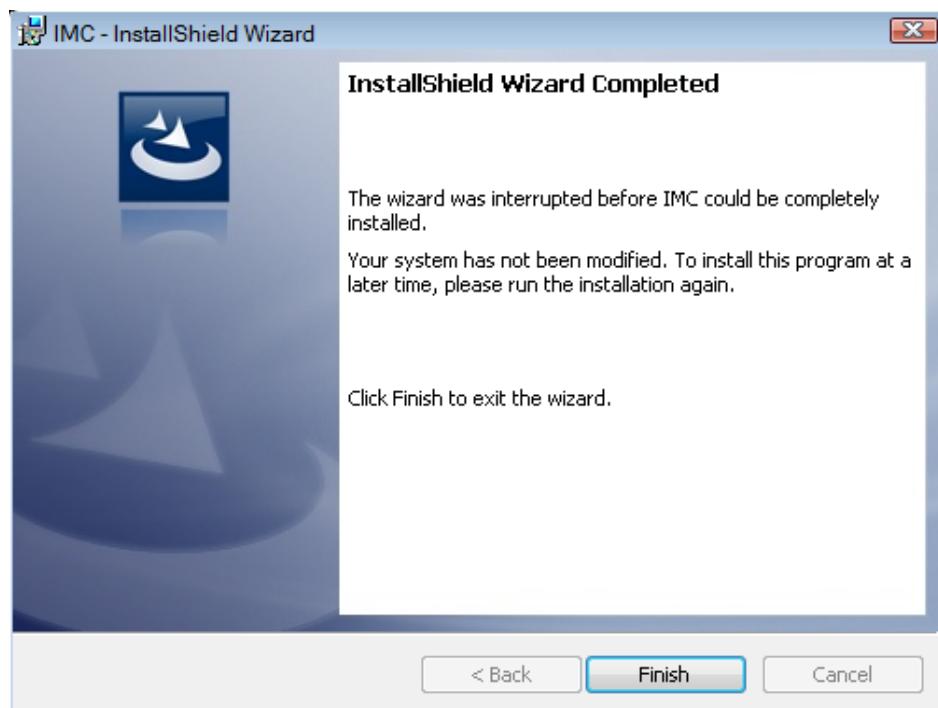


Fig. 8. Exiting the installation wizard

Perform the first launch of the program as an administrator. Run the program through “Start” menu or by clicking desktop “IMC” icon (Fig. 9).



Fig. 9. Desktop “IMC” icon

2.2. Software registration

Before the first IMC launch it is required to replace automatically generated “install.id” file in installation directory with the file of the same name provided together with installer file “Setup.exe”.

During the first IMC launch which should be performed as an administrator the “Registration” window will appear. License registration window contains identification number and setup key (Fig. 10).

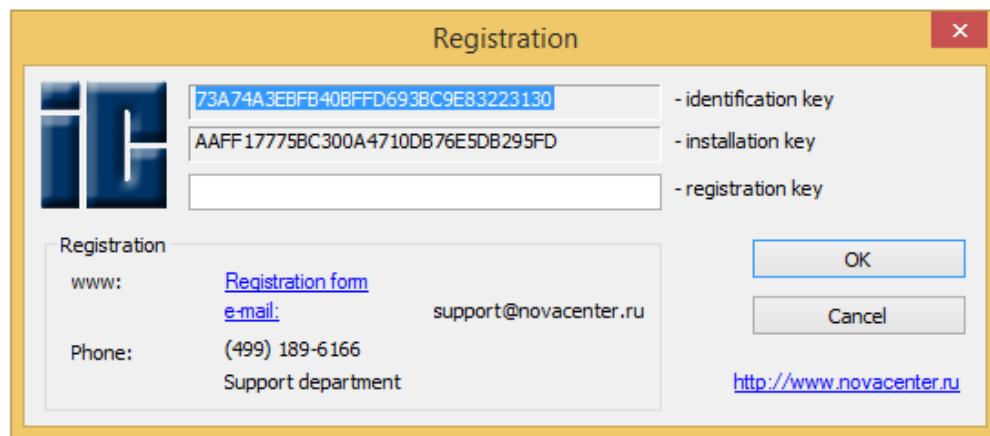


Fig. 10. «Registration» dialog box

In the “Registration options” field following alternatives are provided: registration via internet and registration via phone call.

To perform the registration, follow the “Registration form” link; www.novacenter.ru webpage will open. (Fig. 11).

Identification number:

Setup key:

Surname:

Name:

Organization:

E-mail:

Country:

* all the fields are mandatory

Register

Fig. 11. *Website registration*

On the opened page enter Identification number to the first text-box, and enter the Setup key to the second text-box.

Fill the text-boxes with your personal details (Surname, Name, Organization, E-mail, Country), then press “Register” button.

You will be provided with the registration key, which should be copied to the “registration” window of IMC software.

Then press “OK” button to finish the registration process and launch the program

Another way of receiving the registration key is to send Identification number and Setup key to support@novacenter.ru e-mail.

You will be sent the e-mail reply with the registration key, which should be copied to the “registration” window of IMC software.

Then press “OK” button to finish the registration process and launch the program.

To register IMC software via phone call, please contact technical support department by the following phone number: +7 (499) 189-61-66.

For questions about software please contact technical support by support@novacenter.ru e-mail or make a phone call +7 (499) 189-61-66

PROGRAM EXECUTION

3.1. Program launch

You can launch IMC software by clicking the desktop icon (Fig. 12) or through Windows “Start” menu.



Fig. 12. *IMC icon*

The launch splash screen will appear (Fig. 13).

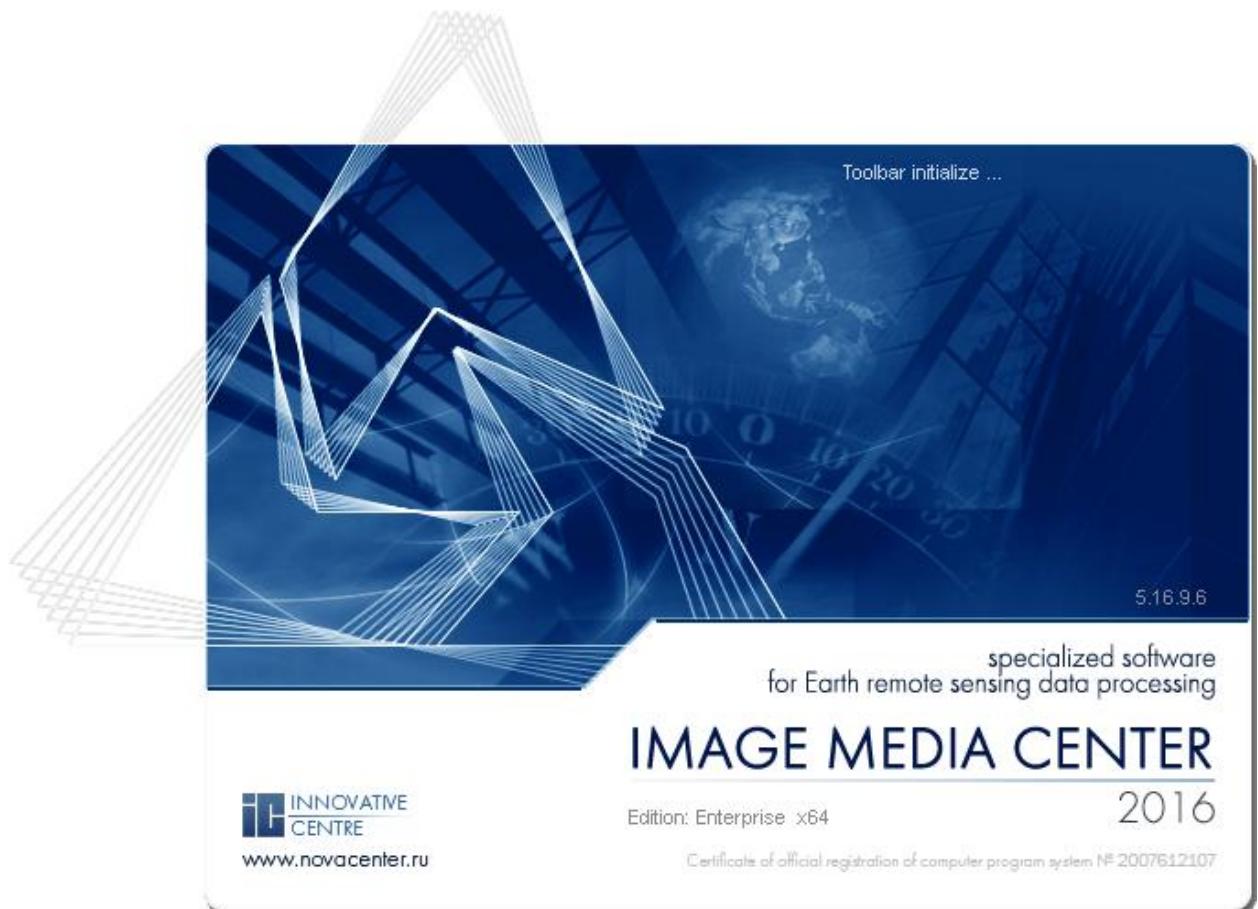


Fig. 13. *Launch splash screen*

MAIN MENU

4.1. Main menu

Main menu (Fig. 14) contains following sections:

- «*File*» – open and save files ;
- «*Edit*» – copy, paste, cut image;
- «*Image*» – work with images;
- «*Preliminary processing*» – atmospheric correction, quick look creation, pansharpening;
- «*Geography*» – geocoding, measurements;
- «*Thematic processing*» – thematic processing tools;
- «*Vector*» – creation and editing vector objects and attribute information;
- «*Selection*» – creation and editing selections;
- «*Layers*» – layers management;
- «*Modules*» – distance measurements, color range, plotting histograms of different frequencies, comparison of images by spectral characteristics;
- «*View*» – scale, design, image viewing;
- «*Window*» – windows, tool bars and tool panels management;
- «*Help*» – user manual.

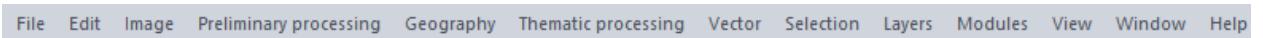


Fig. 14. *Main menu*

To select a menu item and enter the relevant section of this item, the user should use the standard methods of Windows applications operation (using the mouse or navigation keys).

«*File*» menu (Fig. 15) contains following items:

- «*New*» – create new document;
- «*Open*» – open file;
- «*Open as*» – open file copy;
- «*Save*» – save changes in the current document;
- «*Save as*» – save changes in the new document;
- «*Close*» – close file;
- «*Import*» – get image from scanner or camera;
- «*Export*» – export of the window;

«*Print*» – print file;
 «*Print settings*» – set print parameters;
 «*Preview*» – preview document before printing;
 List of last ten opened files;
 «*Exit*» – exit program.

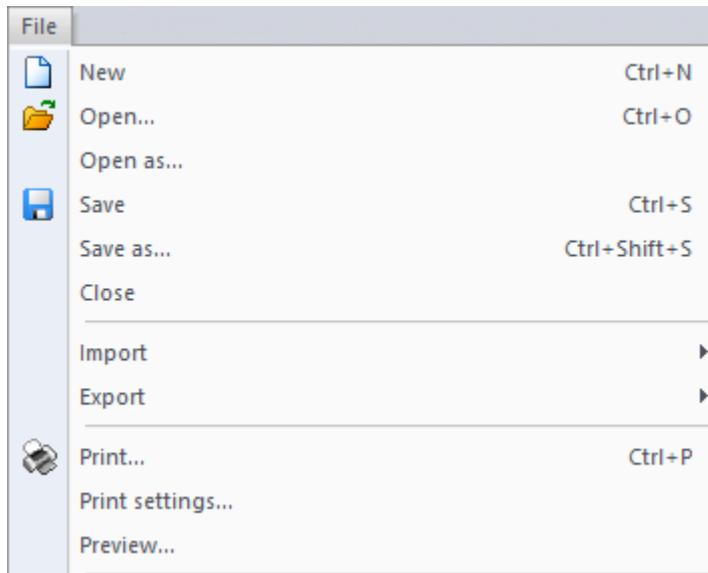


Fig. 15. *Menu «File»*

«*Edit*» menu (Fig. 16) contains following items:
 «*Step backward*» – undo the last user operation;
 «*Step forward*» – redo the most recent action that you undid;
 «*Cut*» – cut the object;
 «*Copy*» – copy object into the clipboard;
 «*Copy to standard buffer*» copy object into the standard buffer;
 «*Insert*» – insert copied or cut object;
 «*Preferences*»:
 «*Keyboard shortcuts*» – change key bindings;
 «*Color settings*» – adjust color settings;
 «*Set the default settings*»
 «*Document properties*» – view file properties;

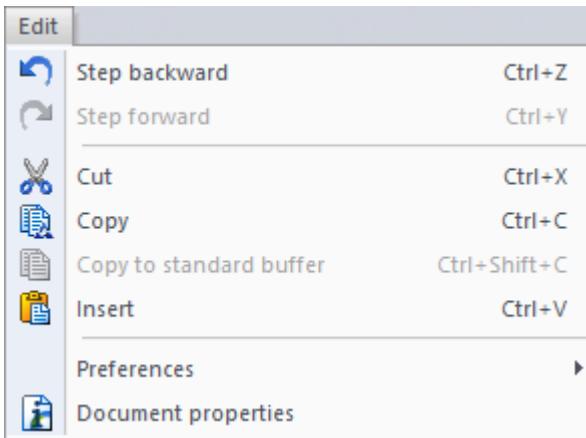


Fig. 16. *Menu «Edit»*

«Image» menu (Fig. 17) contains following items:

«Image information» – view information about the image;

«Open passport..» – open image using metadata file;

«Create a composite..» – form a composite image out of separate color bands;

«Build pyramid»;

«Edit mode» – make a layer editable;

«Copy area» – copy selected area:

Copy area with smoothing – copy selected area into new document with alpha channel;

Copy area without smoothing – copy selected area into new document without alpha channel;

«Delete area» – delete selected area;

«Pixel type» – change puxel type:

«1 unsigned byte (8 bits)»;

«1 signed byte (8 bits)»;

«2 unsigned byte (16 bits)»;

«2 signed byte (16 bits)»;

«4 unsigned byte (32 bits)»;

«4 signed byte (32 bits)»;

«Real number»;

«Double-precision real number»;

«Complex number»;

«Double-precision complex number»;

«Composit suite»;

«Filter» – apply filter to the image:

«Pixels correction» – perform pixel correction;

«Frequency filtering» – increase image quality using frequency filtering algorithm:

 «Direct Fourier transform»;

 «Inverse Fourier transform»;

 «Operation with Filter...»;

 «Algorithm...» – change image's sharpness and eliminate motion blur;

 «Noise» – perform noise filtering:

 «Median...» – apply median filter;

 «Noise elimination...» – eliminate the noise on the image;

 «Add noise...» – add noise;

 «Despeckle noise...» – eliminate the noise on the radar image;

 «Majority filter...» – filter by pixel groups;

 «Noise settings...» -plot the assay of noise level to brightness relation;

 «Sharpen» – perform image sharpening;

 «Sharpen...» – apply sharpening filter;

 «Sharpen more...» – apply sharpening filter;

 «Sharpen more (Laplacian)...» – sharpen image using Laplacian algorithm;

 «Unsharp mask...» – sharpen image using unsharp mask;

 «Blur» – add and eliminate blur;

 «Blur...» – apply blurring filter;

 «Motion blur...» – add motion blur;

 «Radial blur...» – add radial blur;

 «Removal blurring...» – eliminate motion blur at an arbitrary angle;

«Editable»:

 «Arbitrary mask...» – create an arbitrary filter mask;

«Others»:

 «High pass...» – accentuate of color contrast;

 «Minimum...» – accentuate minimum pixel brightness values;

 «Maximum...» – accentuate maximum pixel brightness values;

 «Average...» – calculate average brightness values;

«Stylize»:

 «Bas relief...» – bas-relief filter;

 «Emboss...» – emboss filter;

 «Contours» – accentuate outlines of the objects on the image by detecting areas of drastic brightness changes:

«Find edges...»;
«Marr-Hildreth edge detection...»
«Contour shading...»
«Edge detection (Sobel)...»
«Canny edge detector ...»
«*Distort*» – distort filter:
«Glass...»;
«Waves...»;
«*Textures*» – texture filter:
«Triangles...»;
«Honeycomb...»;
«Mosaic...»;
«Tiles...»;
«Styles»:
«*Cutout*...» – select the color according to the set level;
«*De-interlace*...» – filter image by even and odd rows;
«*Morphology*» – morphological operations:
«Segmentation»;
«Skeletonization»;
«Skeleton vectorization»;
«*Correction*» – perform image correction:
«Auto Levels» – perform color bands correction;
«*Auto Contrast*» – perform automatic contrasting;
«*Auto Colors*» – perform automatic color correction;
«*Brightness/Contrast*...» – perform brightness and contrast correction;
«Color Management...»;
«*Invert*» – inverse colors;
«*Curves*...» – adjust points throughout an image's tonal range for selected bands and for each band separately;
«Hue/Saturation...»;
«*Histogram*...» – correct histogram;
«*Gradient*» – image gradient:
«Apply Gradient»;
«Remove Gradient»;
«Load Gradient»;

«Save Gradient»;

«Adjust Gradient»;

«*Pixel values scale...*» – set pixel value scale;

«*Fill*» – apply solid or gradient fill;

«*Fill the area*»;

«*Gradient filling*»;

«*Edit image*»:

«*Size...*» – change image size;

«*Rotation*» – rotate image:

«*Left (90)*.» –rotate 90 clockwise;

«*Right (90)*.» – rotate 90 counterclockwise;

«*Rotate 180*» – rotate 180;

«*Flip horizontal*» – flip image horizontally;

«*Flip vertical*» – flip image vertically;

«*Arbitrary rotation*» – rotate image at arbitrary angle;

«*Crop*»:

«*Cropping*» – crop selected area;

«*Cropping by selection*» – crop image by rectangular selection;

«*Scaling and alignment*» – scale and align image;

«*Place image*» – change image shape, size and placement;

«*Color Range..*» – apply color range to *Grayscale image*;

«*Crosscalibration*» – pixel by pixel analysis;

«*Color model*» – select color model:

«*Model Grayscale*»;

«*Model RGB*»;

«*Model Lab*»;

«*Model HSB*»;

«*Model HLS*»;

«*Model CMYK*»;

«*Color profile setting...*»;

«*Union multi-channel data*» – band by band merge of multispectral data:

«*Merge down*»;

«*Merge visible*»;

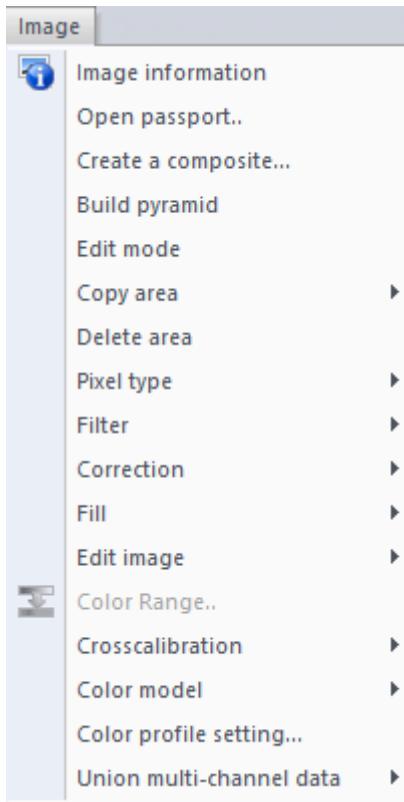


Fig. 17. *Menu «Image»*

«Preliminary processing» menu (Fig. 18) contains following items:

«Atmospheric correction»:

«General» – calculation of surface reflection;

«Atmospheric model» – atmospheric correction according to atmospheric transmission plot;

«Create quicklook...» – create quicklook»;

«Pansharpening...» – image pansharpening;

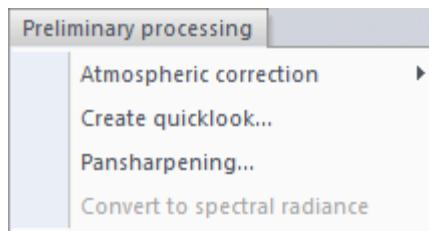


Fig. 18. *Menu «Preliminary processing»*

«Geography» menu (Fig. 19) contains following items:

«Measurements» – perform measurements on the image;

«Geocoding» – raster and vector data georeferencing;

«Table...» – creat a set of reference points;

«Parametres...» – set georeferencing parameters;
 «Snapping to grid (MODIS)» – perform georeferencing for MODIS data;
 «Update image georeferencing...» – set of tools for automatic georeferencing.
 «Positioning» – coordinate positioning;
 «Projection manager...» – create and edit projections;
 «Geocalculator...» – converse coordinates from one projection to another;

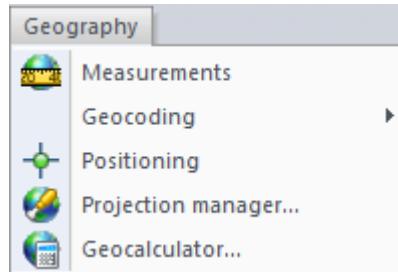


Fig. 19. Menu «Geography»

«Thematic processing» menu (Fig. 20) contains following items:

«Index calculation» – calculate indices:
 «TVDI»;
 «NDSI»;
 «Image classification»:
 «Supervised classification...»;
 «K-MEANS...»;
 «Fuzzy clustering...»;
 «Spectral analysis»:
 «Graph...» – view spectrum charts;
 «Table...» – create set of points for analyzing spectrum charts;
 «Texture analysis ...» – set of tools for texture analysis;

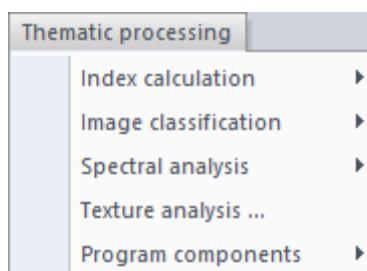


Fig. 20. Menu «Thematic processing»

«Vector» menu (Fig. 21) contains following items:

«*Table*» – set of tools for attribute table management:

 «*View attributes*» – view and edit attribute table;

 «*Rebuild...*» – refresh attribute table;

 «*Update column...*» – fill the column of attribute table with data (text, area, perimeter, object's center coordinates);

 «*Statistics column...*» – statistics for selected column;

 «*Export to CSV...*»;

 «*Requests*» – select objects:

 «*Selection by attributes value...*» – select vector objects using SQL requests;

 «*Display in current window*» – display selected vector objects in a current window;

 «*Display in all windows*» – display selected vector objects in all windows;

 «*Classifier...*» – create and apply vector objects classifier;

 «*New object*» – create new vector object:

 «*Point*» – create vector point;

 «*Line*» – create vector line;

 «*Polyline*» – create vector polyline;

 «*Rectangle*» – create vector rectangle;

 «*Arbitrary rectangle*» – create vector rectangle at arbitrary angle;

 «*Rectangular polygon*» – create vector rectangular polygon;

 «*Polygon*» – create vector polygon;

 «*Circle*» – create vector circle;

 «*Ellipse*» – create vector ellipse;

 «*Text*» – create vector text;

 «*From nodes*» – create vector objects from combination of angle coordinates;

 «*Edit*»:

 «*Add and modify unit*» – add node and modify vector object's boundaries;

 «*Combine*»:

 «*Addition*» – merge two vector objects into one;

 «*Subtraction*» – subtract one vector object from another;

 «*Intersection*» – create vector objects on the area of overlapping of two objects;

 «*Exclusion*» – create vector objects which excludes the area of intersection of two objects;

 «*Delete*» – delete selected vector object;

 «*Move...*» – set move parameters for selected vector object;

 «*Rotation...*» – set rotation parameters for selected vector object;

«Convert to line» – covert vector polygon boundaries into plolyline;
«Convert to polygon» – convert polyline to vector object;
«Convert to point» – convert vector polygon to vector point;
«Convert vector to selections» – convert vector objects to selections;
«Merge» – merge vector objects of similar type into one:
«Merge points» – merge vector points into one object;
«Merge lines» – merge vector lines into one object;
«Merge poligons» – merge vector polygons into one object;
«Smoothing...» – smooth edges of polygons and polylines;
«Split layer by object type» – divide the layer by types of vector objects: markers, lines, polygons, text;
«Split objects» – divide complex polygon into separate discontiguous objects;
«Cut off objects» – cut off vector objects outside the selection;
«Intersection of polygons...»;
«Smoothing methods..» – set of tools for smoothing edges of vector objects;
«Cut polygon by line» – cut polygon by line;
«Cut lines» – cut vector lines;
«Extend/cut line» – extend or cut vector line;
«Extend/cut lines» – extend or cut vector lines;
«Generalization» – set of tools for vector polygon's edges generalization;
«Styles» – set style for vector objects:
«Line style» – set style for vector line;
«Marker style» – set style for vector marker;
«Polygon style» – set style for vector polygon;
«Text style» – set style for vector text;
«Object» – select style of vector object;
«Apply style» – apply style to selected object;
«Select objects» – select vector objects:
«Select element» – select vector objects;
«In rectangle» – select vector objects within rectangle;
«In circle» – select vector objects within circle;
«In polygon» – select vector objects within polygon;
«Select all objects» – select all vector objects of the layer;
«Deselect» – deselect;
«Invert selection» – invert selection;

«*In select area*» – select vector objects within selection;
 «*Buffer zones*» – generate buffer zone of the vector objects;
 «*Standarts buffer zones...*» – select standard buffer zone size from the list;
 «*Buffer zones...*» – set the size of buffer zones;
 «*Buffer zones intersecting objects...*» – generate buffer zones according to attribute table values;
 «*Information*» – view information about vector object;
 «*Algorithms*» – ranking the density of vector objects;

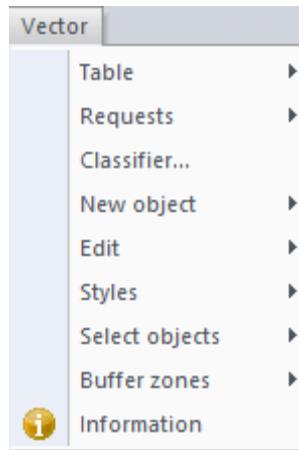


Fig. 21. *Menu «Vector»*

«*Selection*» menu (Fig. 22) contains following items:

2.1.1. «*Select color range...*» – select pixels of particular brightness values;
 «*Create selection*»:
 «*Rectangle selection*» – create rectangular selection;
 «*Polygonal selection*» – create polygonal selection;
 «*Circle selection*» – create circular selection;
 «*Ellipse selection*» – create elliptical selection;
 «*Arbitrary selection*» – create selection of arbitrary shape;
 «*Selection “magnetic lasso”*» – edge detection selection;
 «*Color range*» – create selection of color range;
 «*Selection*» – selection;
 «*Edit*» – edit selection;
 «*Edit selection*» – modify selection shape;
 «*Invert selection*» – inverse selection;
 «*Addition of selections*» – combine two selections;
 «*Subtraction of selection*» – subtract one selection from another;

«*Intersection*» – create selection on the area of overlapping of two selections;
 «*Exception of selection*» – create selection which excludes the area of intersection of two selections;
 «*Expanding / Narrowing*» – evenly expand or narrow selection;
 «*Convert to vector*» – transform selection into vector object;
 «*Addition of all selections*» – combine all selections;
 «*Selection smoothing...*» – smoothen the edges of selection;
 «*Choose layer*» – select all selections in the layer;
 «*Fit active selection into screen*»;
 «*Delete current selection*» – delete current selection;
 «*Delete all selections*» – delete all selections in the layer.
 «*Select corners of the image*» – create selection to delete the empty corners of the image;

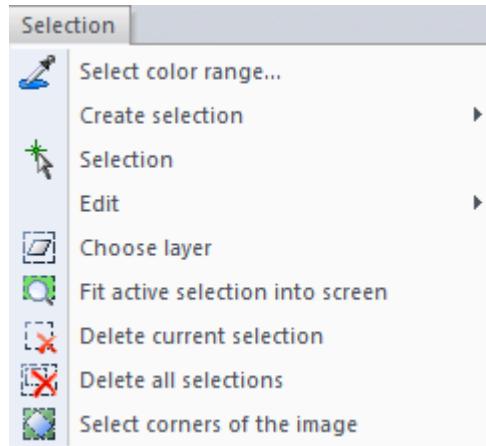


Fig. 22. *Menu «Selection»*

«*Layers*» menu (Fig. 23) contains following items:

«*New*» – create new layer;
 «*Raster*» – create new raster layer;
 «*Vector*» – create new vector layer;
 «*Georeference*» – create new georeferencing layer;
 «*Text layer*» – create new text layer;
 «*Selection*» – create new selection layer;
 «*From file*» – add data from file into new layers;
 «*From Directory...*» – upload files from selected directory;
 «*Duplicate*» – duplicate selected layer;
 «*Delete*» – delete selected layer;

«*Merging*» – merge layers of the same type down, merge visible layers, and merge layers of the same name:

«*Down layer*»

«*All visible*»

«*Same name*»

«*Same name*»

- «*External sources*» – upload data from external sources:

«*Google Maps*»;

«*Meteorological data*» – upload data from selected source;

- «*Web Services*» – connect to cartographic services;
- «*WMS*» – upload data from Web Map Services;
- «*WFS*» – upload vector data from Web Feature Services;

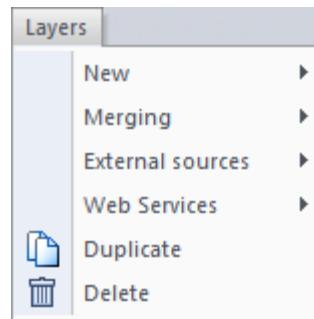


Fig. 23. *Menu «Layers»*

«*Modules*» menu (Fig. 24) contains following items:

«*Cutting...*» – set parameters for cutting raster images;

«*Batch Processing...*» – perform batch processing;

«*External modules*» – work with external modules:

- «*Run an external module...*»;
- «*External modules settings...*»;

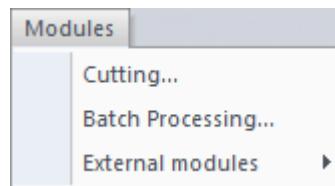


Fig. 24. *Menu «Modules»*

«*View*» menu (Fig. 25) contains following items:

«*Design elements*» – display map design elements:
 «*Compass*»;
 «*Scalebar*»;
 «*Graticule*»;
 «*Diagram*»;
 «*Legend*»;
 «*Reports*»:
 «*New*» – create new report;
 «*Generate*» – generate report;
 «*Save...*» – save report;
 «*Update*» – update report;
 «*Column statistics...*» – add statistical data;
 «*Color line*» – add color grid;
 «*Metadata*» – add information from metadata
 «*Attributes table*» – add information from attribute table;
 «*Scale*» – change scale:
 «*Zoom In*» – zoom in;
 «*Zoom Out*» – zoom out;
 «*Actual scale*» – display the actual size of the image;
 «*Fit into screen*» – fit the image into screen;
 «*Fit into screen*» – fit the layer into screen;
 «*Detailed view mode*» – detailed view mode:
 «*Detailed viewing window*» – open detailed view window;
 «*Detailed view window (tile)*» – place two detailed view windows alongside;
 «*Detailed view window (tile 3)*» – place three detailed view windows alongside;
 «*Detailed view window (tile 31)*» – place three detailed view windows alongside;
 «*Load configuration*» – place detailed view windows according to custom configuration;
 «*Save configuration*» – save detailed view windows' custom configuration;
 «*Close detailed view window*».
 «*Redraw window*»;
 «*Previous window view*» – return to the previous window view;
 «*Next window view*» – revert to the next window view;
 «*Window capture*» – save window view into file;
 «*Magnifying glass*» – enlarge the area under the cursor;
 «*Area of interests*» – select the area of interest to display in the report;

«Grid» – visualize grid;

«Rulers»;

«Grid»;

«Free ruler»;

«Blind» – hide the part of the current layer to view the bottom layer.

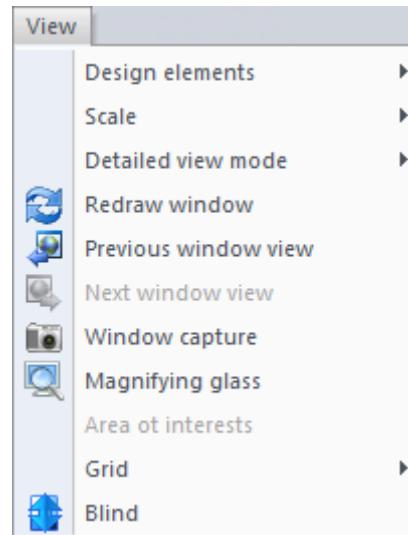


Fig. 25. *Menu «View»*

«Window» menu (Fig. 26) contains following items:

«New Window» – display document in a new window;

«Cascade» – cascade windows arrangement;

«Vertical tile» – arrange windows alongside vertically;

«Horizontal tile» – arrange windows alongside horizontally;

«Sort» – sort windows;

«Close all documents» – close all documents;

«Display tabbed» – display all opened windows tabbed;

«Tools» – display tools:

«File» – tool panel for file management (open, save, close, etc.);

«Image» – tool panel for image processing;

«Geography» – tool panel for georeferencing;

«Vector requests» – tool panel for vector objects selection with SQL requests;

«Brushes» – tool panel for painting with brushes;

«View» – tool panel for scaling and detailed view;

«Design elements» – tool panel for reports creation;

«Selection» – tool panel for work with selections;

«*Vector tools*» – tool panel for vector objects creation;
«*Text*» – tool panel for work with text;
«*Vectorization*»;
«*Working set*» – tool panel which contains the most frequently used tools;
«*Settings*»;
«*Panels*» – display panels:
«*Colors*» – display color adjustment panel;
«*File Browser*» – display file browser;
«*History*» – display user actions history panel;
«*Layers*» – display layers panel;
«*Color bands*» – display color bands panel;
«*Layer properties*» – display layer properties panel;
«*Navigator*» – display navigator;
«*Info*» – display info panel;
«*Operations*» – display user actions record panel;
«*Settings*» – display settings panel;
«*Status panel*» – display status panel;
«*Style*» – select user interface style:
«*Wimdwos 2000*»;
«*Office XP*»;
«*Wimdwos XP*»;
«*Office 2003*»;
«*Visual Studio 2005*»;
«*Visual Studio 2008*»;
«*Wimdwos 7*»;
«*Office 2007*»:
«*Blue Style*»
«*Black Style*»
«*Silver Style*»
«*Aqua Style*»
«*Log*» – visualize user actions log;
«*Windows*» – manage opened windows;

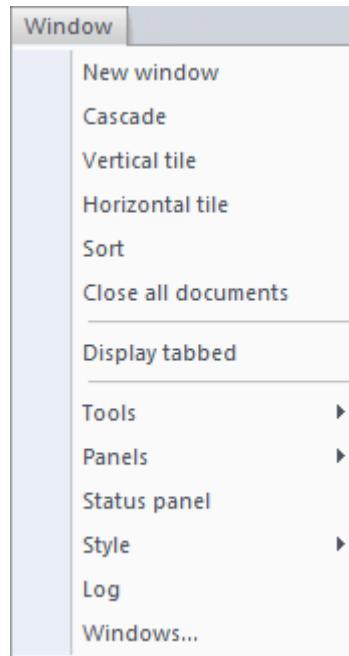


Fig. 26. *Menu «Window»*

«Help» menu (Fig. 27) contains following items:

- «IMC Help»;
- «Program information...»;
- «Methods»:
- «Management...»;
- «Methods...»;
- «Set edition of the program ...».

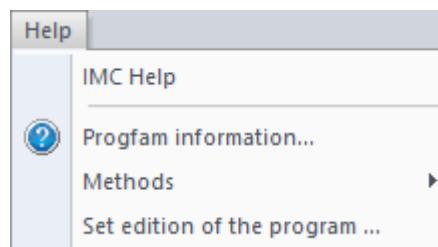


Fig. 27. *Menu «Help»*

To select a menu item and enter the relevant section of this item, the user should use the standard methods of Windows applications operation (using the mouse or navigation keys)

4.2. Tool panels

To display tool panels select «Windows – Tools» menu item (Fig. 28). Select the panel you want to display from the list. Active panels are marked with the check mark.

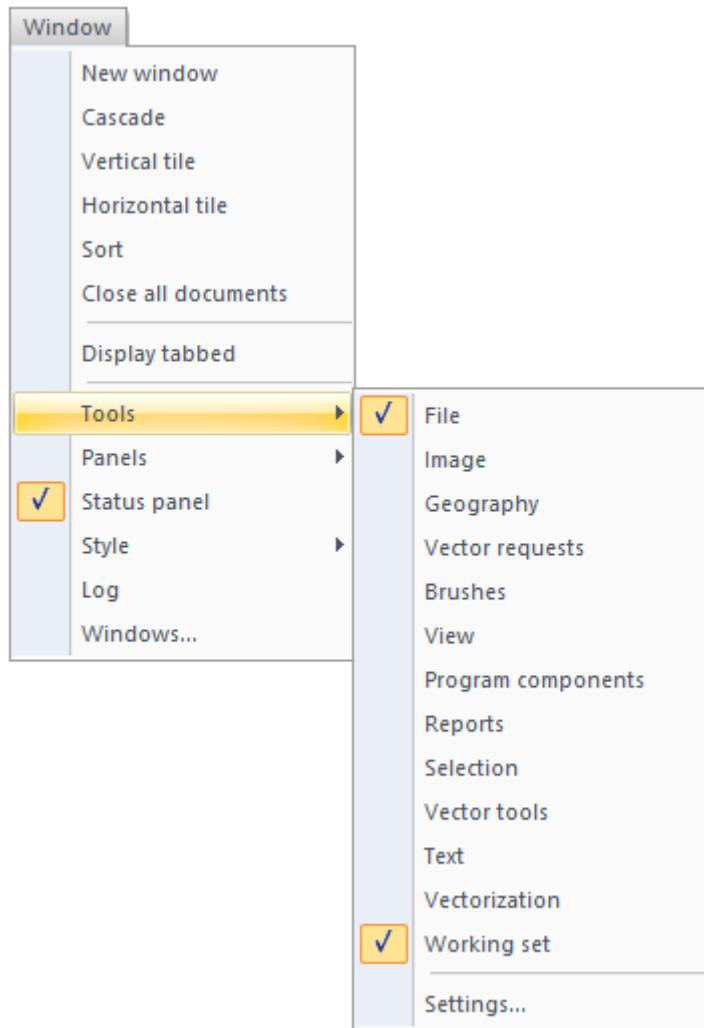


Fig. 28. *Menu «Window» – «Tools»*

4.2.1. Tool panel «File»

Tool panel «File» (Fig. 29) by default contains main items of «File» and «Edit» menus.



Fig. 29. *Tool panel «File»*

Table 1 shows the description of the items of «File» tool panel.

Table. 1. *Description of the items of «File» tool panel*

Item name	Icon	Description
«New»		Open window to set parameters of new document.
«Open»		Open window to select directory, file name and type.
«Save»		Save file.
«Undo»		Undo the last user operation.
«Redo»		Redo the most recent action that you undid.
«Cut»		Cut selected objects
«Copy»		Copy selected object to clipboard.
«Paste»		Insert copied or cut object from clipboard.
«Print...»		Print document. Open window to set the printing parameters.
«About program...»		View information about the software.
«Help»		View help.
«Document properties»		View information about the document.

4.2.2. Tool panel «Image»

Tool panel «Image» (Fig. 30) contains main items of «Image» menu and designed for quick access to them.



Fig. 30. *Tool panel «Image»*

Table 2 shows the description of the items of «Image» tool panel.

Table. 2. *The description of the items of «Image» tool panel*

Item name	Icon	Description
«Copy area with smoothing»		Copy selected area to a new window. If areas are selected, the will be copied.
«Pixel correction»		Open window with pixel values table, color bands name and values range.
«Crop»		Copy the part of the image to a new document. Press and hold the left mouse button while selecting the region of interest on the image, then press keyboard button «Enter» or «Crop» button on the panel.
«Brightness/Contrast»		Open dialog box to correct brightness and contrast of the image.
«Color Management»		Open dialog box to manage color bands of the image.
«Invert»		Invert colors of the image.
«Curves»		Open dialog box to edit brightness distribution curves.
«Histogram»		Open dialog box to edit histogram.
«Color range»		Open dialog box to adjust color range for Grayscale image.
«Image Information»		View information about the image.
«Place Image»		Change placement of one or more layers of the document. Press and hold left mouse button while dragging the layer to the necessary spot.
«Fill the area»		Fill the area with selected color.
«Gradient filling»		Apply gradient to a raster layer.

4.2.3. Tool panel «Geography»

Tool panel «Geography» (Fig. 31) contains main items of «Geography» menu and designed for quick access to them.

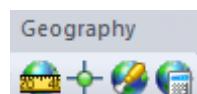


Fig. 31. *Tool panel «Geography»*

Table 3 shows the description of the items of «Geography» tool panel.

Table. 3. *The description of the items of «Geography» tool panel*

Item name	Icon	Description
«Measurements»		Open dialog box to perform measurements on the image.
«Positioning»		Position the image relative to entered coordinates.
«Projection manager»		Open «Projections» dialog box.
«Geocalculator»		Open «Geocalculator» dialog box to change map projection.

4.2.4. Tool panel «Vector requests»

Tool panel «*Vector requests*» contains main items of «*Image*» menu and designed for quick access to them.



Fig. 32. *Tool panel «Vector requests»*

Table 4 shows the description of the items of «*Vector requests*» tool panel.

Table. 4. *The description of the items of «Vector requests» tool panel*

Item name	Icon	Description
«The attributes of vector objects»		Open attribute table.
«Select element»		Select element. Press keyboard button «Ctrl» to select multiple objects.
«Select objects in rectangle»		Select objects within a rectangle.
«Select objects in circle»		Select objects within a circle.
«Select objects in polygon»		Select objects within a polygon.
«Select all objects»		Select all objects in a current vector layer.
«Deselect»		Deselect.
«Invert selection»		Invert selection.
«Select all objects in the area»		Select vector objects within selection borders.
«Vector objects information »		View information about selected vector objects.

4.2.5. Tool panel «Brushes»

Tool panel «*Brushes*» (Fig. 33) is designed for quick access to tools for painting and pinpoint image editing.



Fig. 33. *Tool panel «Brushes»*

Table 5 shows the description of the items of «Brushes» tool panel.

Table. 5. *The description of the items of «Brushes» tool panel*

Item name	Icon	Description
«Line»		Draw lines.
«Brush»		Draw arbitrary lines of selected color, width and shape.
«Stamp»		Draw arbitrary lines, color of which replicates the pixels of the image at a selected area. Point the cursor at the image area you want to paint with, hold down «Ctrl» key, then mouse-click to select the source point for cloning.
«Eraser»		The Eraser tool changes pixels to either the background color or to transparent.
«Burn»		Darkens the area of the image.
«Lighting»		Lightens the area of the image.
«Blur»		Blurs the area of the image
«Sharp»		Sharpens the area of the image
«Sponge»		Saturates/desaturates the area of the image

4.2.6. Tool panel «View»

Tool panel «View» (Fig. 34) contains main items of «View» menu and designed for quick access to them.



Fig. 34. *Tool panel «View»*

Table 6 shows the description of the items of «View» tool panel.

Table. 6. *The description of the items of «View» tool panel*

Item name	Icon	Description
«Cursor»		Use cursor as a pointer.
«Actual scale (1:1)»		Show actual size of the image.
«Scale»		Change image's scale. Press and hold left mouse button while scrolling the mouse wheel to zoom in. Press and hold left mouse button together with «Ctrl» key while scrolling the mouse wheel to zoom out. To scale the image while using other tools use mouse wheel.
«Manually scrolling»		Navigate the image manually.
«Fit into screen»		Fit the image in the current size of the window.
«Fit into screen»		Fit the layer in the current size of the window.
«Detailed view window».		Open detailed view window
«Detailed view window (tile)»		Place detailed view window alongside the original image.
«Detailed view window (tile 3)»		Display two detailed view windows and place them to the left of the original image.
«Detailed view window (tile 31)»		Display two detailed view windows and place them to the right of the original image.
«Load configuration»		Load the custom configuration of detailed view windows placement and scale factors.
«Save configuration».		Save the custom configuration of detailed view windows placement and scale factors.
«Close detailed view window»		Close all detailed view windows.
«Redraw window».		Redraw the window.
«Previous window view»		Return to the previous window view.
«Next window view»		Switch to the next window view.
«Window capture»		Capture the screenshot of the image or user interface.
«Magnifying glass»		Move cursor over the area you want to zoom in.
«Synchronize views»		Synchronize the view between different windows
«Blind»		Make the part of the current layer transparent to view the background layer

4.2.7. Tool panel «Reports»

Tool panel «Reports» (Fig. 35) duplicates items of «View»-«Design elements»-«Reports» menu and is designed for quick access to them.

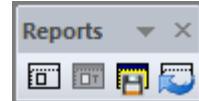


Fig. 35. *Tool panel «Reports»*

Table 7 shows the description of the items of «Reports» tool panel.

Table. 7. *The description of the items of «Reports» tool panel*

Item name	Icon	Description
«New report»		Create new report template.
«Generate report»		Generate report based on the report template and opened documents.*
«Save report»		Save report in *.jpeg or *.pdf file format.
«Update report»		Update report based on the opened documents.

* To update the information in the previously created report template, press «Update report» button before generating the report.

4.2.8. Tool panel «Selection»

Tool panel «Selection» (Fig. 36) contains main items of «Selection» menu and designed for quick access to them.



Fig. 36. *Tool panel «Selection»*

Table 8 shows the description of the items of «Selection» tool panel.

Table. 8. *The description of the items of «Selection» tool panel*

Item name	Icon	Description
«Choose selection»		Choose any of the existing selections.
«Select all layer».		Select the whole layer.
«Rectangle selection»		Create rectangular selection.
«Polygonal selection»		Create polygonal selection.
«Circle selection»		Create circular selection.
«Ellipse selection»		Create elliptic selection.
«Arbitrary selection»		Create arbitrary selection.
«Selection «magnetic lasso»		Draw freeform segments of a selection border.
«Color range»		Select color range.
«Edit selection»		Edit selection boundaries.
«Invert selection»		Invert selection.
«Addition of selections»		Combine two selections.
«Subtraction of selections»		Subtract one selection from another.
«Intersection of selections»		Create new selection on the area of overlapping of two existing selections.
«Exception of selections»		Create new selection on the area which excludes the area of intersection of two existing selections.
«Show active selections»		Fit current selection into screen.
«Narrowing / expanding»		Expand or narrow current selection.
«Convert to vector»		Transform selection into vector object.
«Convert vector to selections»		Transform vector object into selection
«Addition of all selections»		Combine all selections in the layer.
«Delete current selection»		Delete current selection.
«Delete all selections»		Delete all selections.

4.2.9. Tool panel «Vector tools»

Tool panel «*Vector tools*» (Fig. 37) contains main items of «*Vector*» menu and designed for quick access to them. See the detailed description of «*Vector*» menu in clause 3.1.3.



Fig. 37. *Tool panel «Vector tools»*

Table 9 shows the description of the items of «*Vector tools*» tool panel.

Table. 9. *The description of the items of «Vector tools» tool panel*

Item name	Icon	Description
«Line style choice»		Open dialog box with line style settings.
«Marker style choice»		Open dialog box with point style settings.
«Polygon style choice»		Open dialog box with polygon style settings.
«Text style choice»		Open dialog box with text style settings.
«Pick object's style»		Pick the style of existing vector object.
«Apply style to selected objects»		Apply the sampled style to selected vector objects
«Point»		Create a vector point (marker).
«Line»		Draw vector line.
«Polyline»		Draw vector polyline.
«Rectangle»		Create vector rectangle.
«Arbitrary rectangle»		Create vector rectangle at an arbitrary angle.
«Rectangular polygon»		Create rectangular vector polygon.
«Polygon»		Create vector polygon.
«Circle»		Create vector circle.
«Ellipse»		Create vector ellipse.
«Text»		Add vector text.
«Add and modify unit»		Display and modify nodes of the vector borders.
«Addition»		Merge two vector objects into one.
«Subtraction»		Subtract one vector object from another.
«Intersection»		Create vector objects on the area of overlapping of two objects.
«Exclusion»		Create a vector object which excludes the area of intersection of two objects.
«Delete»		Delete vector object

4.2.10. Tool panel «Text»

Tool panel «Text» (Fig. 38) is designed to add text.



Fig. 38. *Tool panel «Text»*

4.2.11. Tool panel «Vectorization»

Tool panel «Vectorization» (Fig. 39) contains tools for vector objects' modification.

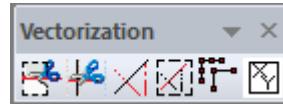


Fig. 39. *Tool panel «Vector requests»*

Table 10 shows the description of the items of «Vectorization» tool panel.

Table. 10. *The description of the items of «Vectorization» tool panel*

Item name	Icon	Description
«Cut polygon by lines»		Cut polygon by line
«Cut lines»		Cut vector lines
«Cut/extend line»		Extend or cut vector line
«Cut/extend lines»		Extend or cut vector lines
«Generalization»		Decreasing the amount of nods of vector object
«Create object by nodes»		Set of tools for vector polygon's edges generalization

4.2.12. Tool panel «Working set»

Tool panel «Working set» (Fig. 40) contains the most frequently used items from other tool panels. By default this panel contains following tools: «Cursor», «Rectangular selection», «Magnetic lasso», «Line», «Crop», «Text», «Scale» and «Select color combination».



Fig. 40. *Tool panel «Working set»*

It is possible to rearrange the order of items in the tool panel. For that you need to right click on the tool panel to open context menu. «Panel settings» dialog box will open (Fig. 41).

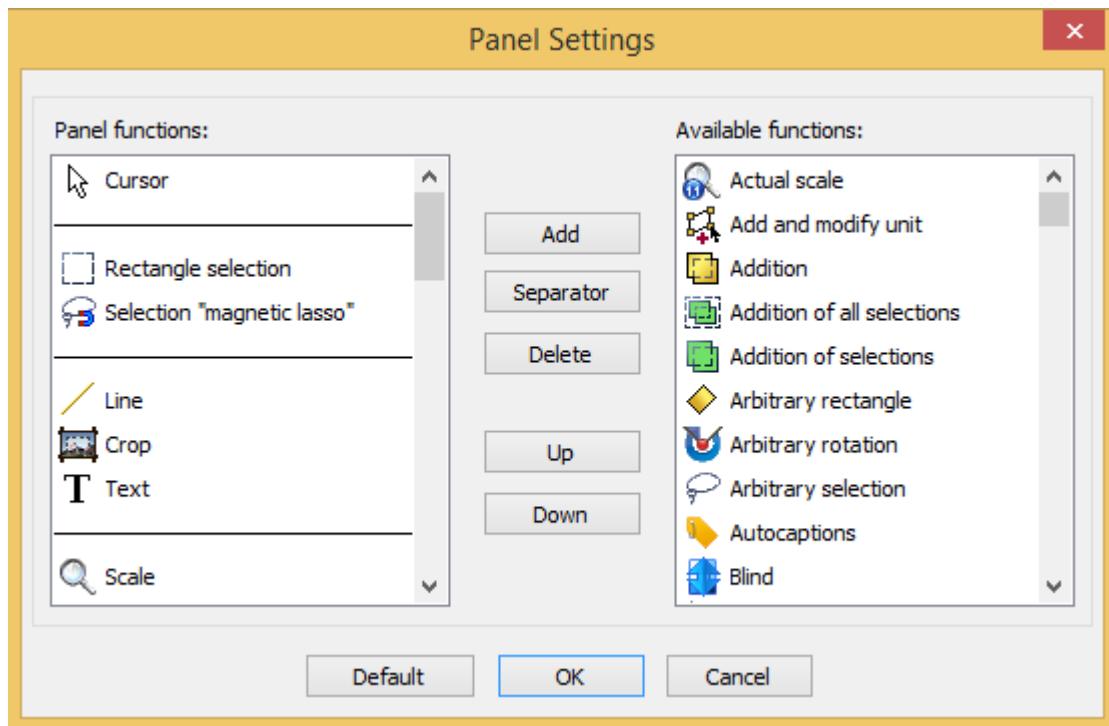


Fig. 41. «Panel settings» dialog box

This dialog box allows user to add, remove and change the order of items and add separators in between of items.

To add an item to the tool panel, select a required item from the «Available functions» list, and then press «Add» button.

To add a separator to the tool panel, select a required item from the «Available functions» list after which you want to place a separator, and then press «Separator» button.

To delete an item or separator, select the required object from the «Available functions» list and press «Delete» button.

You can move items up and down by pressing «Up» and «Down» buttons.

To change the functionality of the tool panel go to «Window» - «Tools» -« Settings...» menu. «Customize» dialog box will open (Fig. 42).

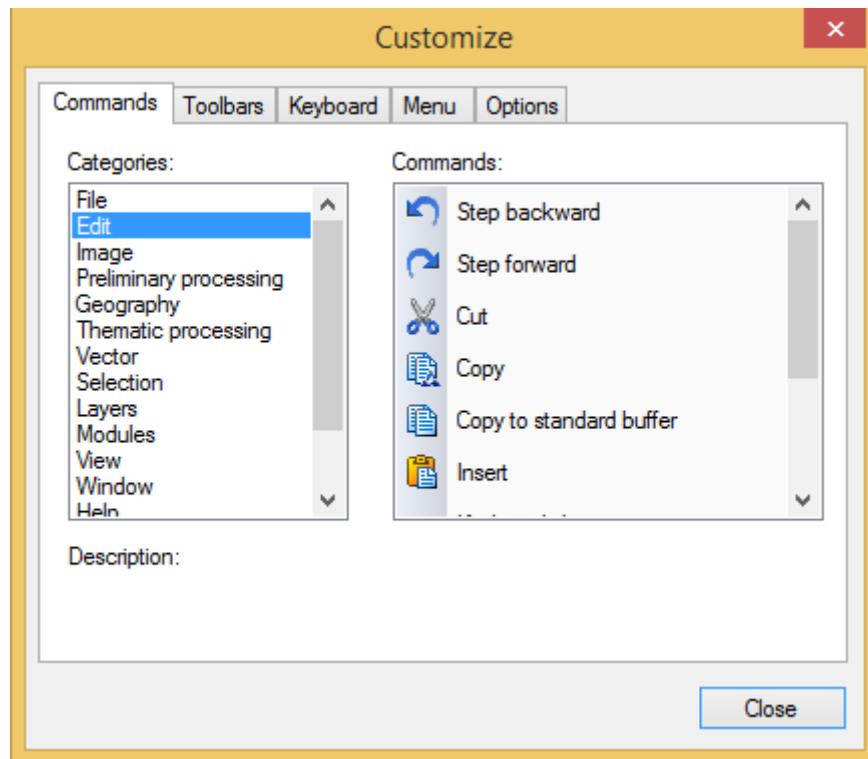


Fig. 42. «Customize» dialog box

Select the required item from the «Commands» list and drag it while holding left mouse button to the tool panel you need.

4.2.13. «Customize» dialog box

To change the functionality of the tool panel go to «Window» - «Tools» - «Settings...» menu. «Customize» dialog box will open (Fig. 43).

Select the required item from the «Commands» list and drag it while holding left mouse button to the tool panel you need.

«Customize» dialog box is designed for arranging program components according to user's needs. User can create custom tool panels, short keys and menus.

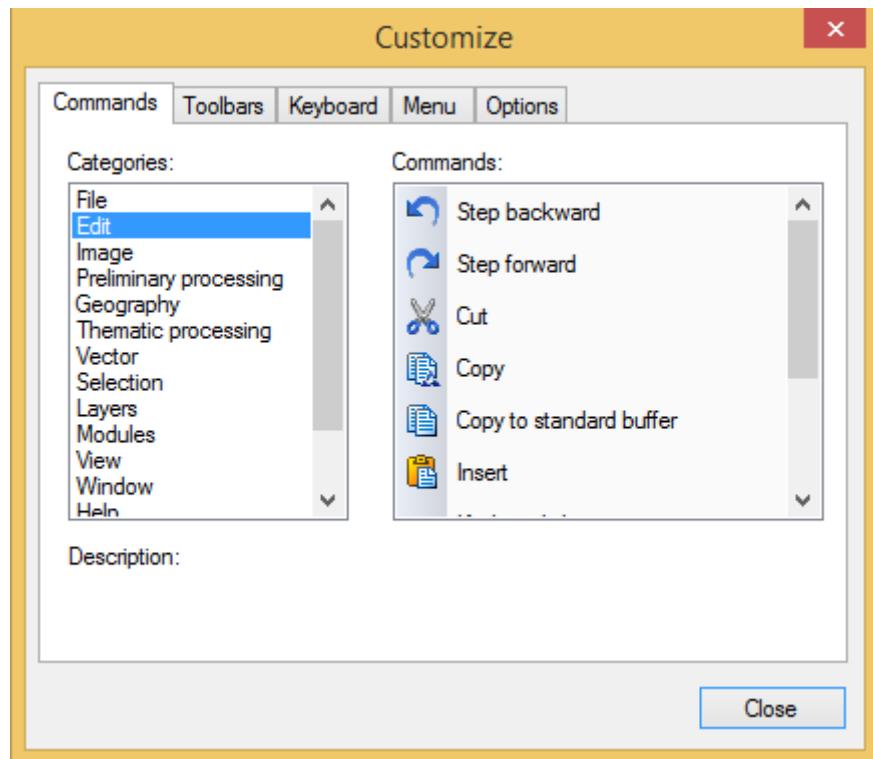


Fig. 43. «Customize» dialog box

«Commands» tab contains menu categories and items related to them (Fig. 44).

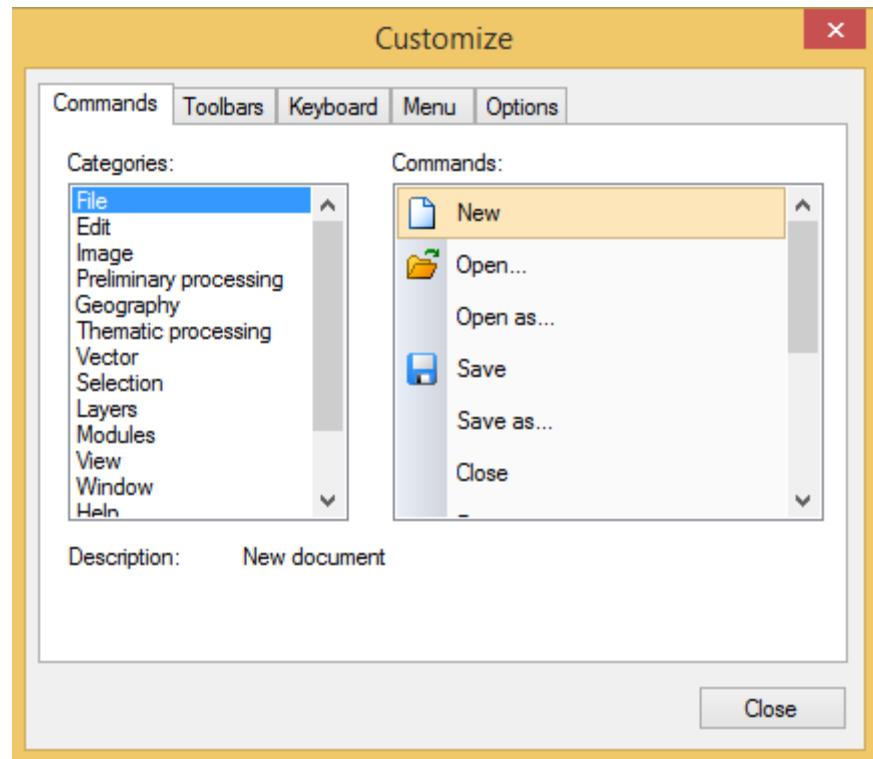


Fig. 44. «Commands» tab

To create a new menu, select «*New menu*» from the «*Categories*» list. Drag «*New menu*» to the required place on the menu bar (cursor icon will change to the following: )

«*Toolbars*» tab contains the list of tool panels which are available in «IMC» software (Fig. 45).

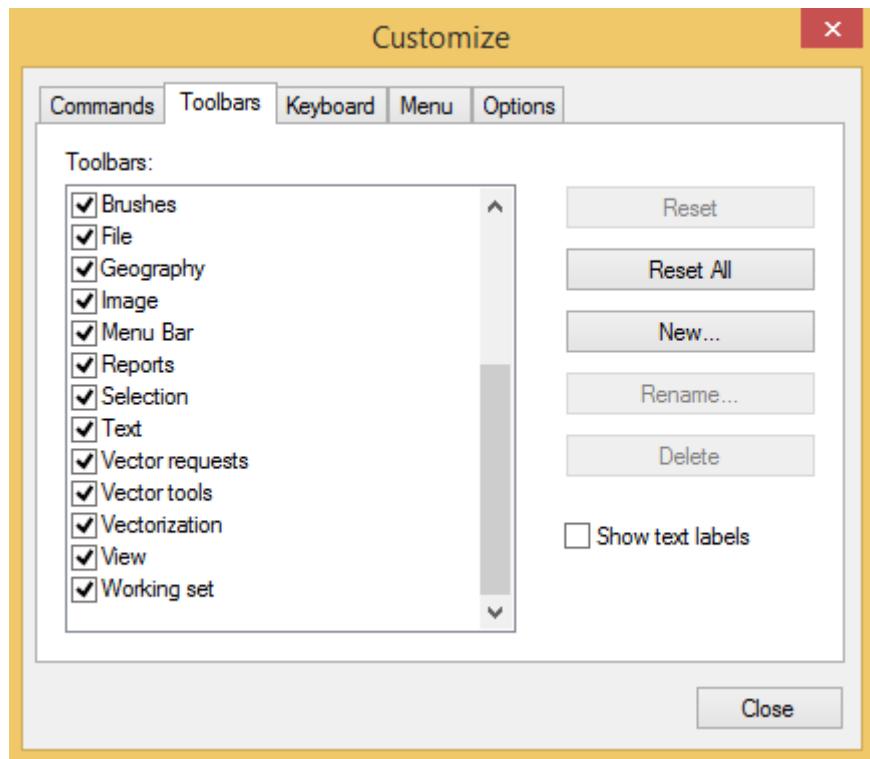


Fig. 45. «*Toolbars*» tab

«*Reset*» button is designed for returning to default settings for selected tool panel.

«*Reset all*» button is designed for returning to default settings for all tool panels.

«*New*» button is designed for creating custom tool panels. Select the name of the new tool panel after pressing the button.

«*Rename*» button is designed for tool panels' name editing. The button is inactive for default panels.

«*Delete*» button is designed for deleting tool panels. The button is inactive for default panels.

«*Show text labels*» parameter is designed for commands' labels visualization. (Fig. 46). The parameter is inactive for «*Menu bar*» panel.

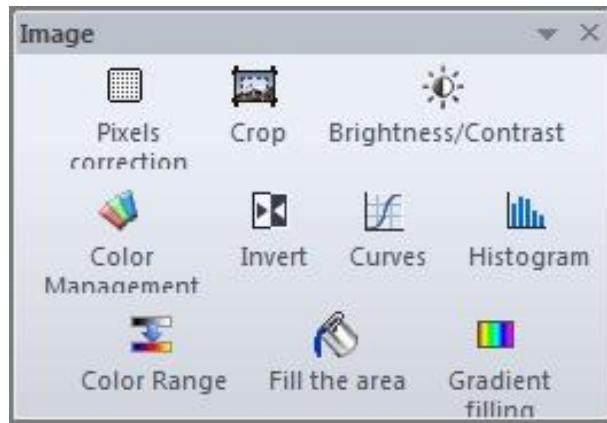


Fig. 46. *Text labels display for «Image» tool panel*

«Keyboard» tab is designed for creating, editing and deleting short keys (Fig. 47).

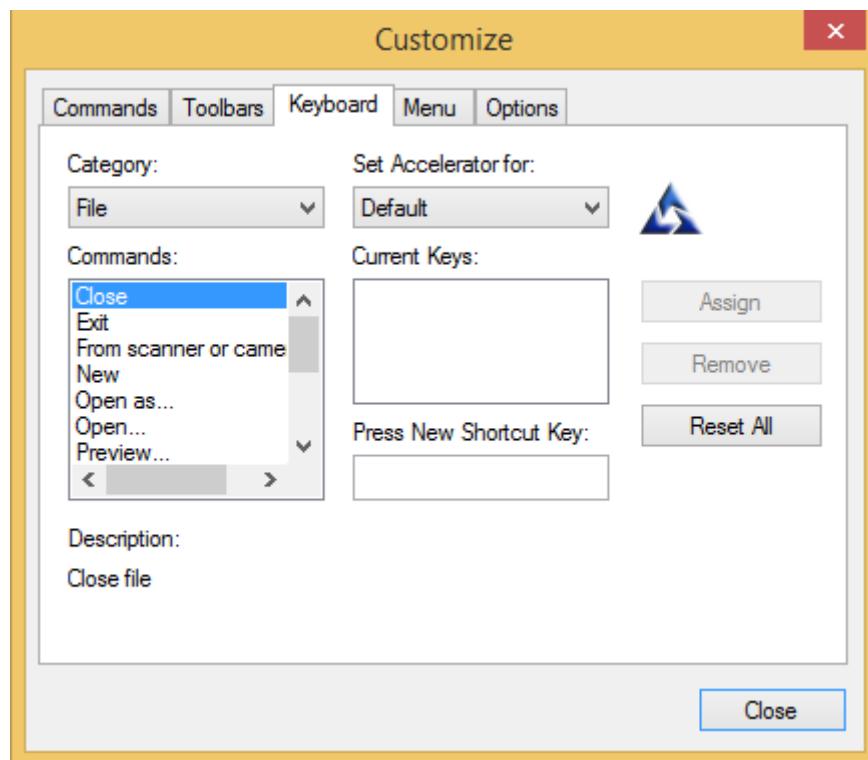


Fig. 47. *«Keyboard» tab*

Select a required category from «Category» drop-down list.

Select an item from «Commands» list, for which you would like to create, edit or delete a short key.

Command description will be displayed in the «Description» bar.

«Current keys» field displays existing short keys for selected command.

Insert the key combination for selected command in «New short key» field, then press «Assign» button. After that, the short key will appear in the «Current keys» field.

Press «Delete» button to remove already existing short key selected in the «Current keys» field.

Change menus preferences in «Menu» tab (Fig. 48).

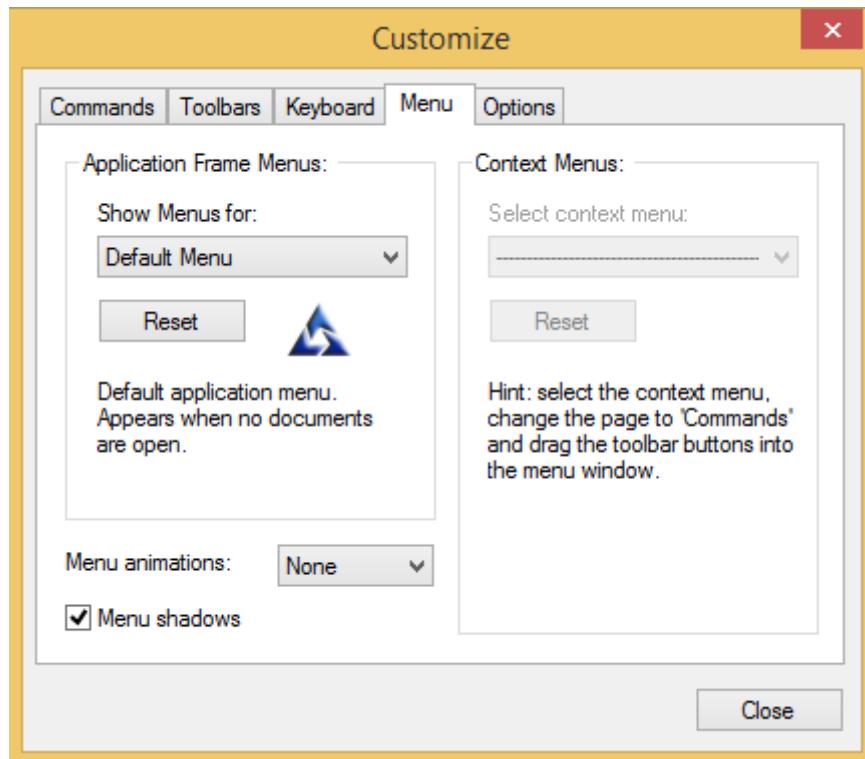


Fig. 48. «Menu» tab

«Options» tab is designed for adjusting the tool panels' display settings (Fig. 49).

When «Show Screen tips on toolbar» parameter is active, tips will appear while moving cursor over the items in tool panels.

When «Show shortcut keys in Screen Tips» parameter is active, short keys will appear while moving cursor over the items in tool panels.

«Large icons» parameter is designed for displaying large icons of items in tool panel.

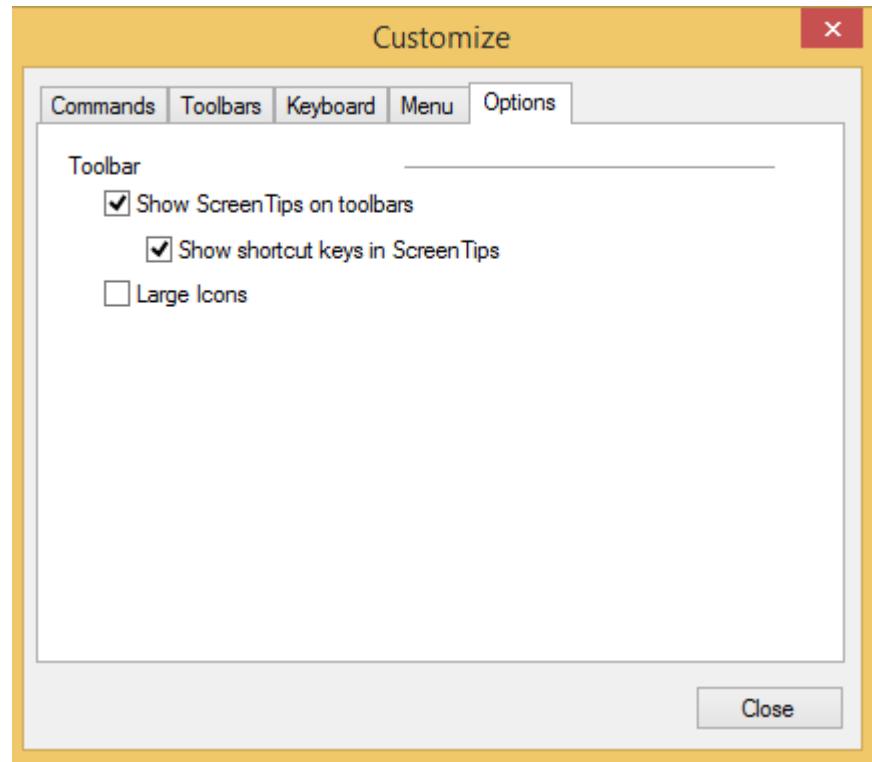


Fig. 49. «Options» tab

Fig. 50 shows the layout of the tool panel when all the parameters are active.

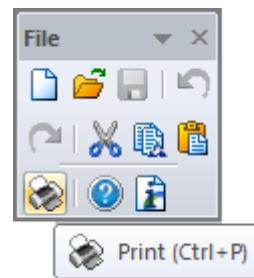


Fig. 50. Panel with large icons

Right click on the name of the menu or item to open context menu (Fig. 51).

«Reset to default» command restores the default item/menu name.

«Copy button icon» command copies button icon to clipboard.

«Delete» command deletes item from tool panel or menu from menu bar.

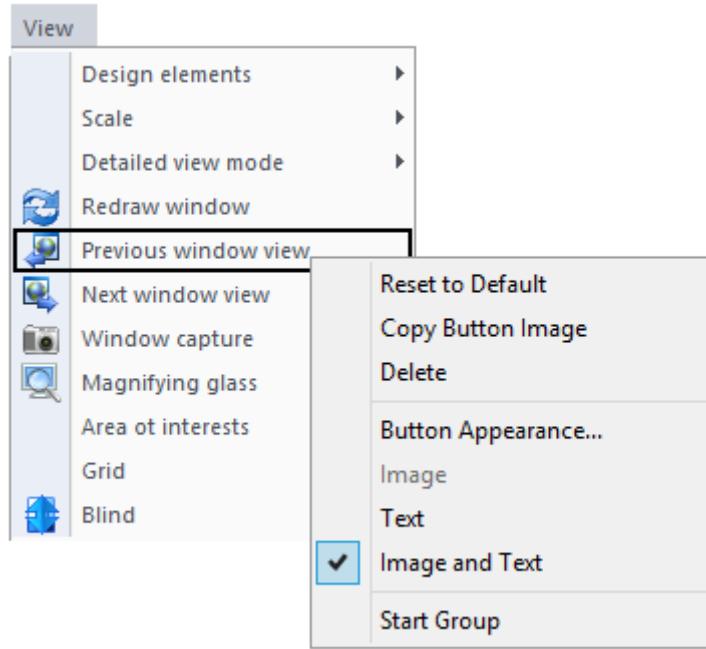


Fig. 51. *Context menu*

«*Button appearance*» command opens the dialog box with button icon settings. (Fig. 52).

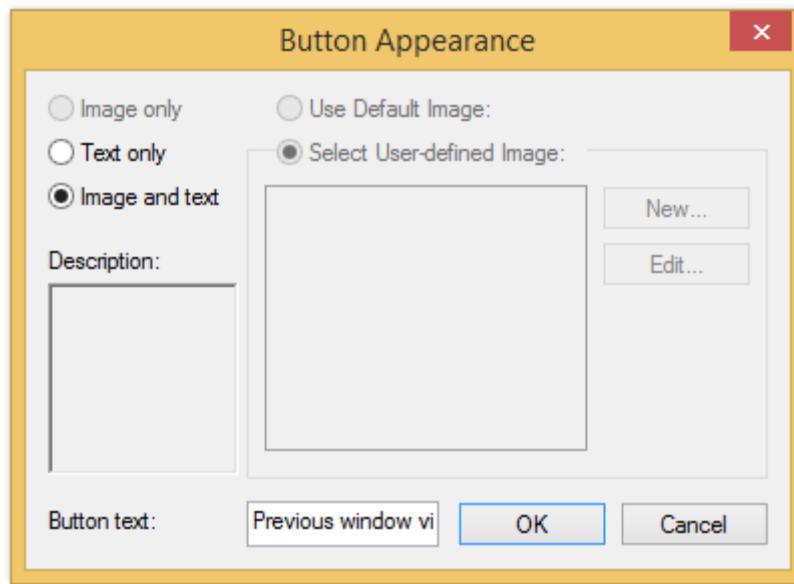


Fig. 52. *Context menu*

When «*Image only*» parameter is active, only icons of the items will be displayed in the tool panel.

When «*Text only*» parameter is active, only labels of the items will be displayed in the tool panel.

When «*Image and text*» parameter is active, icons and labels of the items will be displayed in the tool panel.

To rename the button, insert a new name in the «*Button text*» field.

Press «*OK*» button to save changes.

Press «*Cancel*» button to leave the dialog box without applying changes.

«*Use default image*» resets the icon of the item to the default one.

«*Start group*» command adds a separator to the left of the button.

To add a new command to the menu or tool panel select required category in «*Categories*» tab, then select the required item from the «*Commands*» list and drag it while holding left mouse button to the tool panel you need (cursor will change the icon to the

following: .

See the example of creating a new menu on the Fig. 53.

See the example of adding new items to menu or tool panel on the Fig. 54.

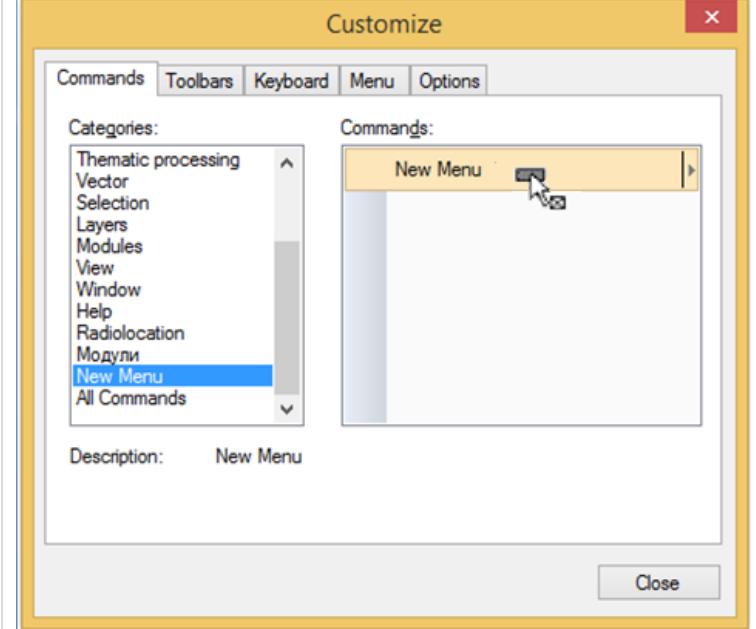
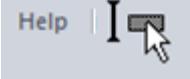
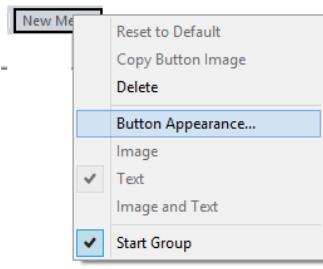
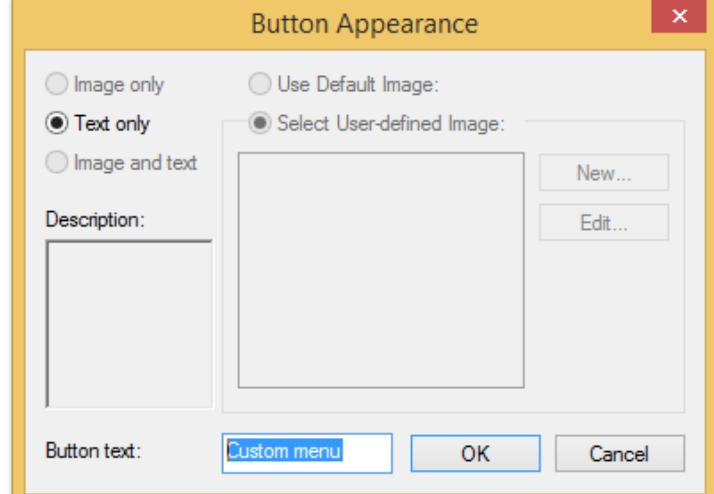
<p>Select «New menu» command from «New menu» category</p>	
<p>Drag new menu from «Customize» window to menu bar</p>	
<p>Open «Button appearance» dialog box from context menu</p>	
<p>«Button appearance» dialog box. Renaming «New menu» to «User menu»</p>	
<p>The result of adding new menu to menu bar</p>	

Fig. 53. Adding new menu

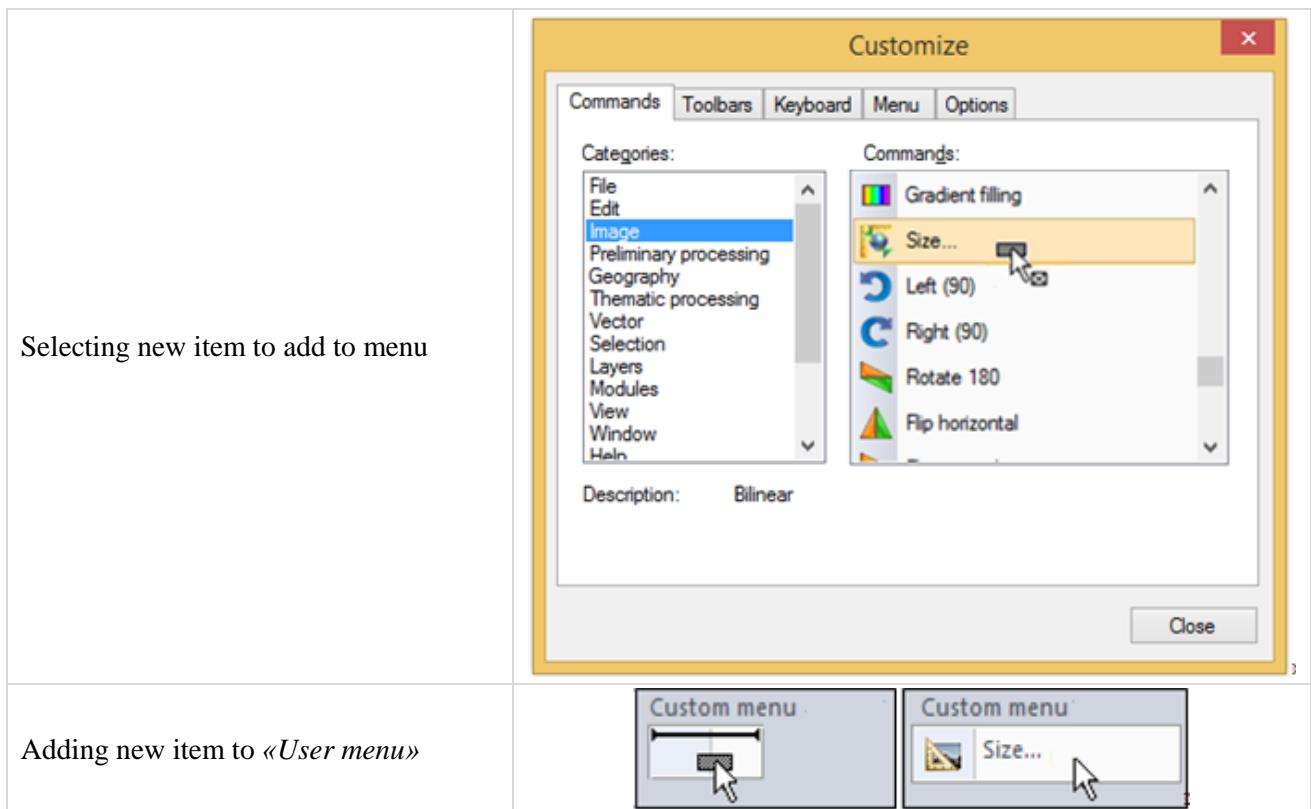


Fig. 54. Adding items to menus and tool panels

4.3. Program panels

To open a tool panel, go to «Window – Panels» menu (Fig. 55). Select the required panel from the list. Active panels are marked with the check mark.

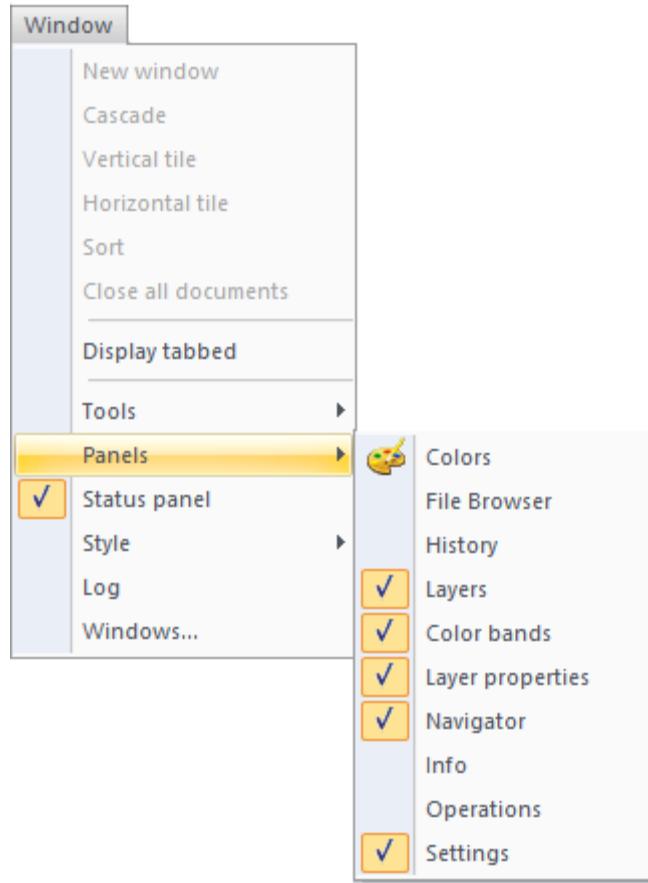


Fig. 55. *Menu «Window – Panels»*

4.3.1. «Colors» panel

«Colors» panel (Fig. 56) is designed to select the standard device-independent color sets.

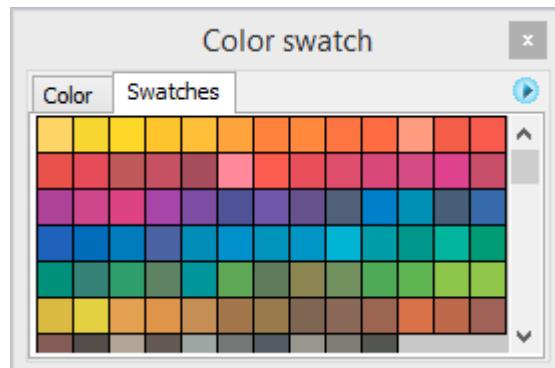


Fig. 56. *«Colors» panel*

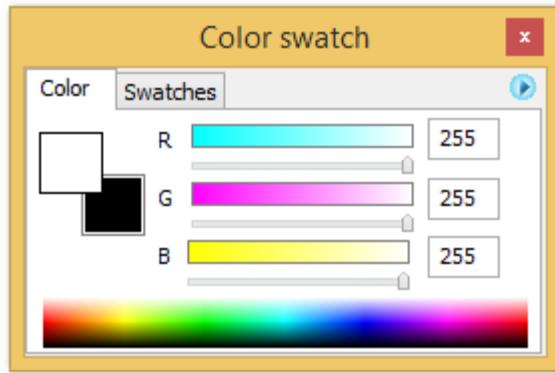


Fig. 57. «Colors» panel

4.3.2. «History» panel

«History» panel (Fig. 58) provides a possibility to track the order of performed user operations.

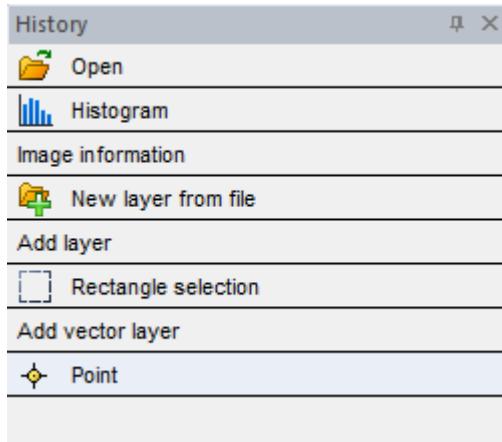


Fig. 58. «History» panel

To cancel the last user operation press button or right click on the operation name in the list and select «Delete» command in the context menu.

In the opened dialog box (Fig. 59) press «Yes», to confirm the deletion or «No» to cancel it.

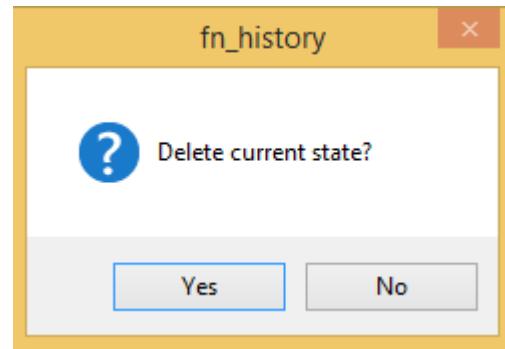


Fig. 59. *Deletion dialog box*

To delete several latest user operations, right click on the earliest of them in the list and select «*Delete*» command in the context menu. This action and all the actions below the selected one will be cancelled.

To clear the user operations history press the button or right click on the panel and select «*Clear history*» command in the context menu. In the opened dialog box press «*Yes*», to confirm the deletion or «*No*» to cancel it. All the items in the list will be deleted.

4.3.3. «Layers» panel

«*Layers*» panel (Fig. 60) is designed to manage layers, allows user to change layers' settings, and change their properties. The list shows the icon of the layer, its state and visibility.

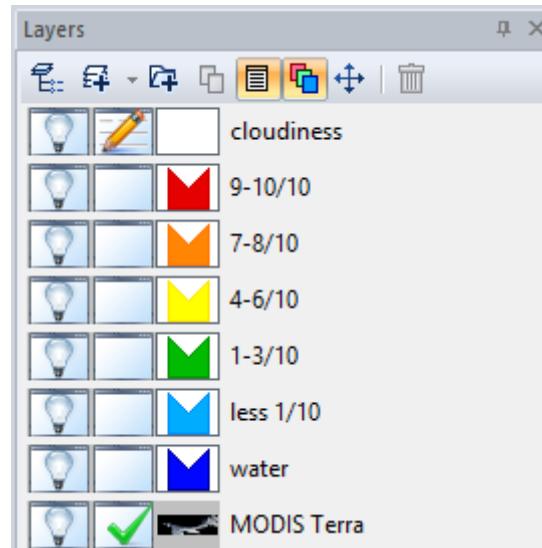


Fig. 60. «*Layers*» panel

Right click on the panel to open context menu, which replicates the items from «*Layers*» menu and «*Layers*» tool panel.

To create a new group of layers, press «*New group*»  button. After the group is created, user can add layers to it.

To create a new layer, press «*New layer*»  button. To select a type of new layer, press a button to the right of the icon and select a necessary type (raster, vector, text, selection) from the drop-down list. To add a new layer to an existing group, one layer inside the group should be editable.

To add an existing file to a new layer, press «*Load*»  button. Set the path to the directory with file, its extension and name in the opened dialog box.

To duplicate the existing layer, press «*Duplicate*» button .

To view layer properties, press «*Settings*» button . The widow with layer's settings will open.

To display color bands of the layer, press «*Color bands*» button . Layer panel will open.

Right click on the «*Layers*» panel and select «*Color models*» command to change color model of the image. Select the required color model from drop-down list of the opened window.

In order to convert color coordinates, put a tick in a «*Recalculate*» check box.

Press «*Apply*» button to apply a selected color model.

Press «*Move*» button  to move the layer. Press and hold left mouse button while dragging the layer to the place you need.

Press «*Delete*» button  or «*Delete*» key to delete the layer. In the opened dialog box press «*Yes*», to confirm the deletion or «*No*» to cancel it.

See the description of layers' icons in Table 11.

Table. 11. The description of layers' icons

Icon	Description
	Layer group
	Raster layer (image preview)
	Text layer
	Selection layer
	Vector layer
	Georeferencing layer
	Mosaic layer
	Scale bar layer
	Grid layer
	Scale layer
	Compass layer
	Scale rule layer
	Coordinate scale layer
	Legend layer
	Elliptical plot layer (ice map layout design according to the international standard)
	Ice cohesion (Making Ice Maps)
	Ice disruption (Making Ice Maps)
	Ice hummocking (Making Ice Maps)
	Ice thickness (Making Ice Maps)

See the description of layers' states in Table 12.

Table. 12. *Layers' states*

Icon	Meaning
	Visible layer
	Invisible layer
	Editable layer
	Active layer

Group of layers

For more convenient work with layers user can combine layers into groups and change visibility settings for the whole group of layers. (Fig. 61).

To create a new group of layers, press «*New group*»  button on the «*Layers*» panel or go to «*Layers*» – «*New Layer*» –«*Group*» menu. After the group is created, user can add layers to it.

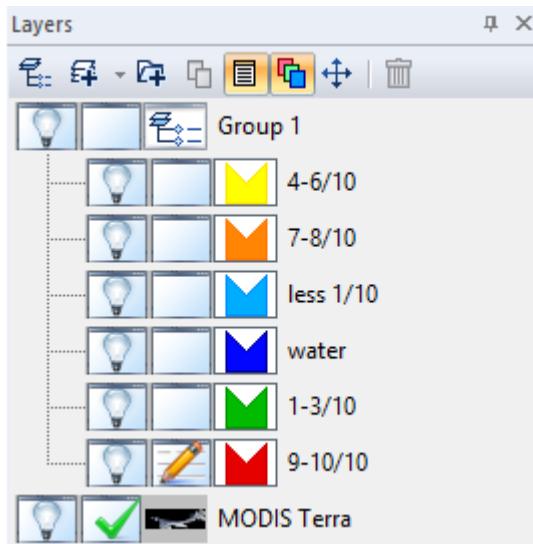


Fig. 61. *Group of layers*

Work with group of layers

Click on the layer with the left mouse button and hold it while dragging the layer in or out of the group. To open or close the list of layers in the group press the icon  alongside the name of the group.

Double click on the name of the layer to rename it.

In order to create a new layer to an existing group, one layer inside the group should be editable.

4.3.4. «Layer properties» panel

«*Layer properties*» panel (Fig. 62) is designed to change layer's settings.

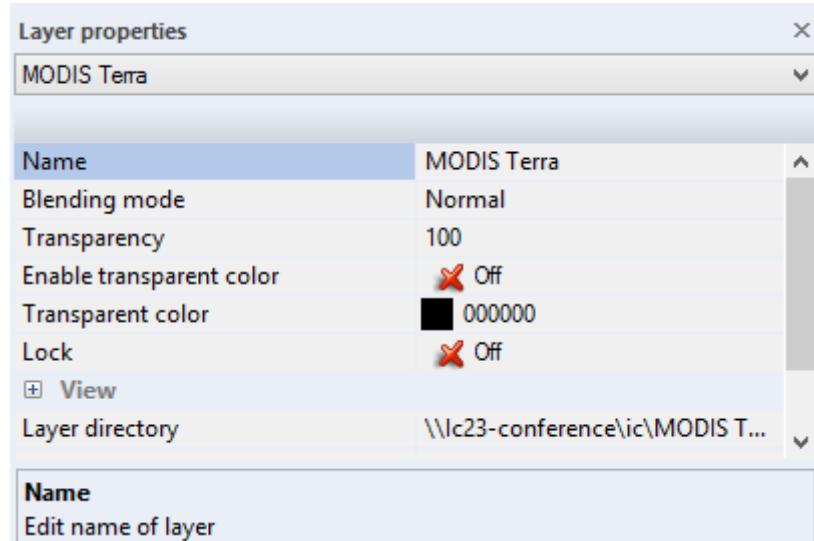


Fig. 62. «*Layer properties*» panel

«*Name*» parameter is designed for layer renaming.

«*Group*» parameter allows user to group layers.

«*Blending mode*» parameter allows user to select the blending mode of the layer: normal, dissolve, multiply, screen, overlay, soft light, hard light, addition, subtraction, darken, lighten, difference, exclusion, hue, saturation, color, brightness.

«*Transparency*» parameter defines the level of the transparency of the layer. Fully opaque layer has the parameter value 100; transparent layer has the parameter value 0.

«*Enable transparent color*» parameter makes it possible to set transparency value for a certain color. «*Transparent color*» parameter is designed to set the color which is going to be transparent if the «*Enable transparent color*» parameter is on.

4.3.5. «Color bands» panel

«*Color bands*» panel (Fig. 63) is designed for viewing and editing the color bands and color models settings.

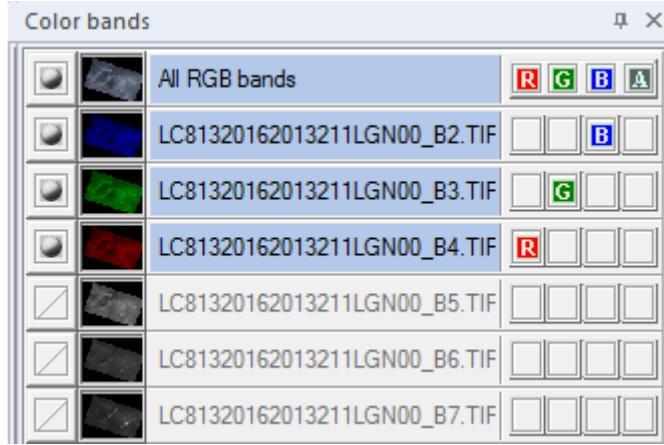


Fig. 63. «Color bands» panel

To make color bands visible/invisible click on the icon to the left of the color band name.

If the color band is visible the icon will look like , if it is invisible the icon will look like .

To set the color band, and adjust current color components click on the cell which is located on the intersection of the color band name row and color component column.

To make the color band inactive, remove all the color components from its row. The icon to the left of the color band name will change to the following:

Editable color bands are highlighted with the color.

«Color bands» context menu (Fig. 64) is designed to perform various operations on the color bands, such as create new color band, duplicate bands, and add color bands form the different documents.

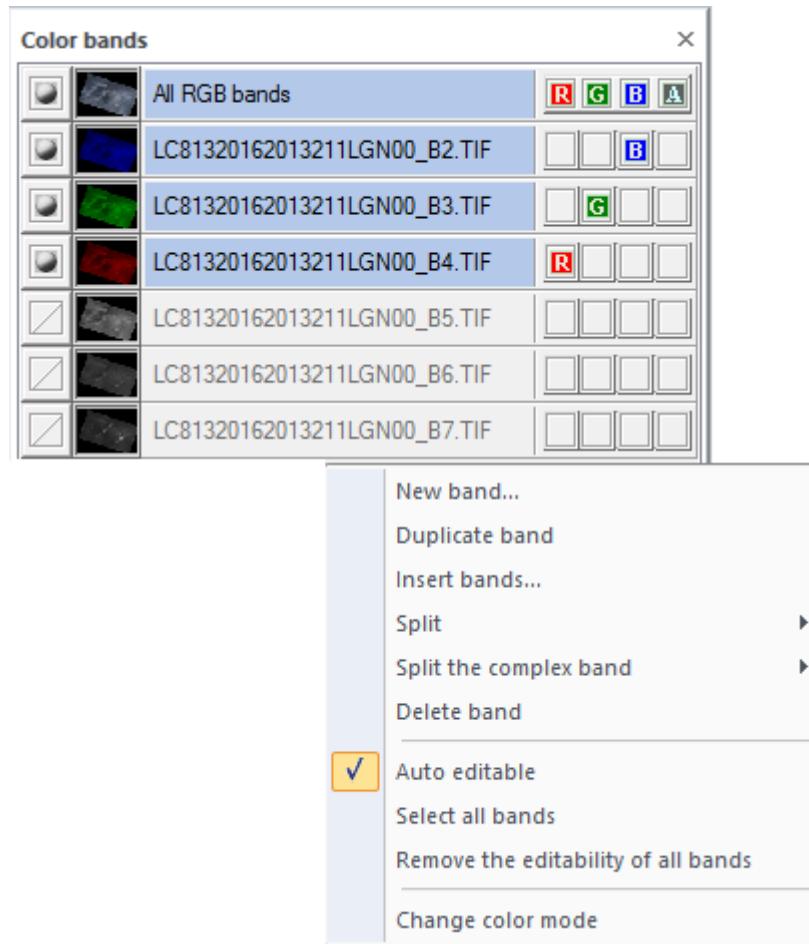


Fig. 64. «Color bands» panel context menu

Select «New band» option from context menu, the dialog box for new color band creation will open (Fig. 65).

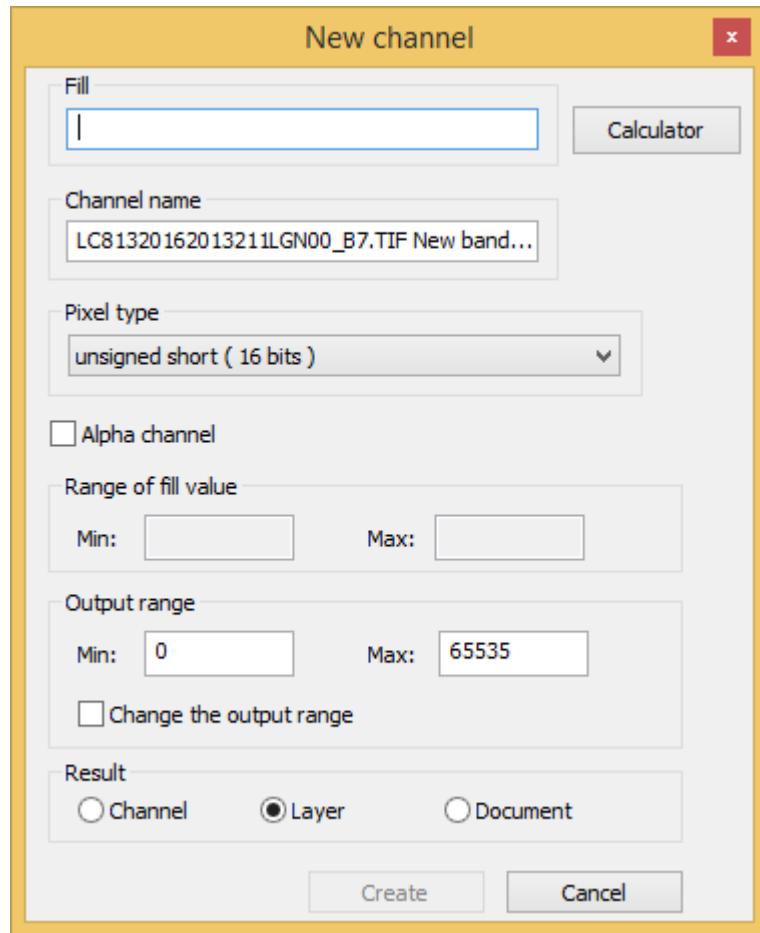


Fig. 65. «*New channel*» dialog box

To create an alpha channel (transparency mask), put a tick in the «*Alpha channel*» check box, «*Fill*» and «*Channel name*» fields will be filled automatically (Fig. 66).

«*Pixel type*» parameter is set by default according to the pixel type of the image. For images with 2 bytes *unsigned char* Alpha channel is generated with 65535.00 (white) fill.

To create Alpha channel press «*Create*» button, to close the dialog box without applying any changes press «*Cancel*» button. The result will appear in the «*Color bands*» panel (Fig. 67).

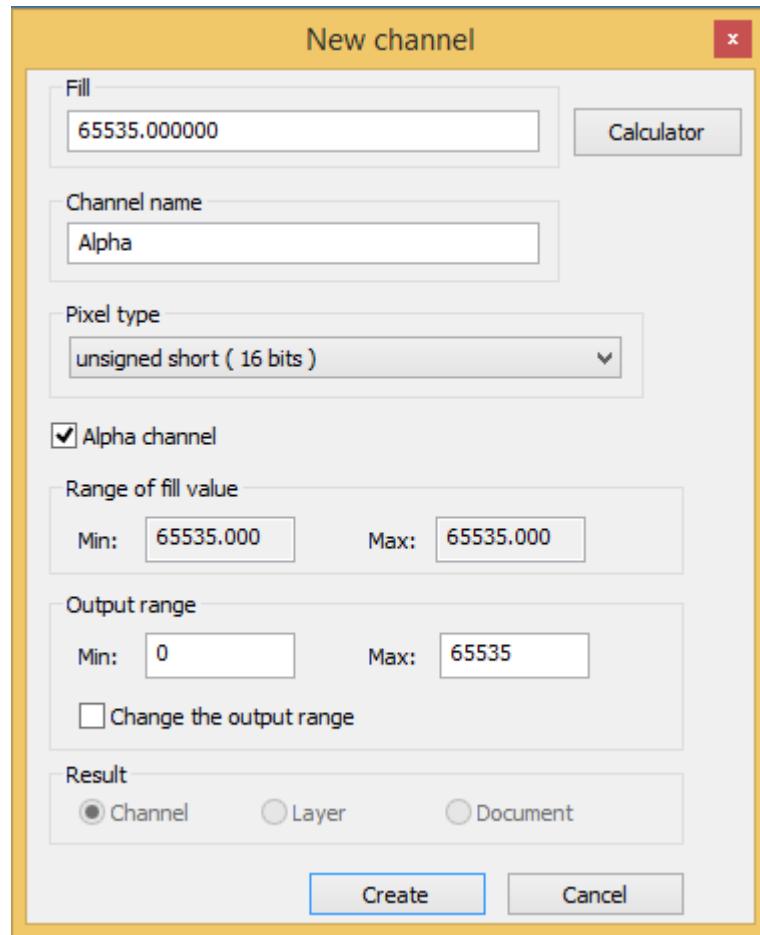


Fig. 66. «New channel» dialog box. *Alpha channel creation*

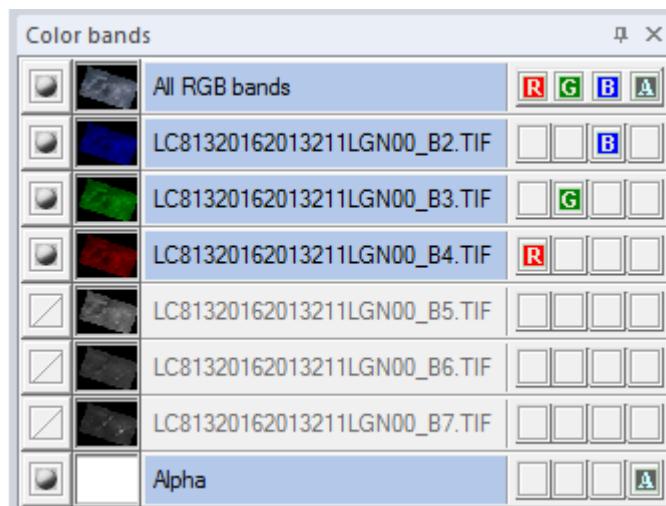


Fig. 67. «Color bands» panel

The raster calculator can apply mathematical operations on the raster pixels; press «Calculator» to enter the formula for calculation. «Band fill» (Fig. 68) dialog box will open.

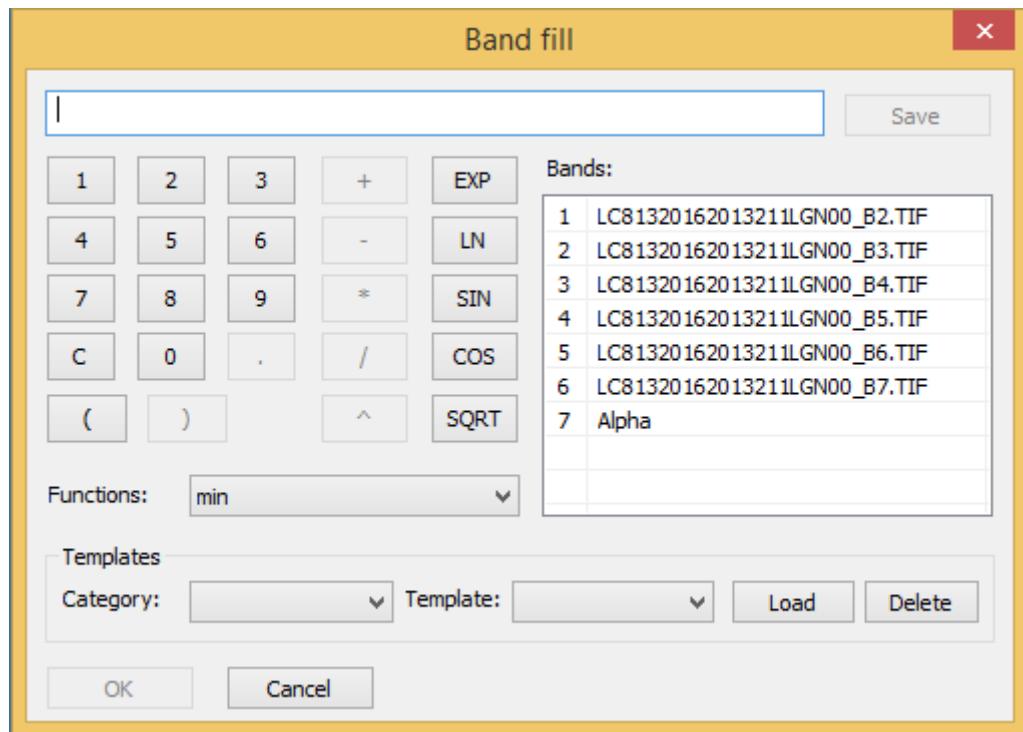


Fig. 68. «*Band fill*» dialog box

To enter the formula, use mathematical operations buttons, functions, and bands' names. Available functions are listed in «*Functions*» drop-down list. Table 13 shows the description of the functions available in raster calculator.

Table. 13. *Functions available in raster calculator*

Function	Description
min	Minimum value of the selected color band
max	Maximum value of the selected color band
mean	Average value of the selected color band
med	Median value of the selected color band
sd	Standard deviation value of the selected color band

For the convenience user can create and save templates of the formulas for further use in the «*Templates*» field.

To save the formula as a template, insert the required formula and press «*Save*» button.

In «*Add template*» dialog box (Fig. 69) select category (e.g. satellite name) and the name of the formula. Then press «*OK*» button.

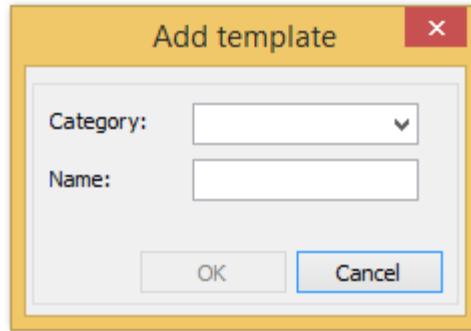


Fig. 69. «Add template» dialog box

To load the existing template select category from the drop-down list then select the name of the template and press «Load» button. The formula will appear in the input field (Fig. 70).

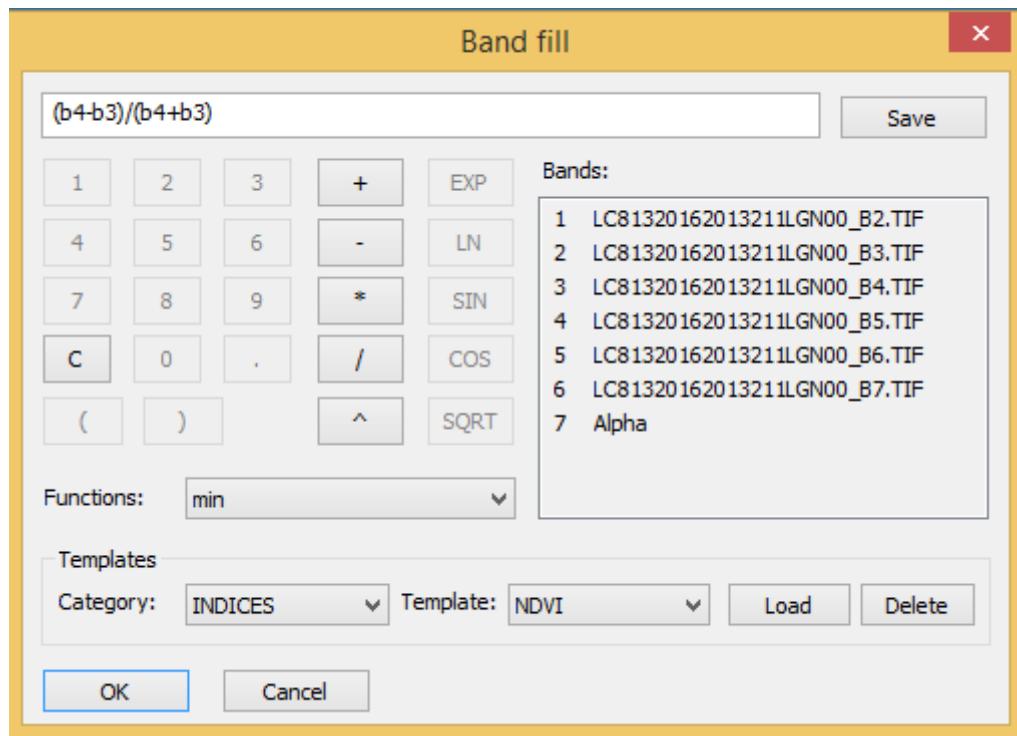


Fig. 70. «Channel fill» dialog box

Select the category and template name and press «Delete» button to delete template.

«New channel» dialog box (Fig. 71):

«Fill» field displays the input formula;

«Channel name» filed is designed to input the name of the new channel;

Select the required pixel type from «Pixel type» drop down list. By default the pixel type value is set according to the type of the initial image. For complex formulas select the «Double

(64 bits) » *pixel type*, which allows each pixel to store the whole and fractional values of the index;

«*Range of fill values*» field displays the range of the index values;

In «*Output range*» filed user can set the minimum and maximum range of the output image to visualize the image within the selected range;

In «*Result*» field user can select the format of the output image (new color band, new layer or new document).

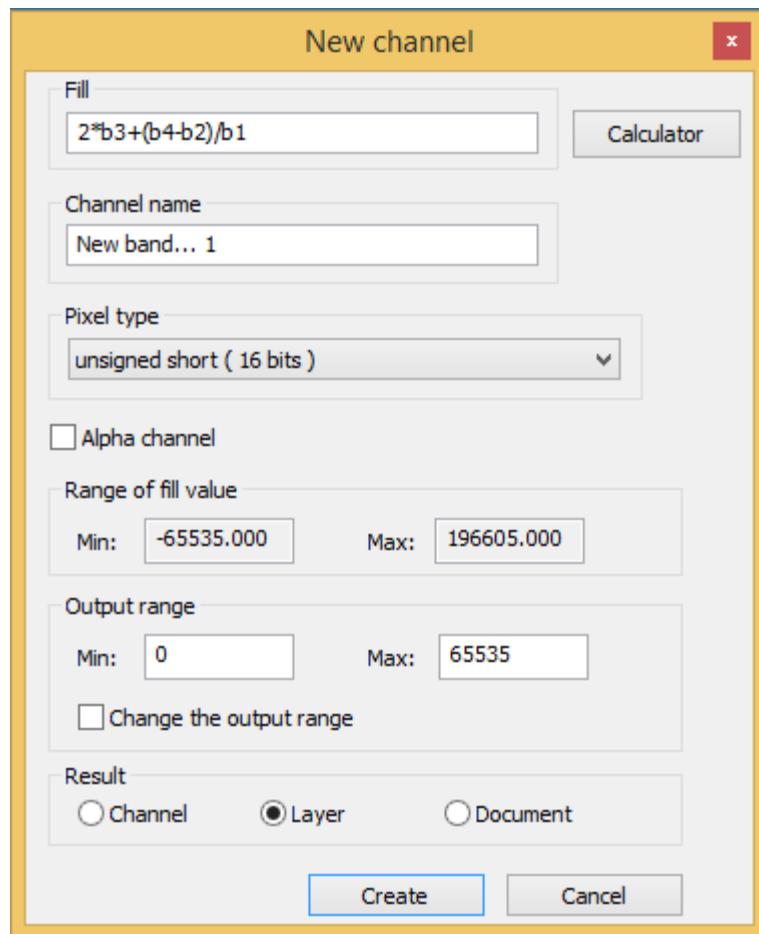


Fig. 71. «*New channel*» dialog box. Formula input

After all the parameters are set press the «*Create*» button to generate the image or press «*Cancel*» to cancel the operation.

To duplicate the existing color band select «*Duplicate band*» command from the context menu of «*Color bands*» panel.

Select the «*Insert bands*» option from the context menu of «*Color bands*» panel to select the color bands which are necessary to insert (Fig. 72).

To add a color band, select the name of the document from «*Documents*» drop-down list, select the layer from the «*Layers*» drop down list, and select bands you would like to insert from «*Channels*» list by putting a tick in a checkbox to the left from the band's name. The list of selected bands will be displayed in the «*The list of selected channels*» filed.

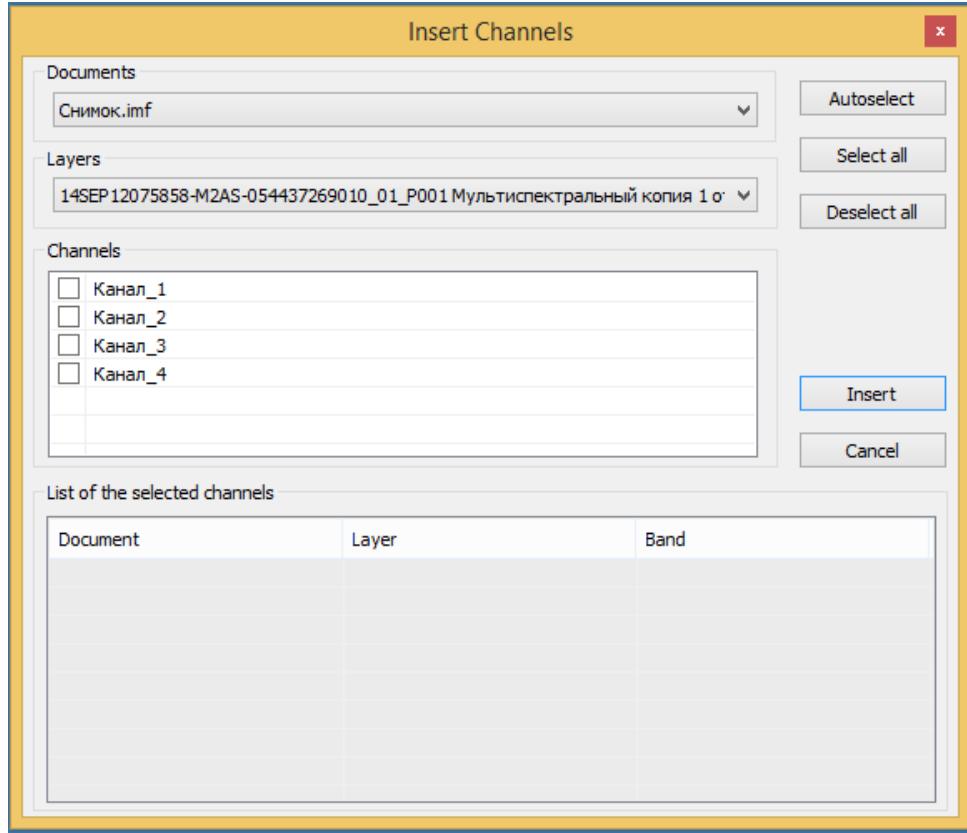


Fig. 72. «*Insert channels*» dialog box

Press «*Autoselect*» button to make an automatic selection of the color bands.

Press «*Select all*» button to select all color bands.

To remove the selection from all color bands press «*Deselect all*» button.

To insert the selected color bands press «*Insert*» button.

To leave the window without applying any changes press «*Cancel*» button.

To separate one of the color bands of the layer and open it as a different document select «*Split*» command from the context menu of «*Color bands*» panel.

Select the «*Split the complex band*» option from the context menu of «*Color bands*» panel to split the band of radar image into real and imaginary values.

Select the «*Delete band*» option from the context menu of «*Color bands*» panel to delete the selected color band.

Select the «*Select all bands*» option from the context menu of «*Color bands*» panel to make all color bands editable.

Select the «Remove the editability of all bands» option from the context menu of «Color bands» panel to remove selection form all color bands and make them inactive.

Select the «Change color mode» option from the context menu of «Color bands» to open the color model selection dialog box. (Fig. 73).

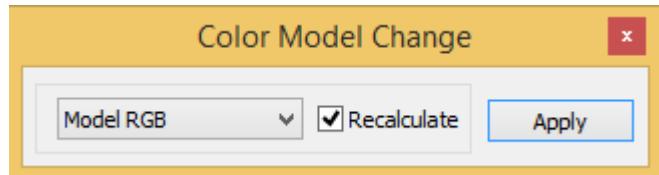


Fig. 73. «Change color model» dialog box

Select the required color model from drop-down list of the opened window.

In order to convert color coordinates, put a tick in a «Recalculate» check box.

Press «Apply» button to apply a selected color model.

4.3.6. «Navigator» panel

«Navigator» panel (Fig. 74) is designed for visualization of the location of the window relative to the whole image.

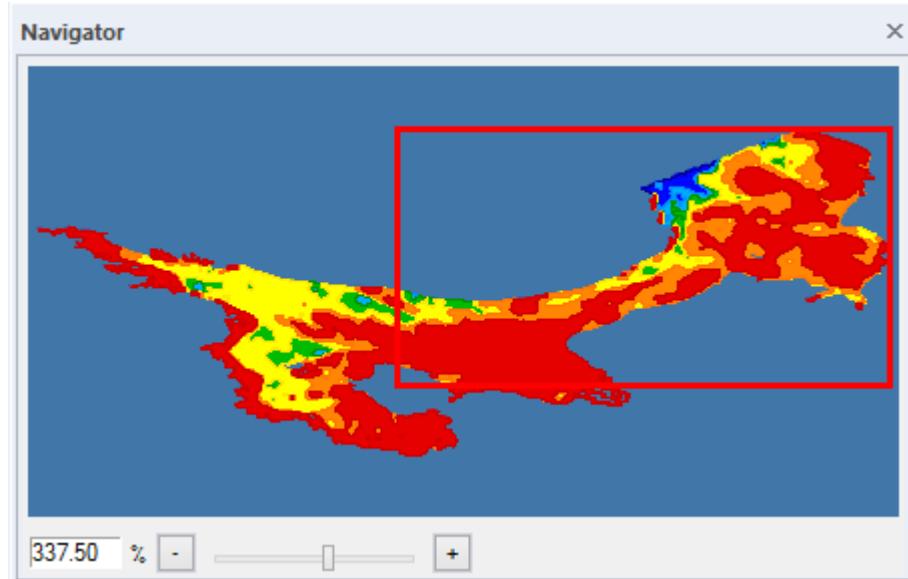


Fig. 74. «Navigator» panel

4.3.7. «Info» panel

«Info» panel (Fig. 75) is designed for viewing the general information about the image, values of color coordinates, coordinates of the cursor location, and the size of selection.

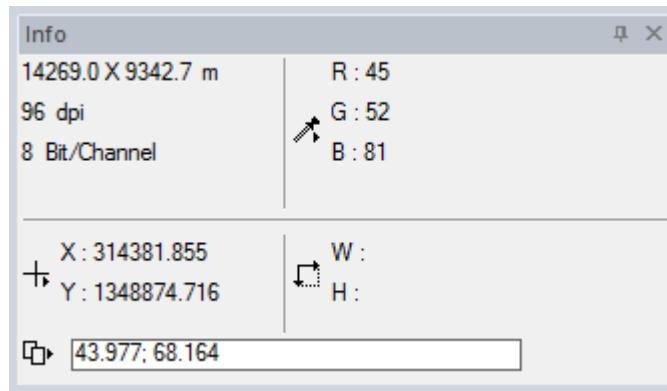


Fig. 75. «Info» panel

Image general information section is located in the top left corner of the image. It displays the size of the image in the units of image's coordinate system, resolution in pixel per inch, and the size of the channel in bits.

Information about the color model of the image is located in the top right corner of the panel. It displays the values of the pixel's color coordinates at the cursor's location. Select the color model to display the values of color by clicking with left mouse button on the following icon (Fig. 76) .

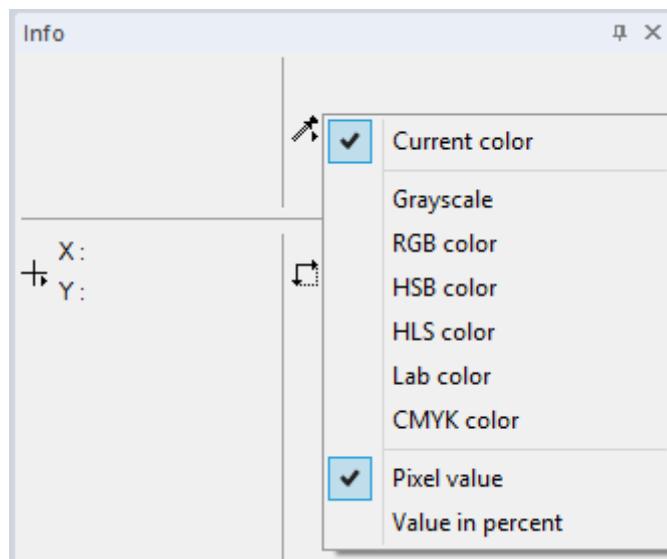


Fig. 76. Color model display parameters

In the bottom left corner of the panel the information about the cursor's coordinates is displayed. Click the following icon: (Fig. 77) to see the list of measurements' units. The origin point of the coordinates is located in the top left corner of the image.

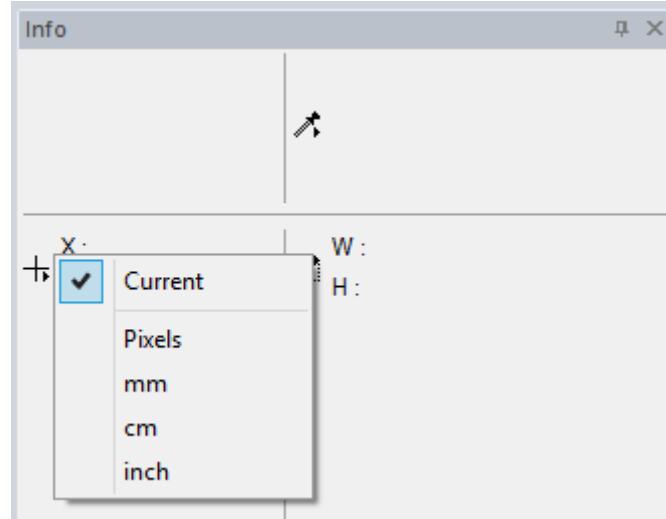


Fig. 77. *Cursor location display parameters*

Information about the size of the selection is located in the top right corner of the panel. It displays the width (W) and height (H) of the selection.

In the bottom of the panel the coordinates of the last selected point in the units of the document are displayed. To copy the coordinates press «*Copy to clipboard*» button.

4.3.8. «Operations» panel

«Operations» panel (Fig. 78) is designed for recording the sequences of user operations (macros).

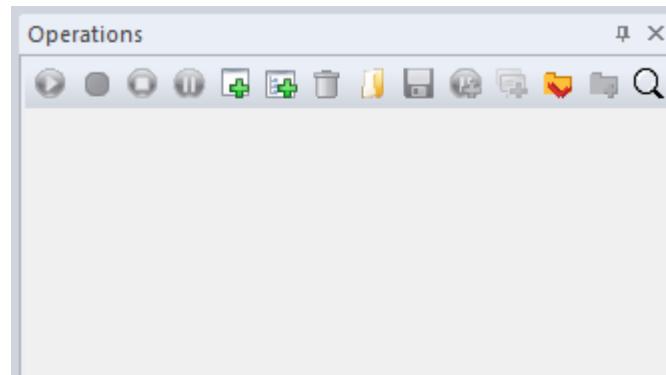


Fig. 78. *«Operations» panel*

When the panel is empty, the following buttons are active:

– «*Create macro*».

– «*Create group*».

– «*Load macro*».

– «*Work directories*».

Q – «Search».

Click «Create macro» button to create new macro and select its name (Fig. 79).

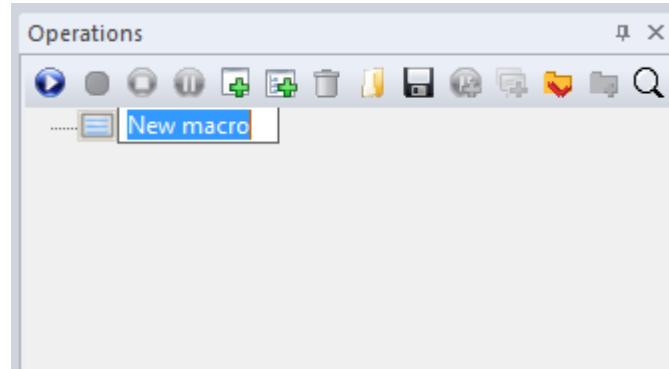


Fig. 79. Creating new macro

Press «New group» button to create a new group of macros and select its name (Fig. 80).

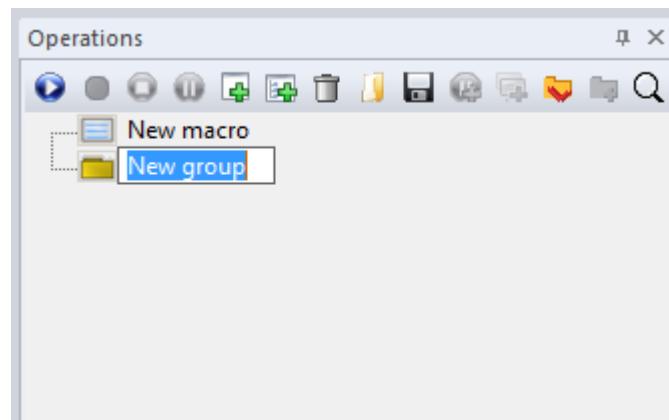


Fig. 80. Creating group of macros

To create a subgroup select an existing group and press «New group» button (Fig. 81).

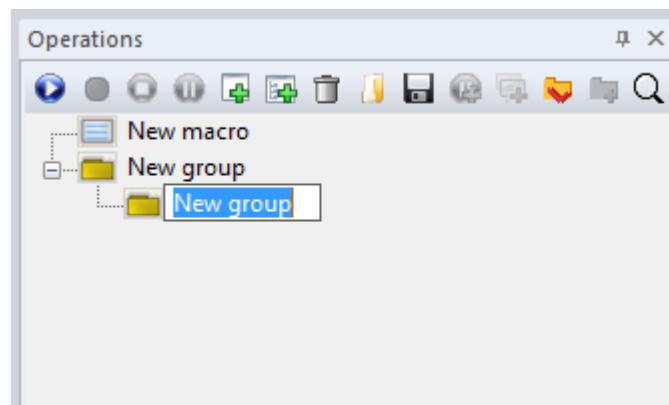


Fig. 81. Creating subgroup

To create a macro inside the group press «*Create macro*» button or drag the existing macro into the group. (Fig. 82).

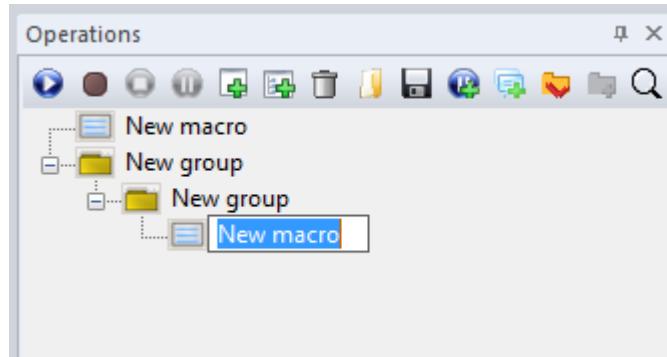


Fig. 82. *Creating a macro inside the subgroup*

To delete a macro or group of macros press «*Delete*» button .

To set the work directories (relative paths to the data) press the «*Work directories*» button. The dialog box where user can set the path to the input and output directories will open. When the input directory is selected, the path will be automatically copied to the output directory field. User can change the paths if it is necessary.

If the work directories are not set, the absolute paths to the data will be used.

To record the macro (user operations sequence) user should perform the following actions:

Press «*Record macro*» button. It will change color to bright red .

Select the macro to which you want to start recording the sequence.

Note:

There are a number of features of the macro recording.

When user records macro from the beginning, the user operations will be recorded successively one after another.

When it is necessary to add more operations to an existing subgroup:

Click on the subgroup to which you want to add operation, then press «*Record macro*» button. New operations will be recorded to the end of the subgroup;

If it is necessary to add more operations between the already recorded operations, click on the operation after which you want to start recording and start recording the macro.

Next, the example of the operations recording is provided.

To create a new document, go to «*File - New*» menu.

The dialog box where user can set the name of the new document will open (Fig. 83); set the name «*Image correction*», and press «*OK*» button.

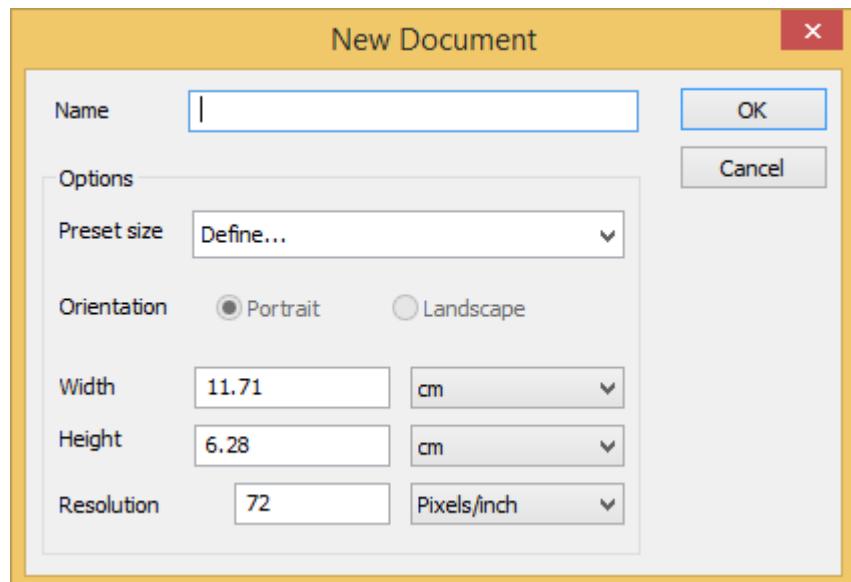


Fig. 83. «New document» window

The performed operation will be recorded to macro; in this case it will be the creation of the new document with the name «*Image correction*» (Fig. 84).

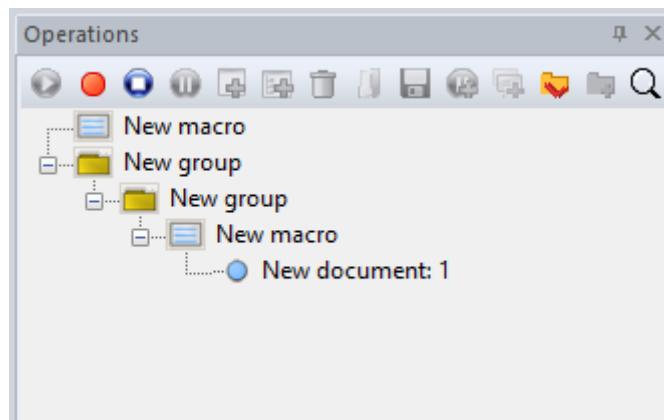


Fig. 84. «Operations» panel. Recording «New document» action to macro

Load an image to the new document. Press «Load» button  in «Layers» panel.

In «Open» dialog box set the path to the image and press «Open» button.

If the geographic projection of the image differs from the projection of the original document the «*Geographic projection*» window will open (Fig. 85).

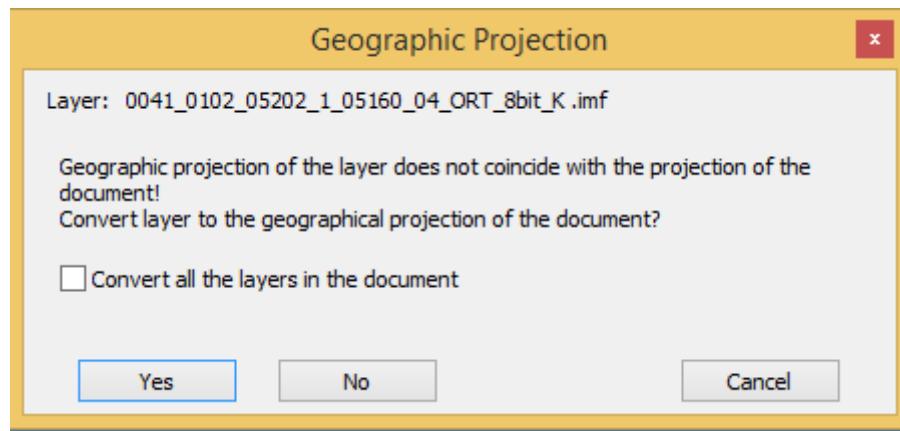


Fig. 85. «Geographic projection» dialog box

To convert the projection of the image to the projection of the document press «Yes» button and put a tick in the «Convert all the layers in the document» checkbox if the file contains more than one layer.

To keep the original geographic projection of the document, press «No» button.

Press «Cancel» to cancel the file opening.

The opened file will be displayed in the workspace and in the «Layers» panel (Fig. 86); the preformed operation will be recorded to macro (Fig. 87).

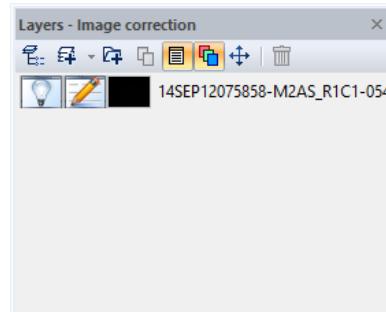


Fig. 86. «Layers» panel

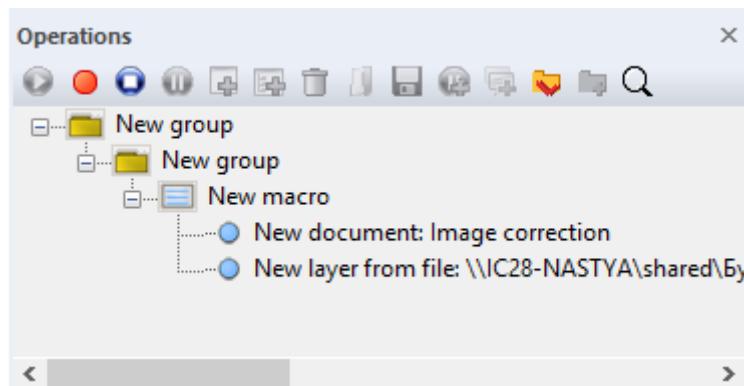


Fig. 87. «Operations» panel. «New layer from file» operation recorded to macro

Perform the histogram correction with «Histogram» tool.

«Histogram» dialog window will open (Fig. 88), press «Auto» button for automatic histogram correction, then press «OK» button.

The preformed operation will be recorded to macro (Fig. 89).

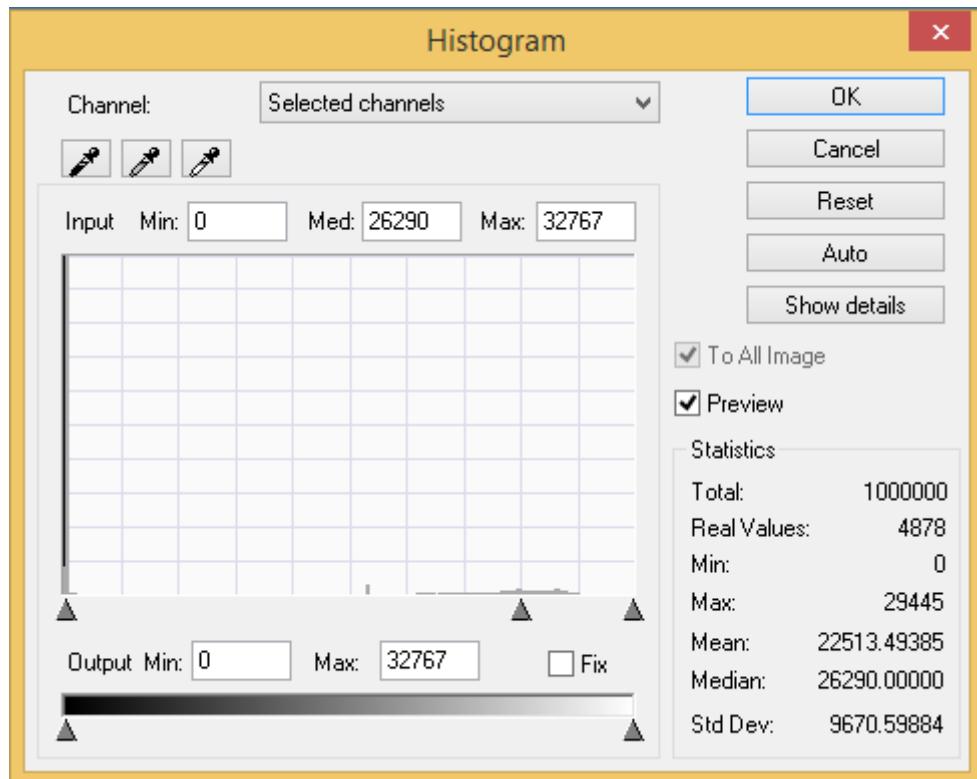


Fig. 88. «Histogram» dialog box

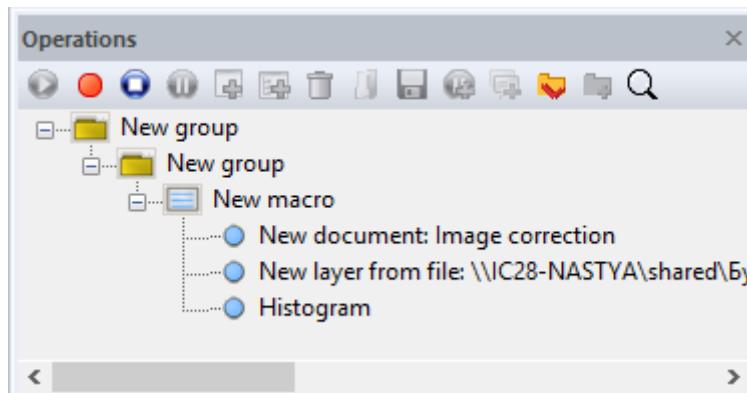


Fig. 89. «Operations» panel. «Histogram» operation recorded to macro

To save the result of the processing go to «File» – «Save as» menu. In the opened window set the path to the directory and file format of the document you want to save and press «Save as» button. The preformed operation will be recorded to macro.

Close the document.

The context menu will open. Press «Yes» button to save the changes applied to the document.

The preformed operation will be recorded to macro (Fig. 90).

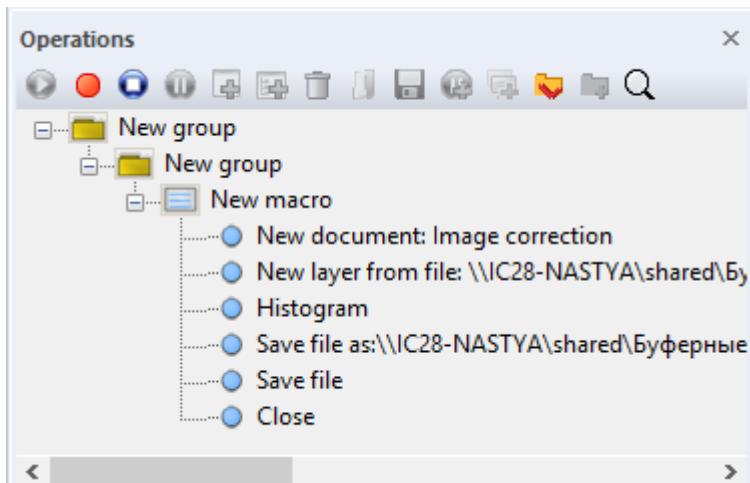


Fig. 90. «Operations» panel. «Save as» operation recorded to macro

Press «Stop» button .

You can play the recorded macro to check its performance. Select the macro in the panel and press «Run macro» button. While the macro is running, the button will be highlighted with orange color (Fig. 91).

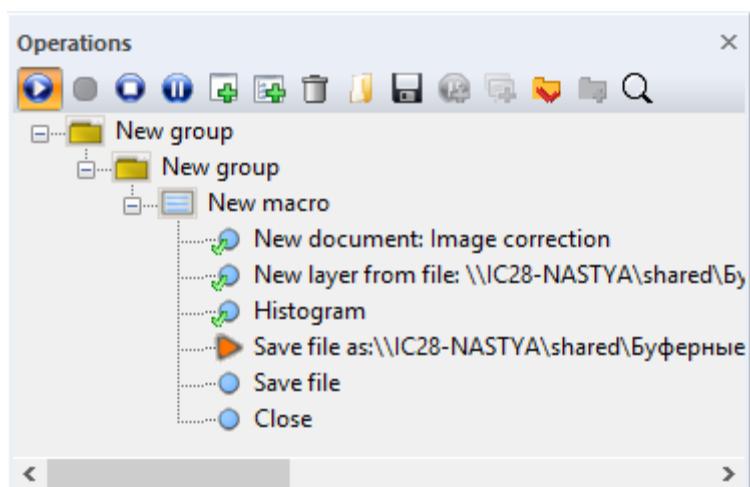


Fig. 91. «Operations» panel. Macro playback

The icon marks the successfully performed operations; icon marks the operation in progress; icon marks the operation on which the macro playback was interrupted due to an error.

To pause the macro playback press «Pause» button.

The playback of the macro presented above doesn't require any operator's involvement and doesn't have any pauses. To add pauses after some operations you should select the required operation and press «Add pause»  button (Fig. 92).

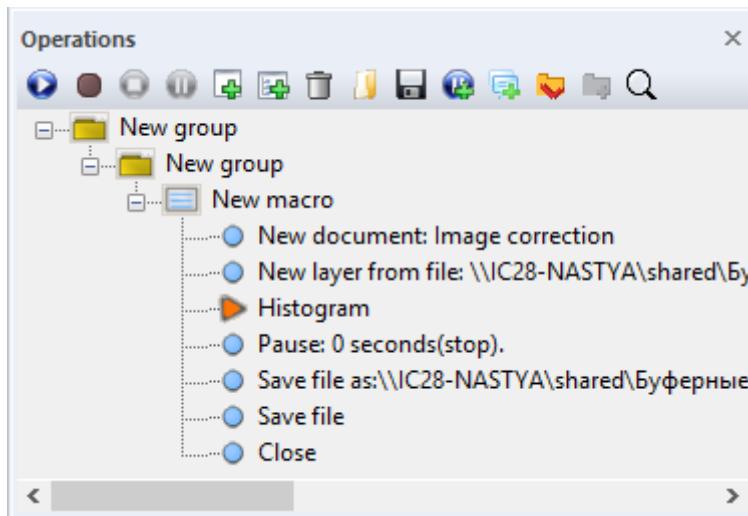


Fig. 92. «Operations» panel. Adding pause after «Histogram» operation

The timer on the pause is 0 seconds by default, which means the full stop of the macro playback. To resume the playback, press «Run macro» button. To stop the macro without the possibility to resume playback, press «Stop» button.

To set the timer for a pause, click with the right mouse button on the pause action in macro and use the slider to set the time (Fig. 93).

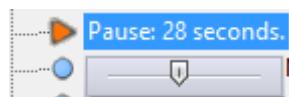


Fig. 93. Setting the timer of macro playback pause

If it is necessary to change any parameters recorded operations, click with the right mouse button on the operation and select «Dialog» option from the context menu (Fig. 94).

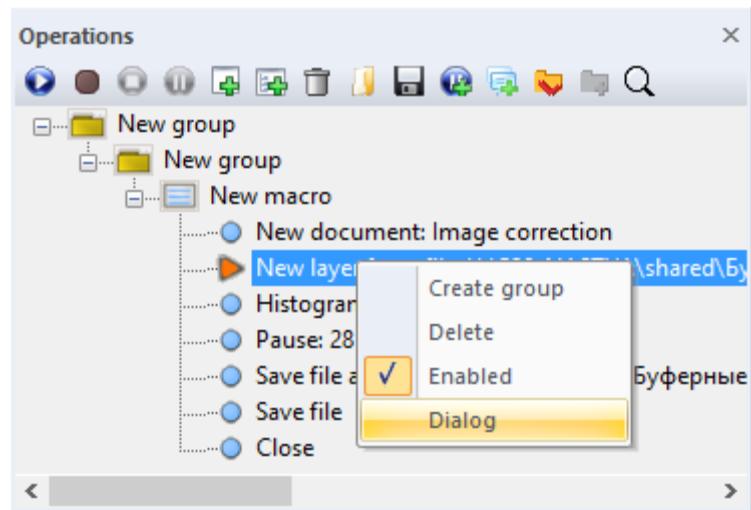


Fig. 94. «Operations» panel. Dialog

The icon of the operation with dialog option on will change to:

To add a pop-up notice to macro the playback process press «Add message» button. The dialog box where user can enter the message will open (Fig. 95).

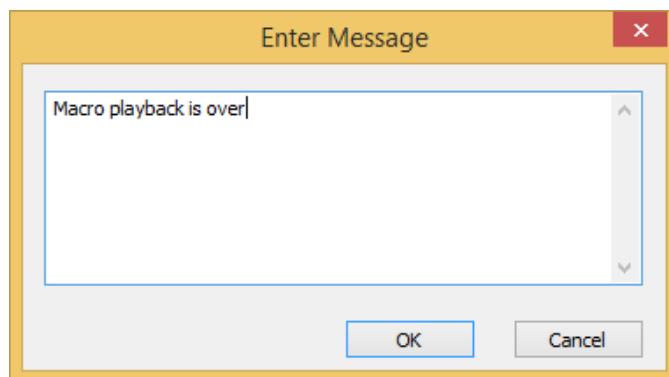


Fig. 95. Message window

After the message is entered, press «OK» button. The message action will be recorded to macro (Fig. 96).

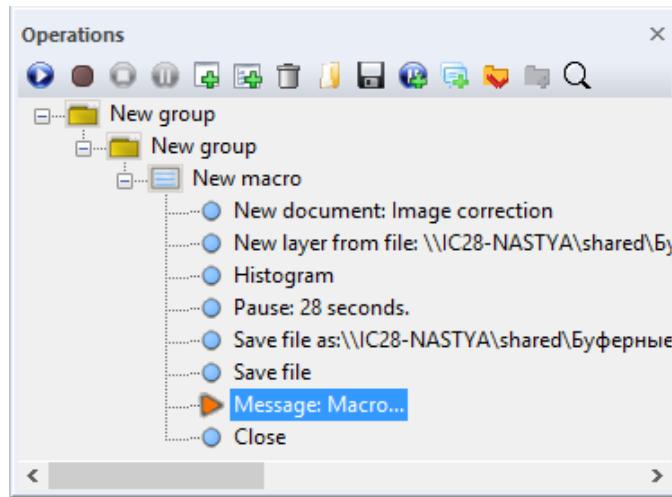


Fig. 96. «Operations» panel. Adding user message

The created structure of macros and groups of macros can be saved to *.mcr file format. Press the «Save macro» button. In the opened window set the path to the directory and the name of the macro and press «Save » button.

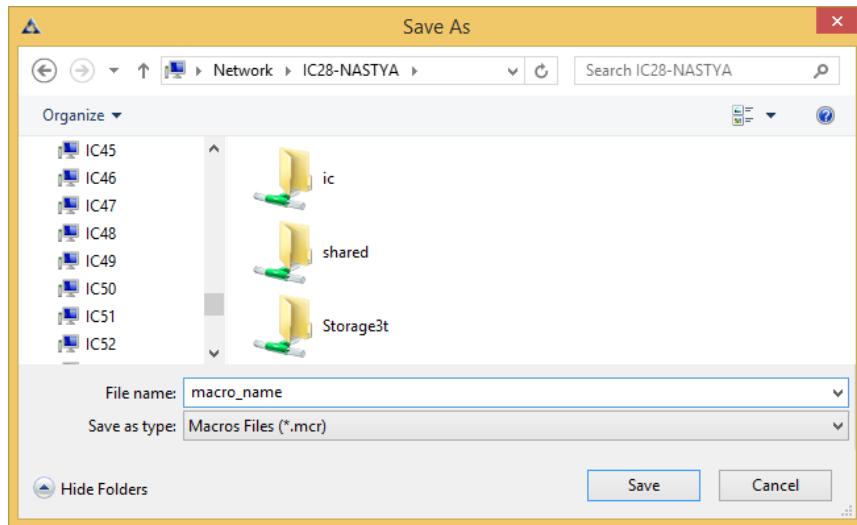


Fig. 97. «Save as» dialog box

To load the existing macro to the «Operations» panel, press the «Load macro» button. In the opened dialog box select the path to the macro and press «Open» (Fig. 98).

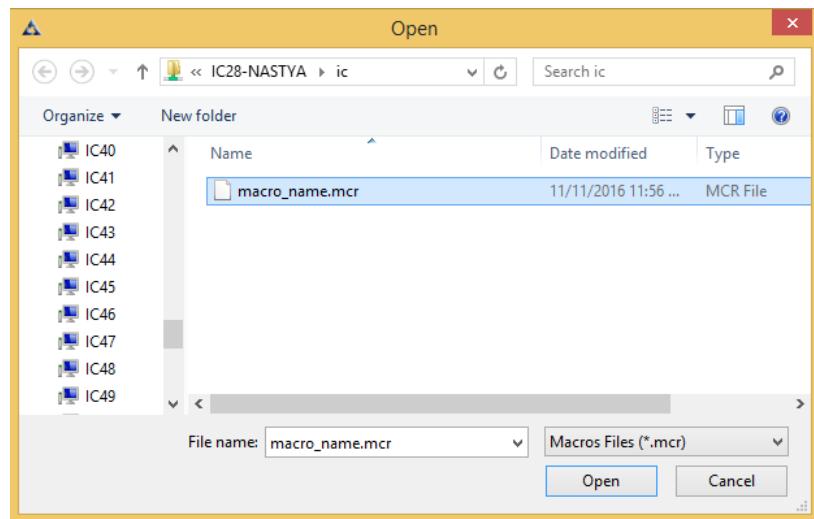


Fig. 98. «Open» dialog box

4.3.9. «Settings» panel

«Settings» panel (Fig. 99) is designed to adjust the main settings of various instruments.

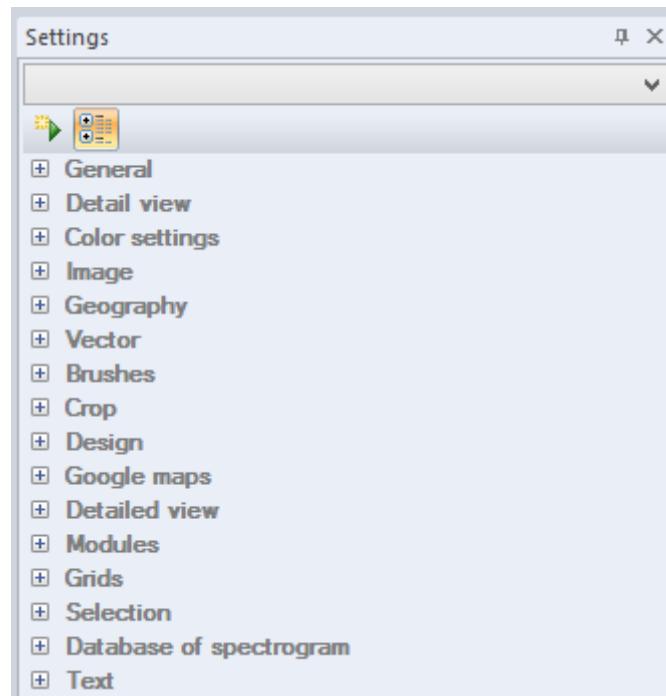


Fig. 99. «Settings» panel

Fig. 100 shows the main recommended settings of the «Settings» panel.

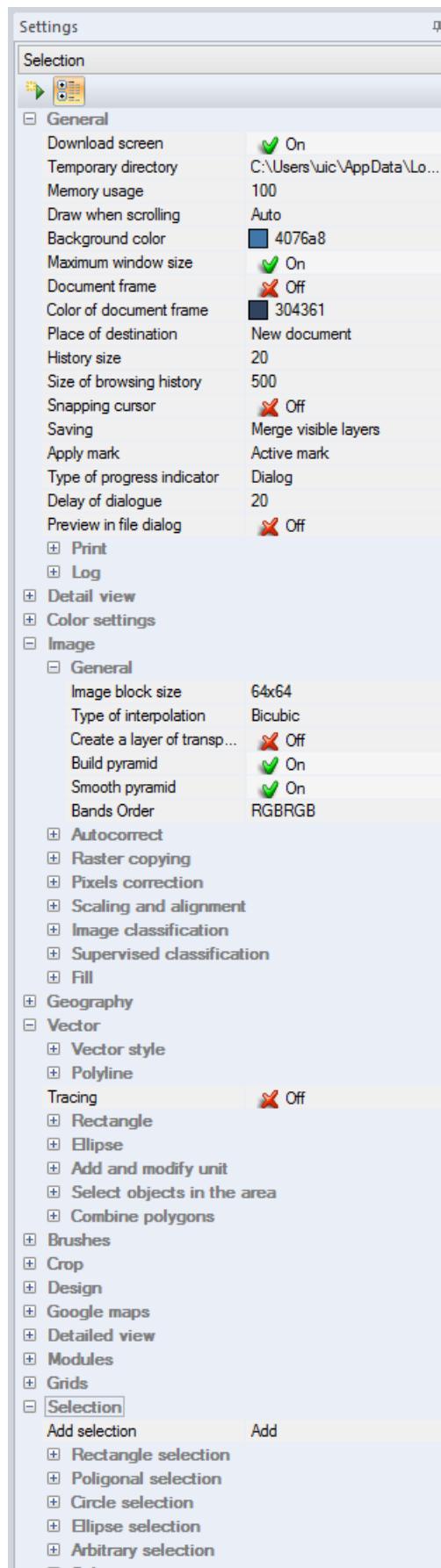


Fig. 100. «*Settings*» panel

Most of the tools' parameters in «IMC» software can be adjusted in «Settings» panel, thus it is recommended to have this panel opened in the workspace all the time.

Press the «List» button  to display the parameters of the active tool (Fig. 101).

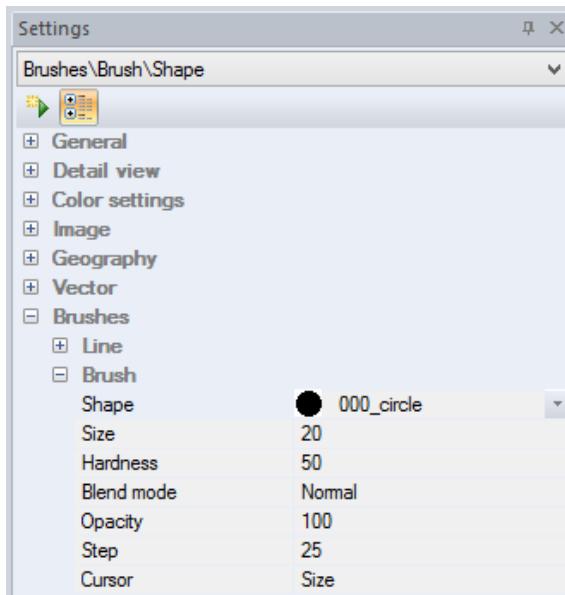


Fig. 101. «Settings» panel for «Brush» tool

Press the «Sections» button  to display all parameters (Fig. 102).

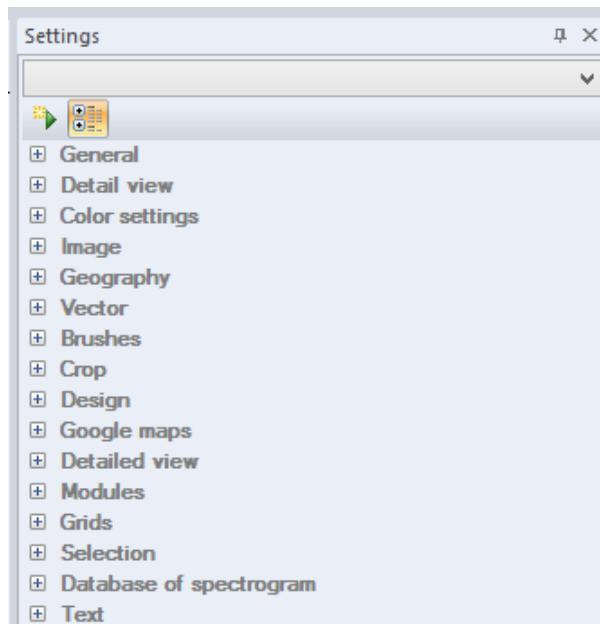


Fig. 102. «Parameters» panel

4.3.9.1 «General» section

«General» section contains the main settings of «IMC» workspace (Fig. 103).

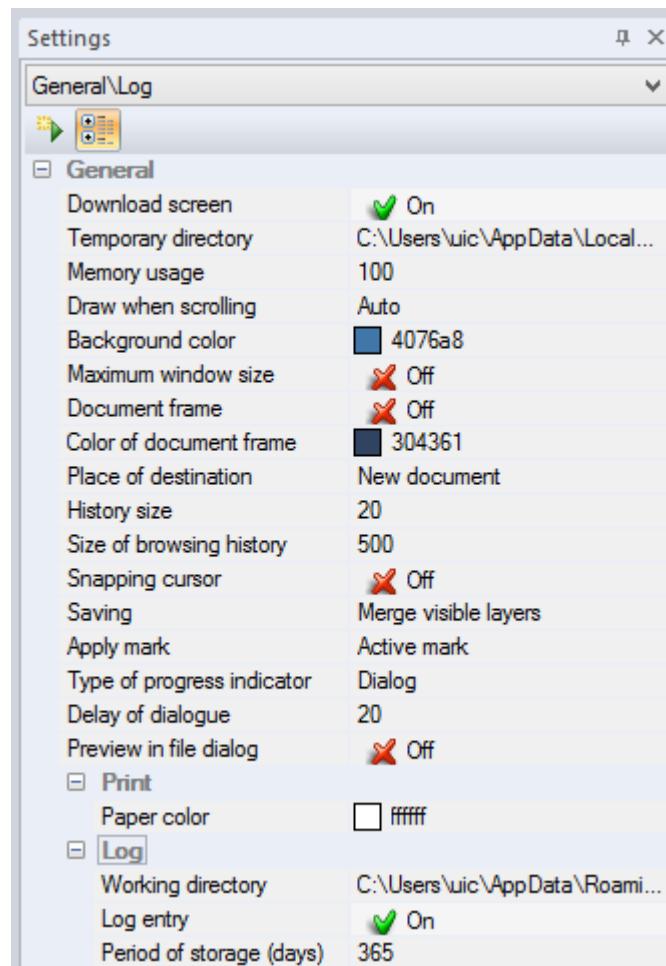


Fig. 103. «General» section

«Download screen» parameter is designed to show or hide splash screen during the program launch.

The «Memory usage» parameter allows user to specify how much of the computer's RAM will be used while performing data processing in «IMC». The possible range is from 5 to 100. Use the slider to change the values.

The «Drawing when scrolling» parameter allows user to adjust the visualization mode of the document as it moves. «On» mode allows the window to redraw while user is navigating through the image. «Off» mode allows the window to redraw only after the left mouse button is released and navigation is over. When the «Automatic» parameter is active, the visualization modes switch automatically, depending on the time required for area visualization.

The «Background color» parameter defines the background color of the main document. To change this value click on the color box, and in the opened dialog box select any color value.

The «Maximum size of the window» parameter defines the window size of the documents. When the parameter is enabled, all opened windows will be maximized to the entire work area.

When parameter is disabled, the opened windows will match the document size or any other preset proportions.

The «*Document frame*» parameter allows user to draw a frame around the document.

The «*Document frame color*» parameter defines the color of the frame around the document. To change this value click on the color box, and in the opened dialog box select any color value.

The «*Place of destination*» parameter defines how to open result of image conversion. To change this setting select one of options from the drop-down list: «*New Document*», «*New Layer*» or «*Replacement of layer*».

The «*History Size*» parameter defines the maximum number of user operations to undo. To change the size of the history, move the slider to the necessary value. The available range is from 0 to 1000.

The «*Size of browsing history*» parameter allows user to specify the maximum number of steps of the history of the user operations. To change the size of the history, move the slider to the necessary value. The value varies in a range from 0 to 1000.

The «*Snapping Cursor*» parameter is designed to anchor the cursor on nodes of vector objects.

The «*Saving*» parameter defines the document saving mode. Following options are available: merge all layers, merge only visible layers, or save only active layer. Select the desired option from the drop-down list.

The «*Apply mark*» parameter determines the mode in which the selection will be available in the layer: each separately or all together. Select the desired option from the drop-down list.

The «*Type of progress indicator*» parameter defines the type of progress indicators: the status bar or dialog. Select the desired option from the drop-down list.

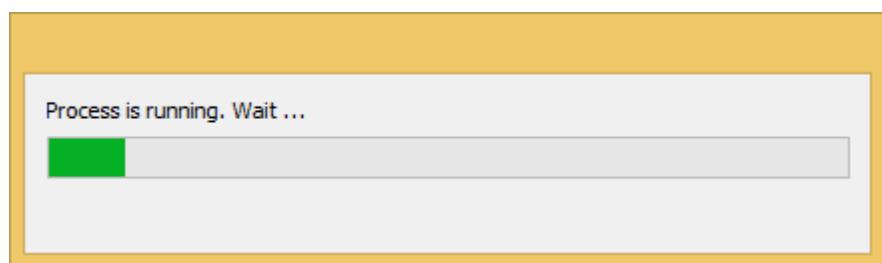


Fig. 104. «*Progress status*» dialog

«*Dialog delay*» parameter defines the time after which the dialog box will pop up. By default the parameter is 20 milliseconds.

«Preview file in the dialog» allows user to view the document's content before opening it in the dialog window.

«Print» parameter is designed for adjusting printing settings.

«Paper color» parameter defines the color of the background while printing. To change the color, click on the color box and pick a desired color value.

«Log» parameter is designed for adjusting the user operations log's settings.

«Log entry» parameter is used to enable or disable user operations logging. To enable the logging of user operations, select «On» option.

«Working directory» parameter allows user to set the location of the directory where the log file is stored. The log file name corresponds to the date and time of program operation's completion and it has the *.txt file format

«Period of storage (days)» defines the amount of days to store the log on the PC. After the expiration period, the old entries will be overwritten with the new ones.

4.3.9.2 «Detailed view» section

«Detailed view» section contains the detailed view settings. (Fig. 105).

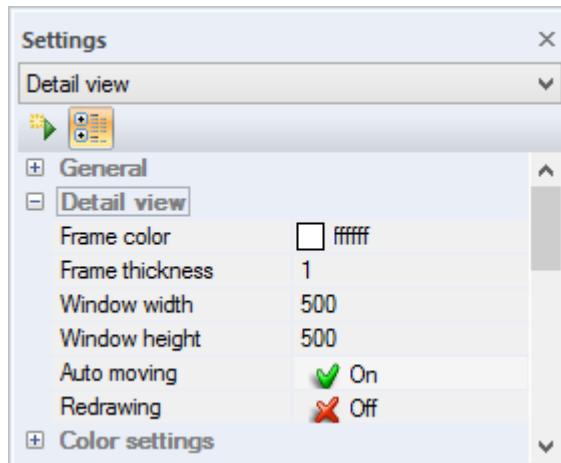


Fig. 105. Section «Detailed view»

«Border color» parameter defines the border color of the detailed view window. To change the color, click on the color box and pick a desired color value.

«Frame thickness» parameter defines the border thickness of the detailed view window. The higher the value, the thicker the frame is. It varies in the range from 1 to 15; move the slider to change the value.

«Window width» parameter allows user to set the width of the detailed view window. The value varies in the range from 200 to 5000; move the slider to change the value.

«Window height» parameter allows user to set the height of the detailed view window. The value varies in the range from 200 to 5000; move the slider to change the value.

«Auto move» parameter allows user to set the frame location change on the image, as it moves along the detailed view window. This parameter has two modes: «On» and «Off».

«Redraw» parameter is designed for image visualization while navigating the detailed view window adjustment. This parameter has two modes: «On» and «Off».

User can set the width, height and zoom factor for magnifying glass tool.

«Glass width» parameter allows user to set the width of magnifying glass by entering the desired value on the keyboard.

«Glass height» parameter allows user to set the height of magnifying glass by entering the desired value on the keyboard.

«Zoom scale» defines the zoom scale of magnifying glass. The value varies in range from 1 to 10; move the slider to change the value.

4.3.9.3 «Color settings» section

«Color settings» section is used to adjust color settings in IMC software (Fig. 106).

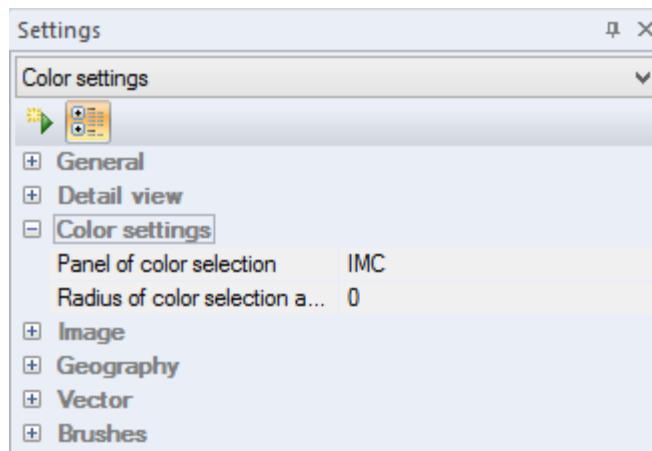


Fig. 106. «Color settings» section

«Panel of color selection» parameter allows user to select the type of color selection panel. There are three available options: Image Media Center (IMC), Windows and MFC. Pick any of these options from drop-down list to change the panel type.

«Windows» option.

When the «Windows» option is selected, the «Color» dialog box will open (Fig. 107).

«Basic colors» section is a set of colors; user can select one of the available options (Fig. 108).

Click on the cell with the necessary color to select it. Selected cell will become outlined.

To select the additional color, press «*Define custom color*» button (Fig. 109).

Move a cursor to the necessary color on color matrix to select it.

To adjust the contrast, move the cursor up or down, to adjust the hue, move the cursor left or right.

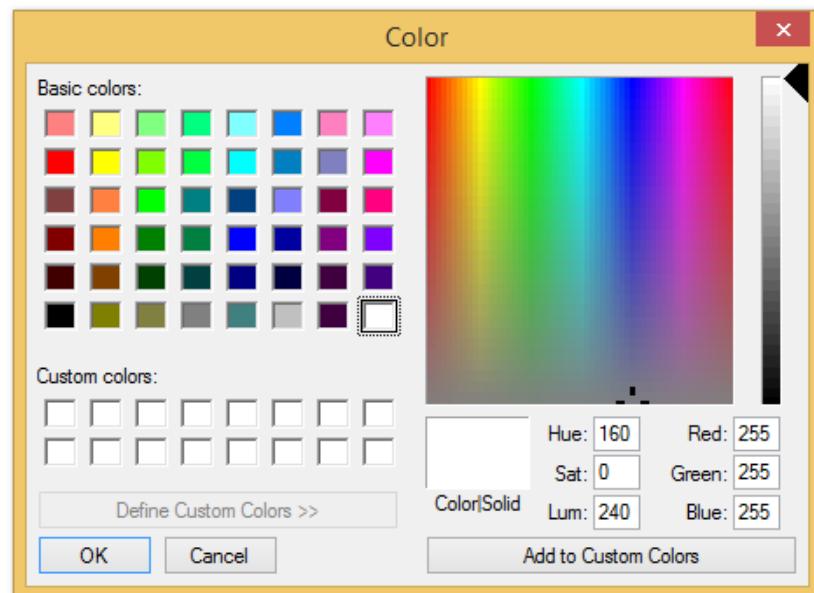


Fig. 107. «*Color*» dialog box

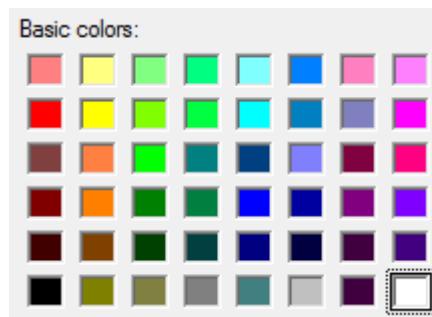


Fig. 108. «*Basic colors*» section

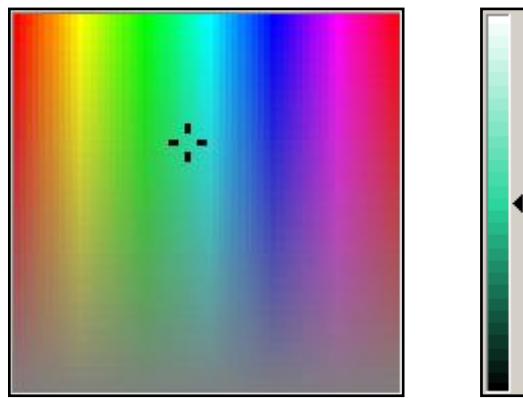


Fig. 109. *Color matrix*

To adjust the brightness, move the slider on the right from the color matrix up or down.

Selected color will be displayed in the «*Color|Fill*» field.

Press «*Add to custom color*» button to set the selected color as a «*Custom color*».

Selected color will be placed in the selected cell.

To change the hue, brightness or contrast, as well as the levels of red, green or blue colors, move the cursor on the color matrix or enter the numeric values to the corresponding boxes (Fig. 110).



Fig. 110. *Changing the numeric values*

Contrast defines the purity of the selected color, the higher the contrast value, the more pure is the color.

The brightness value varies in the range from 0 (black color) to 240 (white color). If the «*Contrast*» is 0, «*Brightness parameter*» will define the shade of grey color.

Set the levels of red, green or blue in «*Red*», «*Green*» and «*Blue*» fields. The allowable range is from 0 to 255.

«*IMC*» option.

Select the «*IMC*» option and the «*Color*» dialog box will open (Fig. 111).

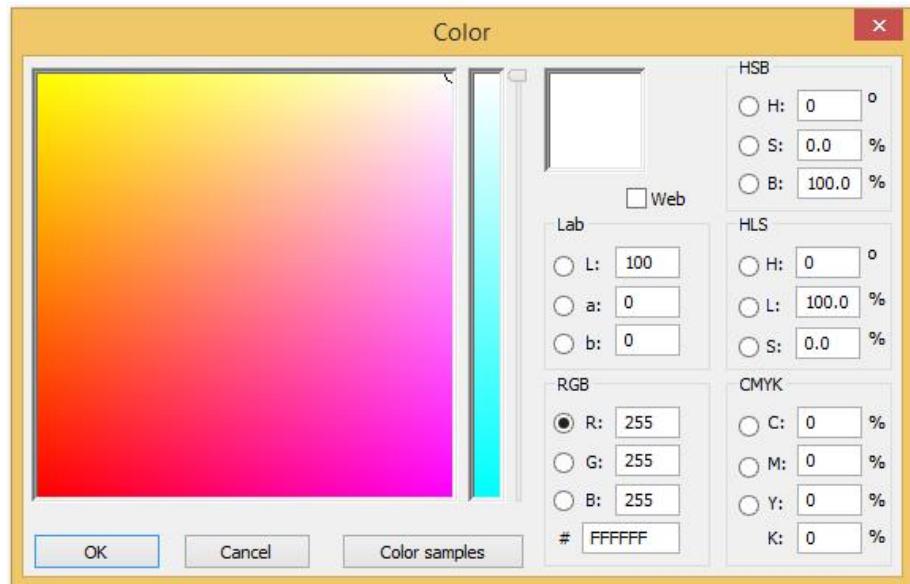


Fig. 111. «Color» dialog box

«IMC» «Color» dialog provides user with greater color adjustment possibilities, compared to the same Windows standard dialog.

The color can be specified using various color models: HSB, Lab, HLS, RGB, CMYK.

Color matrix is used for color selection (Fig. 112).

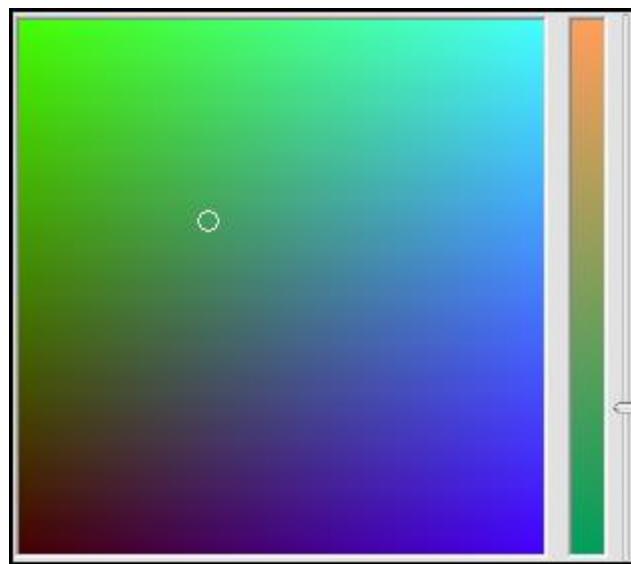


Fig. 112. Color matrix

The slider on the left of the color matrix is designed for adjusting any specific color feature of a corresponding color model. Selected feature is marked with the dot.

Color features of different color models are displayed in groups. (Fig. 113).

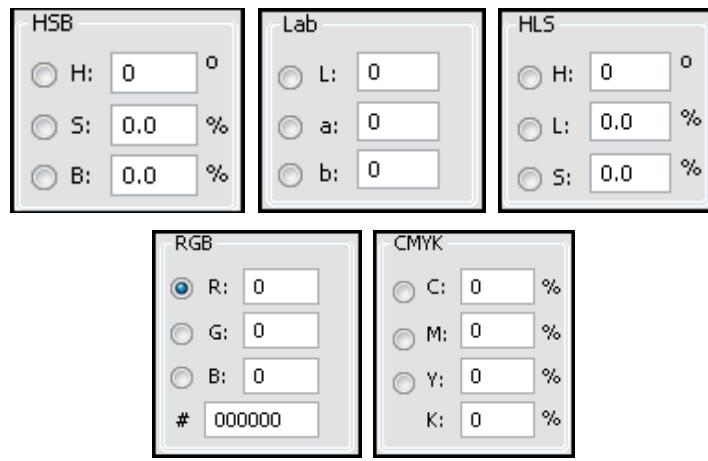


Fig. 113. *Color features of different color models*

The color value is displayed in RGB hexadecimal format, which varies in the range from 000000 (black) to FFFFFF (white).

The currently selected color is displayed at the top of the color field, and the previously selected color is displayed at the bottom part.

There is a color palette, which will be displayed on the user's monitor in a similar way, regardless of the equipment and the set-up used to produce it. The colors which do not belong to the device independent color palette will be replaced with the nearest color value from it. It can cause a color distortion and lead to an incorrect display of the graphic data. Put a "check" to «Web» checkbox to make sure you are using the device independent colors (Fig. 114).

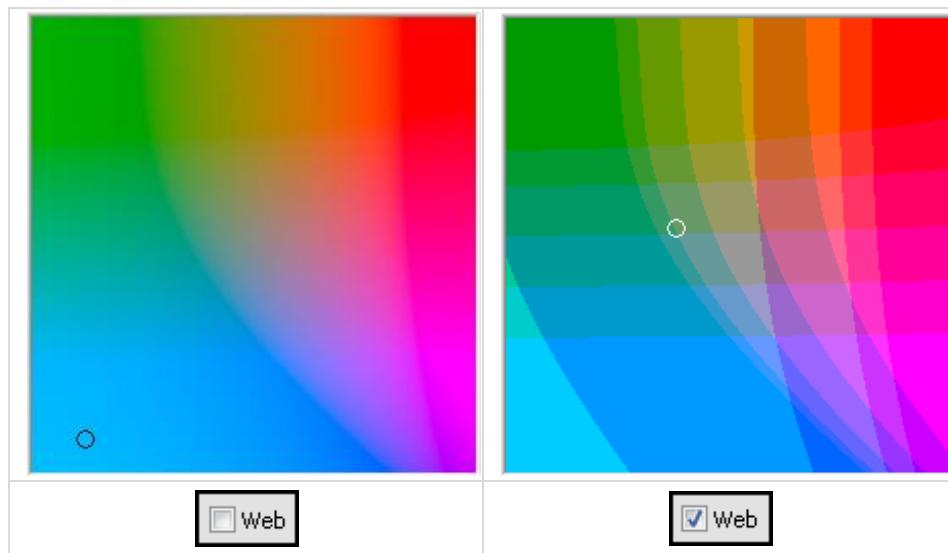


Fig. 114. *«Web» color scheme activation*

«MFC» option.

Select the «MFC» option and the «Color» dialog box will open (Fig. 115).

The standard color set includes color and black-and-white palettes. Select a color by clicking on it with the left mouse button.

The custom set is similar to the Windows standard color selection tool.

Press «Select...» button, then move the “eyedropper” to the necessary color and click on it. The currently selected color is displayed at the top of the color field, and the previously selected color is displayed at the bottom part.

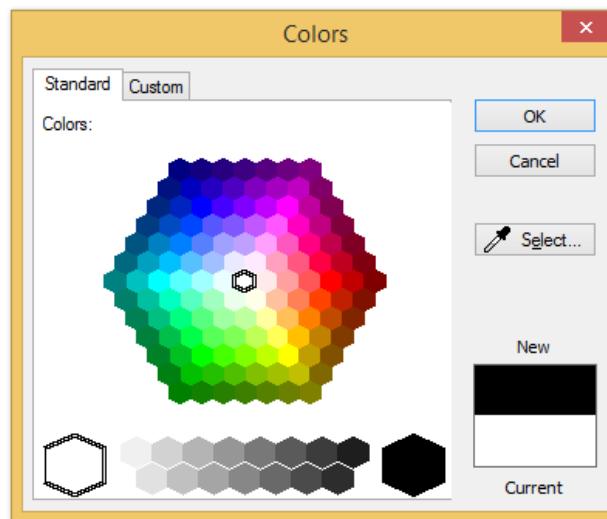


Fig. 115. «Color» dialog box

The «Radius of color selection» item of «Color Settings» section allows user to adjust the radius of color selection. The value varies in the range from 0 to 10; use the slider to change the value.

4.3.9.4 «Image» section

«Image» section contains information about the raster image and particular pixels (Fig. 116).

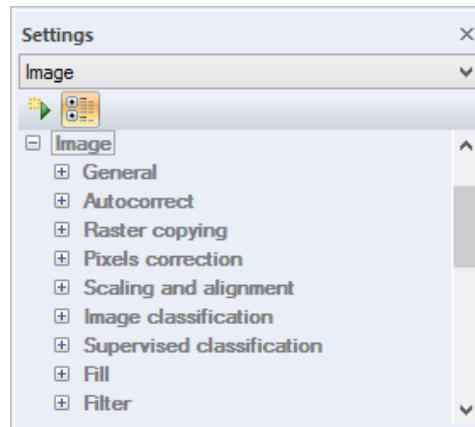


Fig. 116. «Image» section

«General» section contains the general information about the image (Fig. 117).

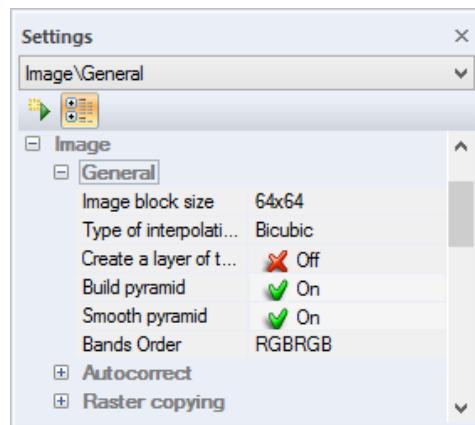


Fig. 117. «General» section

«Image block size» parameter is designed to set the size of the part of the image which will be stored in RAM. When image is opened in IMC software, it is converted to an *.imc file format, which processes blocks instead of the lines. It speeds up the image's visualization and software performance in general.

«Interpolation type» parameter allows user to select the type of image transformation (for example, while rotating the image).

«Create a transparency layer» parameter defines whether to create an alpha-channel or not, while combining the raster layers.

«Generate a pyramid» parameter is designed for adjusting the image visualization with the optimal details' level while zooming, which reduced the image processing time.

«Smooth pyramid» is designed for eliminating the asperities on the straight contours, which can appear after reducing the image's scale.

«*Bands order*» parameter allows user to set the order in which the information about color bands is stored in a file. It may affect the precessing time in some cases.

RGBRGB – is used when it is necessary to analyse all color bands of the image simultaniously during the processing (for example, during supervised classification, clusterization, etc.).

RRGGBB – color bands' processing is performed successively. This order is used when it is required to process one color bands at a time.

RR|GG|BB - color bands' processing is performed successively; information about each color band is stored in a separate temporary file.

RGBRGB is the order which is used by default.

«*Automatic correction*» section is designed for image quality improvement (Fig. 118).

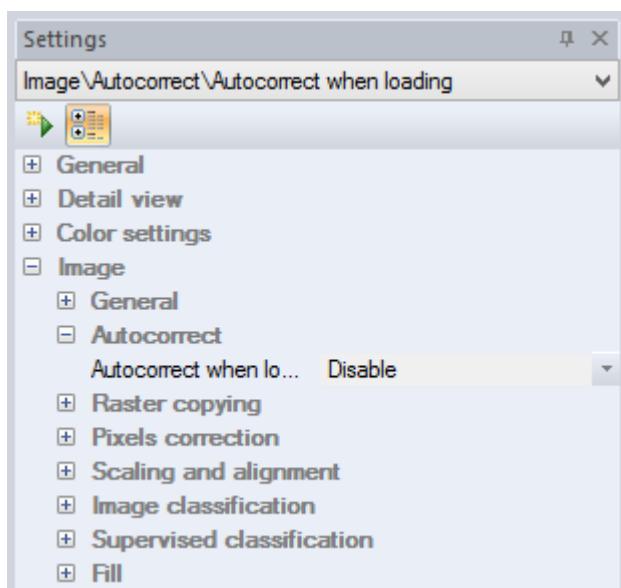


Fig. 118. «*Automatic correction*» section

«*Autocorrect when loading*» parameter determines the method of image enhancing while loading. The following options are available: «*Autolevels*», «*Autocontrast*» and «*Autocolor*». If the parameter is disabled, no auto enhancement will be performed.

«*Raster copying*» section defines the parameters of image copying (Fig. 119).

When the «*Pixel is completely in the area*» parameter is on, only the pixels that fully included inside the borders of fragment will be copied. If the parameter is off, pixels that intersect the border will be copied along with the pixels that belong to area of selection fully. Click on the parameter value to change it.

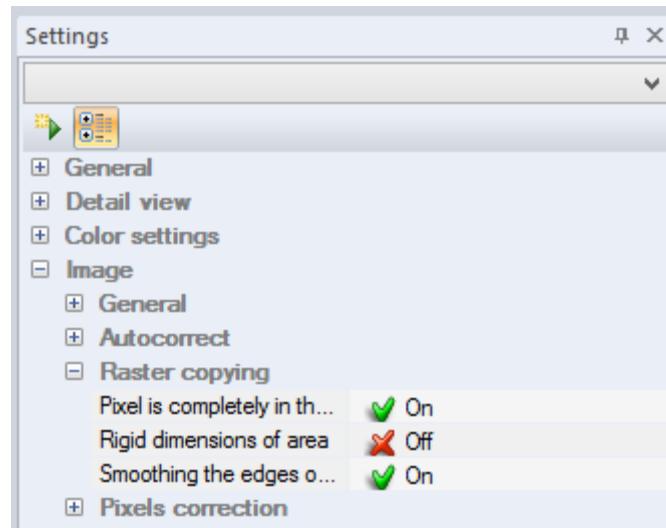


Fig. 119. «Raster copying» section

«Rigid dimensions of area» parameter allows user to set a fixed size of the area. Click on the parameter value to change it.

«Smoothing the edges of new raster» parameter is used to smooth the image's edges. Edge pixels are often transparent. The transparency value for border pixels is calculated according to the ratio of pixel size to the size of the area of the pixel that belongs to the image. Click on the parameter value to change it.

«Pixel correction» contains the settings of pixel correction table (Fig. 120).

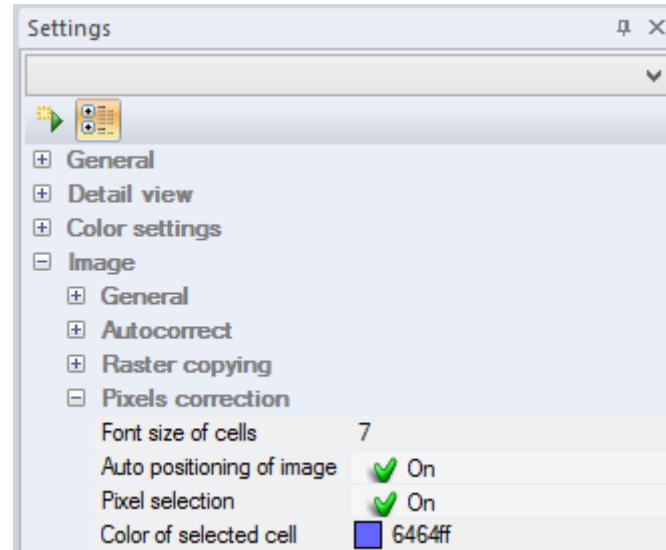


Fig. 120. «Pixel correction» settings

«Font size of cells» parameter defines the font size inside the cells of the table.

When the «*Auto positioning of the image*» parameter is on, image will be positioned relative to the selected pixel values in the table and the table will be positioned relative to the selected pixels on the image. Click on the parameter value to change it.

«*Pixel selection*» parameter defines the selected pixel on the image. Click on the parameter value to change it. When the parameter is on, the selected pixel will be highlighted; when the parameter is off, selected pixel won't be highlighted.

«*Color of selected cell*» parameter defines the color of the border of highlighted pixels. To change the color, click on the color box and select any necessary color.

«*Scaling and alignment*» section is designed to adjust the parameters of scaling and alignment (Fig. 121).

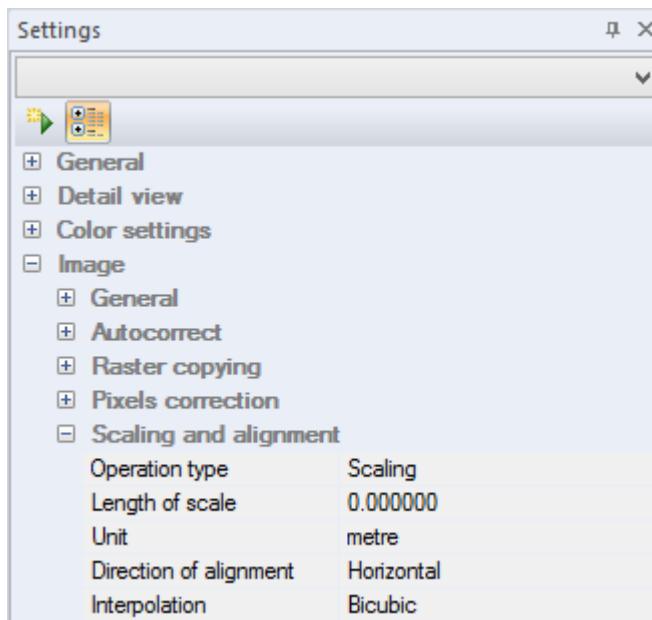


Fig. 121. «*Scaling and alignment*» section

«*Operation type*» parameter defines the type of operation (scaling or alignment). To change the parameter settings, select one of the options from drop-down list.

«*Length of scale*» defines the scale length. To change the parameter, enter the necessary value in the box.

«*Unit*» parameter allows user to select the unit type. To change the parameter settings, select one of the options from drop-down list.

«*Direction of alignment*» parameter defines the direction of alignment (vertical or horizontal). To change the parameter settings, select one of the options from drop-down list.

To select the type of interpolation, select one of the options from drop-down list.

«*Image classification*» contains the parameters of image classification settings (Fig. 122).

«Vectorize result» parameter provides a possibility to create vector layers for each type of objects automatically.

«Color image» parameter provides a possibility to create a color raster image as a result of clustering.

«Apply majority filter» allows user to filter the result of clustering according to the specified settings, such as «Filter radius» and «Filter threshold».

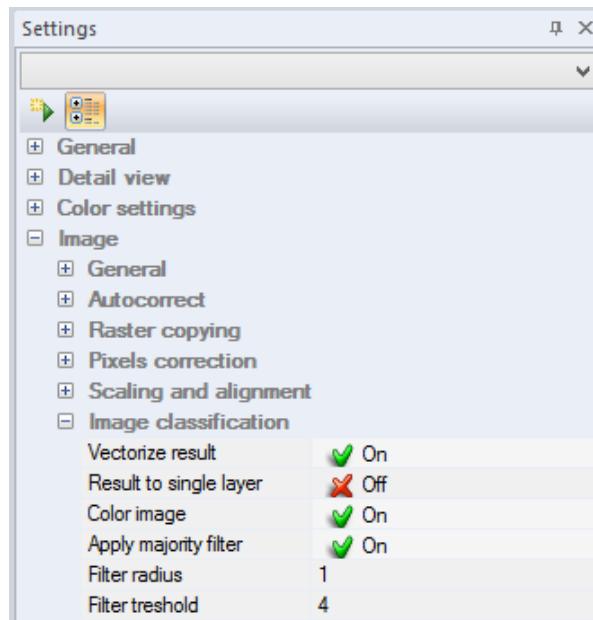


Fig. 122. «Image classification» section

«Supervised classification» section allows user to apply «Average group statistic» parameter (Fig. 123).

When the parameter is on, the pixel brightness values inside all selections are averaged within the class of objects. When the parameter is off, the classification is performed according to the brightness of pixels in all selections separately.

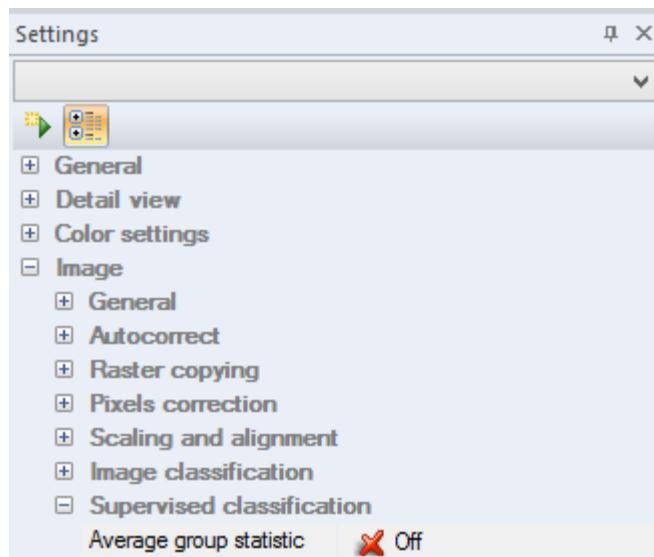


Fig. 123. «*Supervised classification*» section

«*Fill*» section contains the parameters of area fill (Fig. 124).

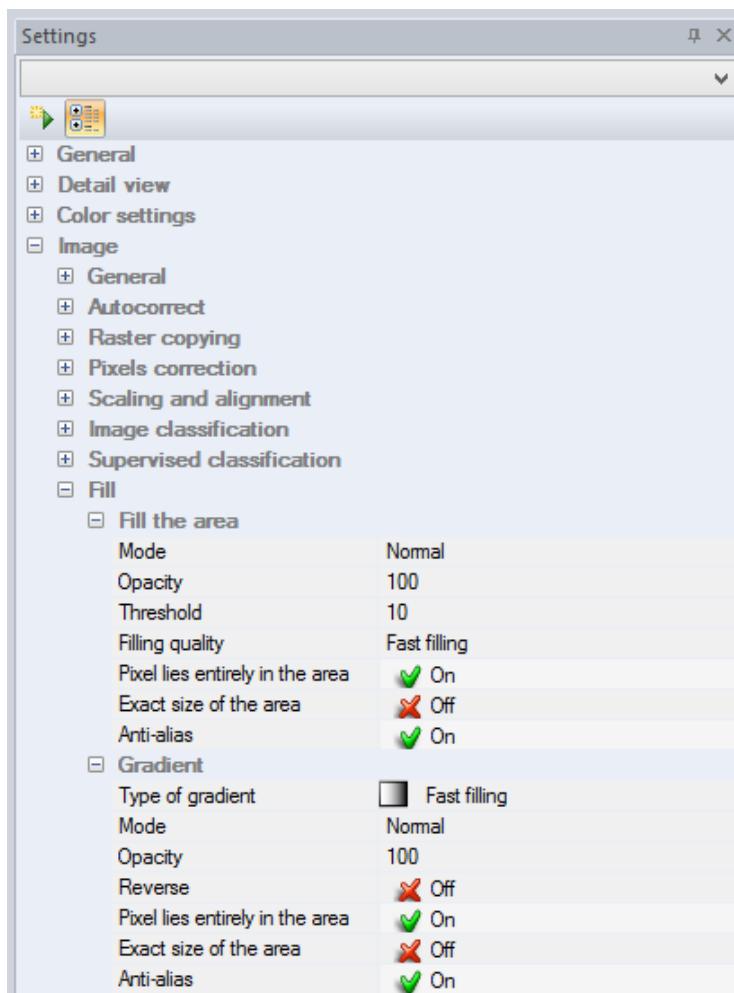


Fig. 124. «*Fill*» section

«*Mode*» parameter defines the blend mode of fill.

«*Opacity*» parameter defines the transparency of the fill. Parameter is measured in percents. Move the slider to change the value of transparency.

«*Threshold*» parameter allows user to set the fill sensitivity threshold. The value varies in range from 0 to 255. The higher is the threshold value, the greater is the tolerance of the fill, which means how different in tone and color a pixel can be from the area user clicked on for it to be included in the fill. When the threshold value equals 0, only adjacent pixels of exactly same color will be filled. If the threshold value equals 255; the whole layer will be filled. The examples of fill with different threshold values are displayed on the Fig. 125.

«*Filling quality*» parameter contains two options: «*Fast filling*» and «*Accurate filling*» To change this parameter, select one of the options from the drop-down list.

Set the parameter «*Pixel lies entirely in the area*» on, to fill only the pixels that are fully included in the area of selection.

To apply fill to the area of the exact size, use the «*Exact size of the area*» parameter.

«*Anti-alias*» parameter is used to smooth the edges of the filled area.

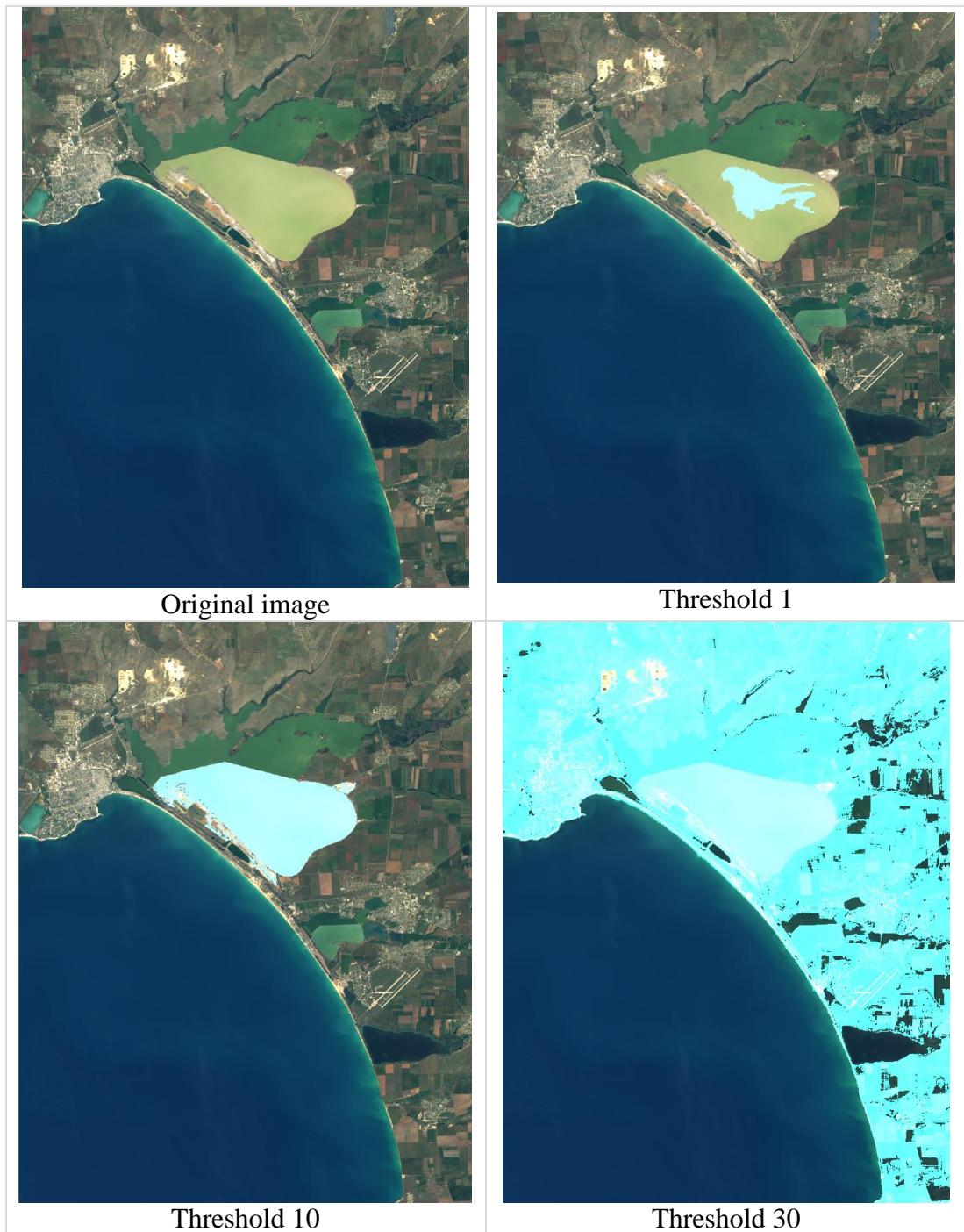


Fig. 125. *Fill with different threshold values*

«Gradient» contains the parameters of area gradient fill.

«Type of gradient» parameter determines the type of gradient.

«Mode» parameter defines the blend mode of gradient fill.

«Opacity» parameter is used to adjust the gradient transparency. Value varies in range from 0 to 100. Move the slider to change the value

User can reverse the direction of gradient using «Reverse» parameter.

Set the parameter «Pixel lies entirely in the area» on, to fill only the pixels that are fully included in the area of selection.

To apply gradient fill to the area of the exact size, use the «Exact size of the area» parameter.

«Anti-alias» parameter is used to smooth the edges of the filled area.

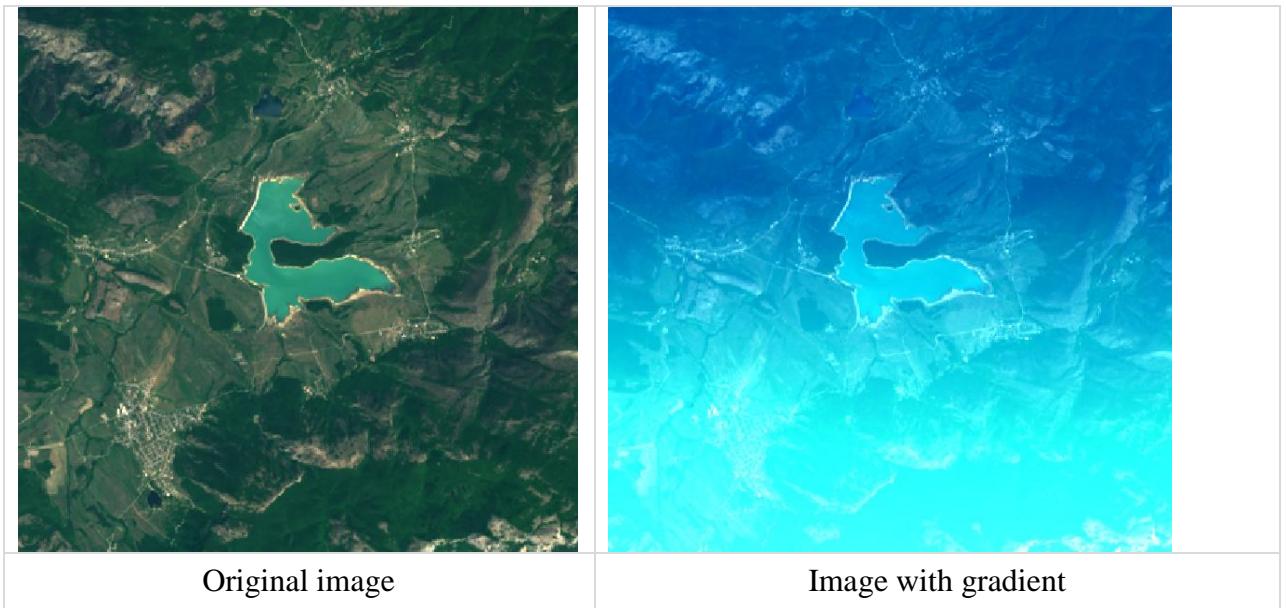


Fig. 126. *Gradient examples*

4.3.9.5 «Geography» section

«Geography» section contains information about pixel type, its width and height (Fig. 127).

□ Geography	
□ Accuracy of representation	
Linear units	3
Angular units	1
Pixel type	Areal
Pixel width	1.000000
Pixel height	1.000000
Type of projection transformation	OGR

Fig. 127. *«Geography» section*

«Accuracy of representation» parameter allows user to set the precision (number of decimal digits) of coordinates.

«Pixel type» parameter has two options «Areal» and «Dotted».

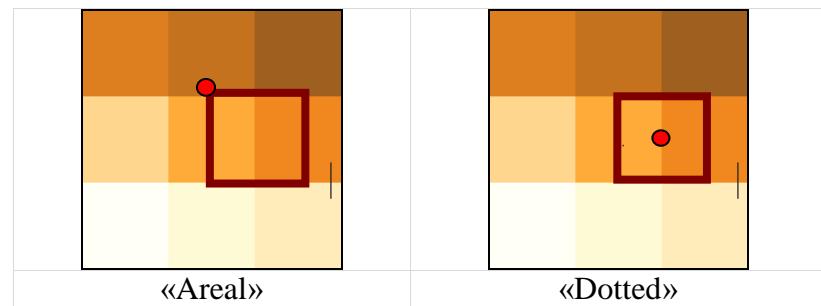


Fig. 128. *Pixel types*

«Pixel width» and «Pixel height» parameters are used to set pixel width and height.

4.3.9.6 «Vector» section

«Vector» section contains the parameters of vector objects (Fig. 129)

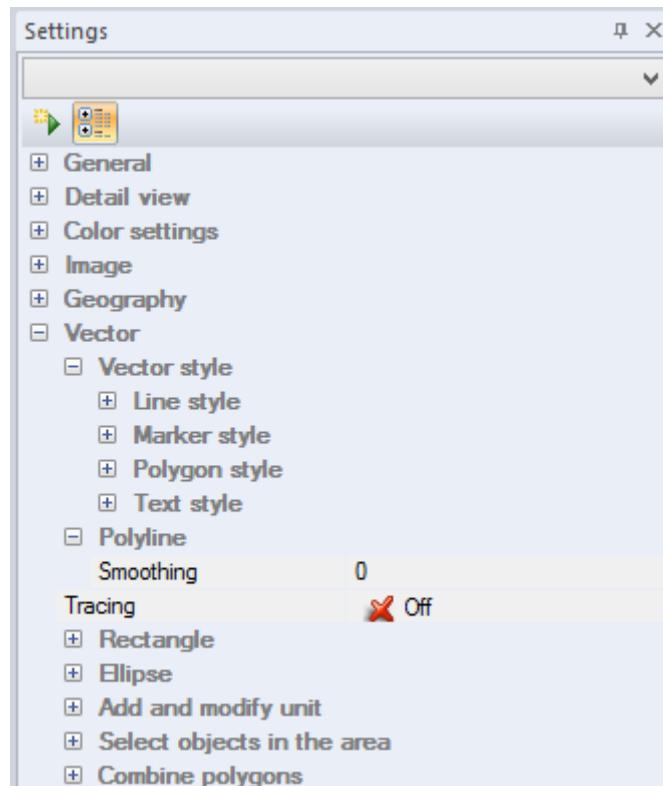


Fig. 129. *«Vector» section*

«Vector» section contains following sub-section:

- «Vector styles» sub-section which contains the parameter settings for different types of vector objects, such as vector line, vector point, vector polygon and vector text.
- «Polyline» sub-section which is designed for polyline's settings adjustment.

4.3.9.7 «Brushes» section

«Brushes» section contains the parameters of brushes described in the clause 3.2.3 (Fig. 130).

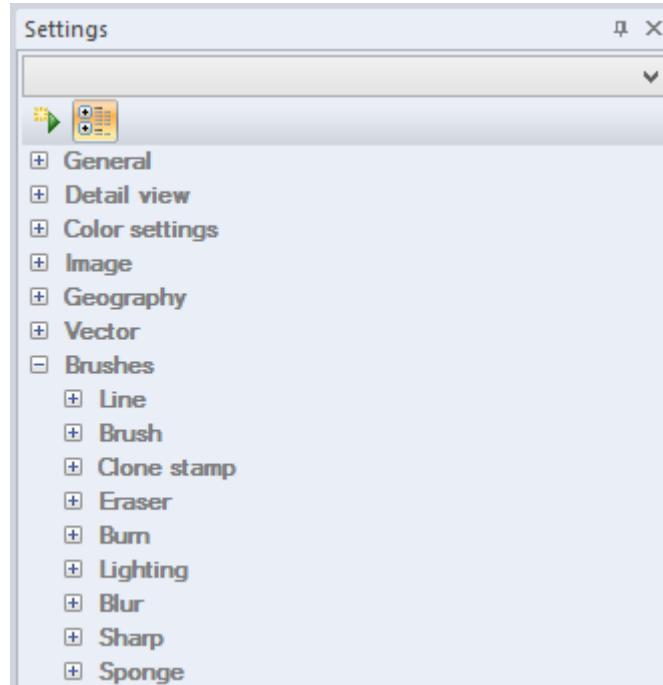


Fig. 130. «Brushes» section

«Line» section contains the parameters of line brush (Fig. 131).

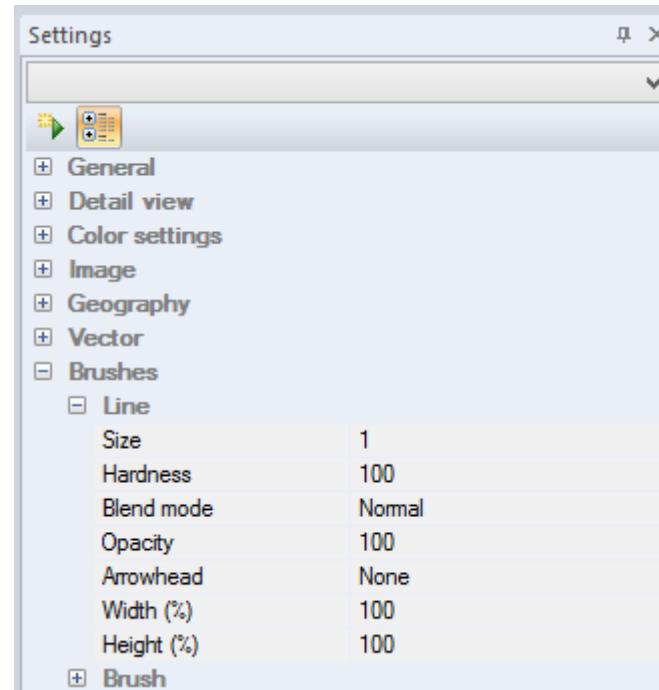


Fig. 131. «Line» section

«Size» parameter defines the width of the line. The value varies in the range from 1 to 150. Move the slider to change the size of the line.

«Hardness» parameter defines how crisp the edges of the line are. The more you increase the «Hardness» percentage, the cleaner the line. For a more diffused edge, decrease the «Hardness». Move the slider to change the hardness of the line.

«Blend mode» parameter defines the blend mode of the line on the image. To change the blend mode, select one of the options from the drop-down list.

«Opacity» parameter defines the transparency level of the line. Move the slider to change the opacity of the line.

«Arrowhead» parameter allows user to add arrowheads to the ends of the line. To add an arrowhead, select one of the options from the drop-down list.

«Arrowhead height» and «Arrowhead width» define the size of the arrowheads on the ends on the line. Move the slider to change the arrowhead size.

«Brush» section contains the parameters of the brush (Fig. 132).

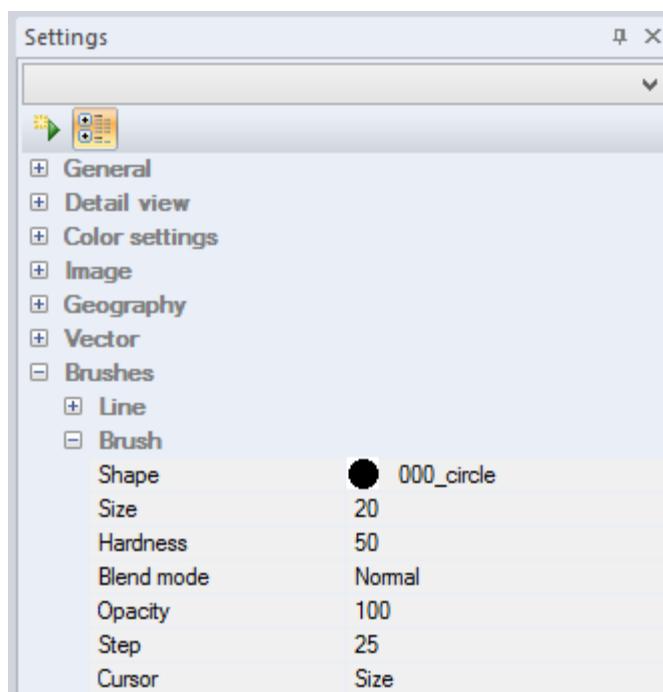


Fig. 132. «Brush» section

«Shape» parameter defines the brush's shape. Click on the icon to open the list of shapes. User can own add custom brushes to the list by copying them to «Brushes» folder of «IMC» installation directory.

«Size» parameter defines the width of the brush. The value varies in the range from 1 to 150. Move the slider to change the size of the brush.

«Hardness» parameter defines how crisp the edges of the brush are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the brush.

«Blend mode» parameter defines the blend mode of the brush stroke on the image. To change the blend mode, select one of the options from the drop-down list.

«Opacity» parameter defines the transparency level of the brush stroke. Move the slider to change the opacity of the brush.

«Step» parameter determines how often the brush is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 255.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

Press «Shift», key to draw a straight horizontal or vertical line.

«Stamp» section contains the parameters of the stamp.

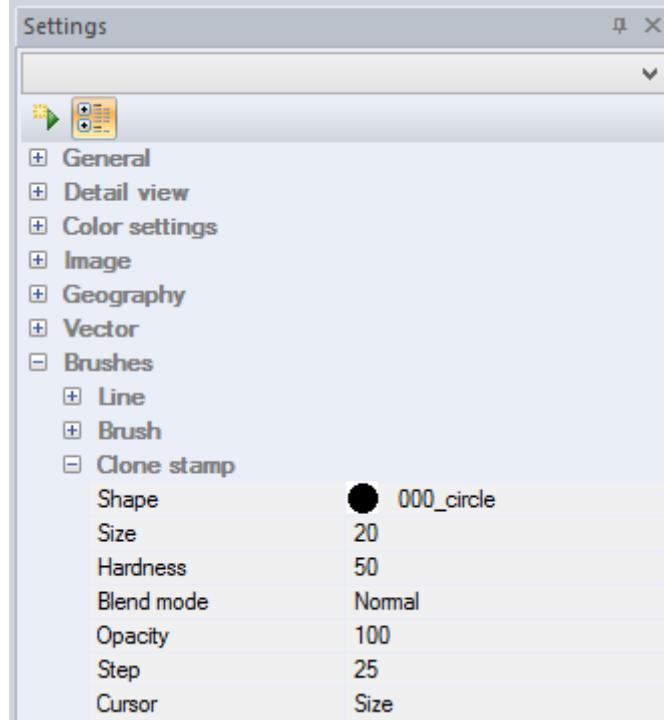


Fig. 133. «Stamp» section

«Shape» parameter defines the stamp's shape. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the stamp. The value varies in the range from 1 to 150. Move the slider to change the size of the stamp.

«Hardness» parameter defines how crisp the edges of the stamp are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the stamp.

«Blend mode» parameter defines the blend mode of the brush stroke on the image. To change the blend mode, select one of the options from the drop-down list.

«Opacity» parameter defines the transparency level of the stamp. Move the slider to change the opacity of the stamp.

«Step» parameter determines how often the stamp is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 255.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

Press «Shift», key to draw a straight horizontal or vertical line

«Eraser» section contains the parameters of the eraser (Fig. 134).

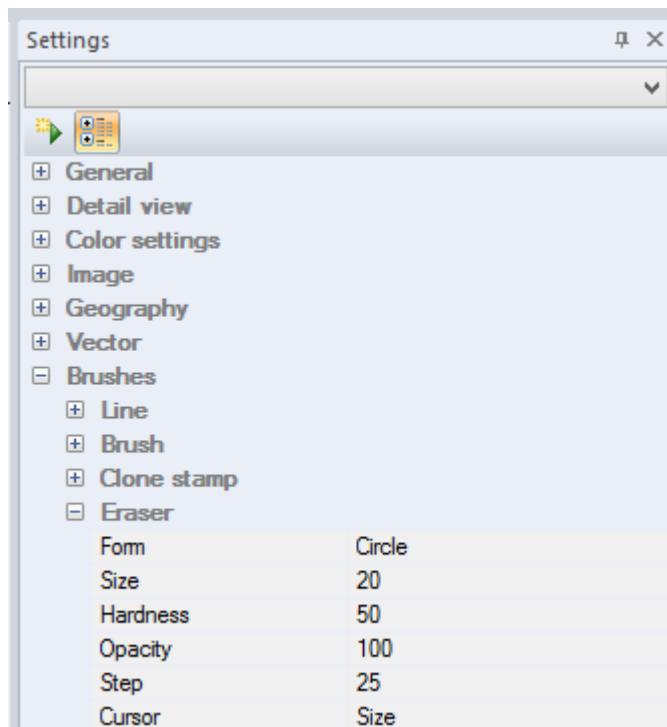


Fig. 134. «Eraser» section

«Form» parameter defines the eraser's shape. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the eraser. The value varies in the range from 1 to 150. Move the slider to change the size of the eraser.

«Hardness» parameter defines how crisp the edges of the eraser are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the eraser.

«Opacity» parameter defines the transparency level of the eraser. Move the slider to change the opacity of the stamp.

«Step» parameter determines how often the eraser is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

«Burn» section contains the parameters of the burn tool (Fig. 135).

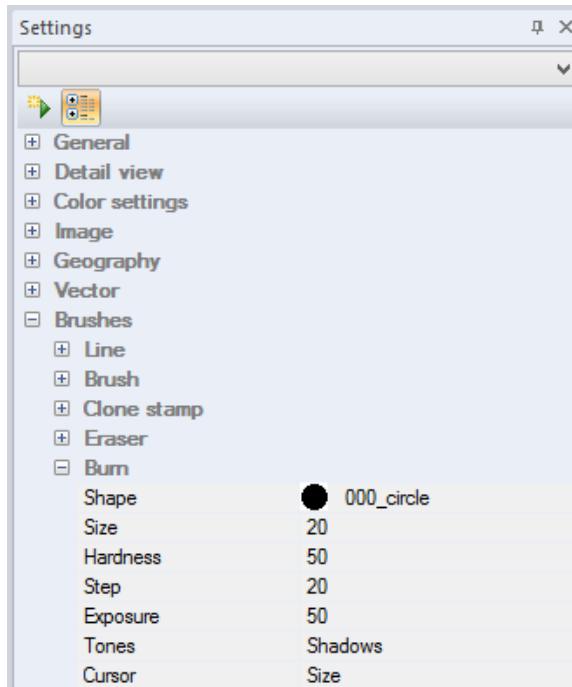


Fig. 135. «Burn» section

«Shape» parameter defines the shape of the burn tool. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the burn tool. The value varies in the range from 1 to 150. Move the slider to change the size of the burn tool.

«Hardness» parameter defines how crisp the edges of the burn tool are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the burn tool.

«Step» parameter determines how often the burn tool is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Exposure» parameter determines the exposure in percent. Move the slider to change the exposure.

«Tones» parameter determines the tonal range which burn tool affects. «Tones» parameter has three range settings: «Highlights», «Midtones», and «Shadows».

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

«Lighting» section contains the parameters of the lighting tool (Fig. 136).

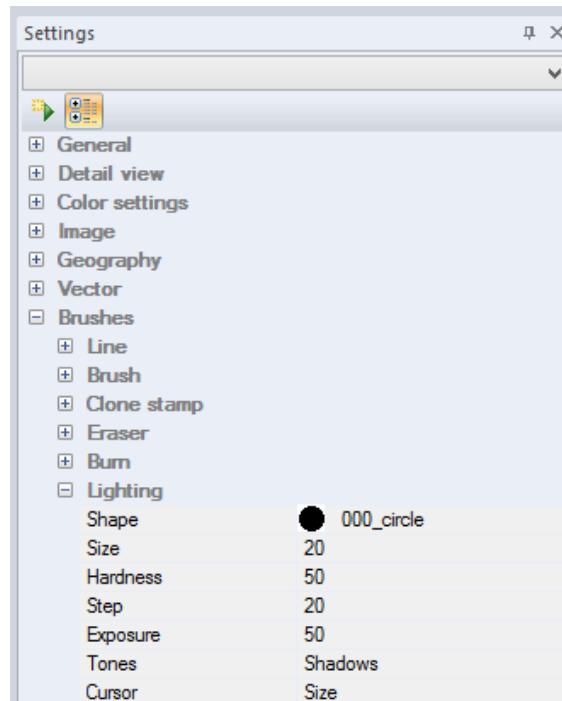


Fig. 136. «Lighting» section

«Shape» parameter defines the shape of the lighting tool. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the lighting tool. The value varies in the range from 1 to 150. Move the slider to change the size of the lighting tool.

«Hardness» parameter defines how crisp the edges of the lighting tool are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the lighting tool.

«Step» parameter determines how often the lighting tool is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Exposure» parameter determines the exposure in percent. Move the slider to change the exposure.

«Tones» parameter determines the tonal range which lighting tool affects. «Tones» parameter has three range settings: «Highlights», «Midtones», and «Shadows».

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

«Blur» section contains the parameters of the blur tool (Fig. 137).

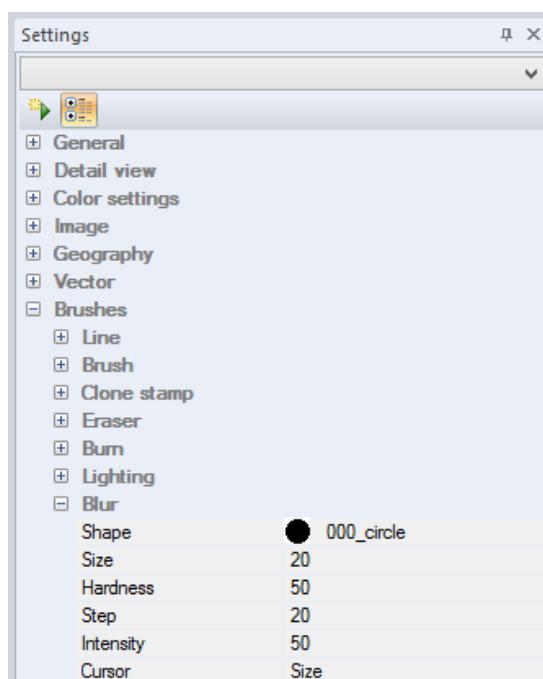


Fig. 137. «Blur» section

«Shape» parameter defines the shape of the blur tool. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the blur tool. The value varies in the range from 1 to 150. Move the slider to change the size of the blur tool.

«Hardness» parameter defines how crisp the edges of the blur tool are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the blur tool.

«Step» parameter determines how often the blur tool is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Intensity» parameter determines the intensity of blur in percent. Move the slider to change the intensity.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

«Sharp» section contains the parameters of the sharp tool (Fig. 138).

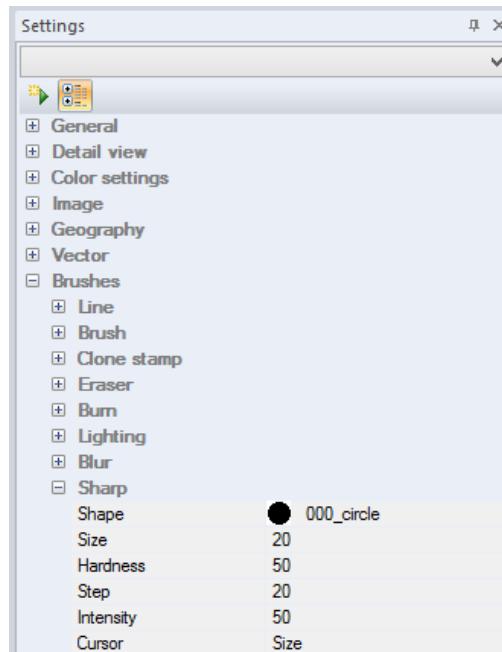


Fig. 138. «Sharp» section

«Shape» parameter defines the shape of the sharp tool. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the sharp tool. The value varies in the range from 1 to 150. Move the slider to change the size of the sharp tool.

«Hardness» parameter defines how crisp the edges of the sharp tool are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the sharp tool.

«Step» parameter determines how often the sharp tool is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Intensity» parameter determines the intensity of sharp in percent. Move the slider to change the intensity.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip

«Sponge» section contains the parameters of the sponge tool (Fig. 139).

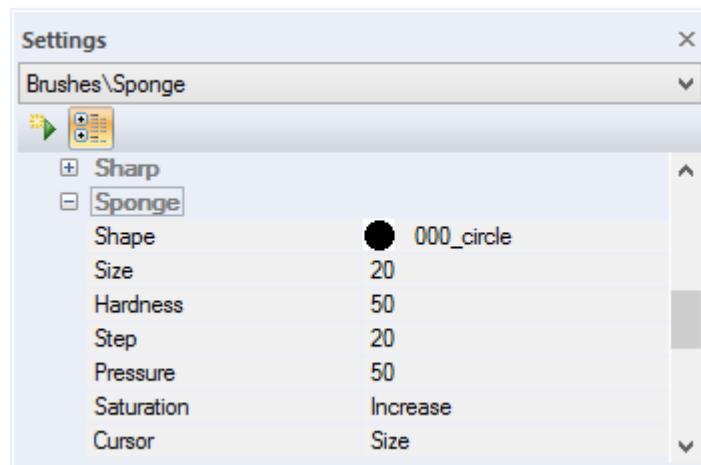


Fig. 139. «Sponge» section

«Shape» parameter defines the shape of the sharp tool. Click on the icon to open the list of shapes.

«Size» parameter defines the width of the sharp tool. The value varies in the range from 1 to 150. Move the slider to change the size of the sharp tool.

«Hardness» parameter defines how crisp the edges of the sharp tool are. The more you increase the Hardness percentage, the cleaner the brush stroke. For a more diffused edge, decrease the Hardness. Move the slider to change the hardness of the sharp tool.

«Step» parameter determines how often the sharp tool is sampled onto the layer. Lower values place the samples close together, and higher values space them out. Value varies in range from 1 to 100.

«Pressure» parameter determines the intensity of sponge tool in percent. Move the slider to change the pressure

«Saturation» parameter determines whether the sponge tool increases or decreases saturation of the colors on the image.

«Cursor» parameter is designed for setting cursor preferences. User can choose between «Standard», «Pointer», and «Size» options. «Standard» cursor looks like a small brush icon; user should draw with the tip of the brush. «Pointer» cursor looks like a crosshair, the brush stroke will begin from the center of the crosshair. «Size» cursor looks like circle which size corresponds to the size of selected brush tip.

4.3.9.8 «Crop» section

«Crop» section allows user to adjust the image cropping settings (Fig. 140).

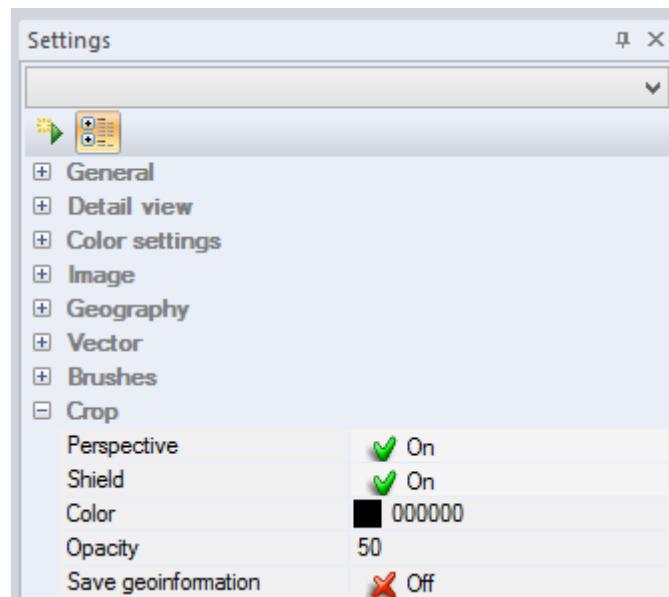


Fig. 140. «Crop» section

4.3.9.9 «Design» section

«Design» section contains the preferences of map design elements (Fig. 141).

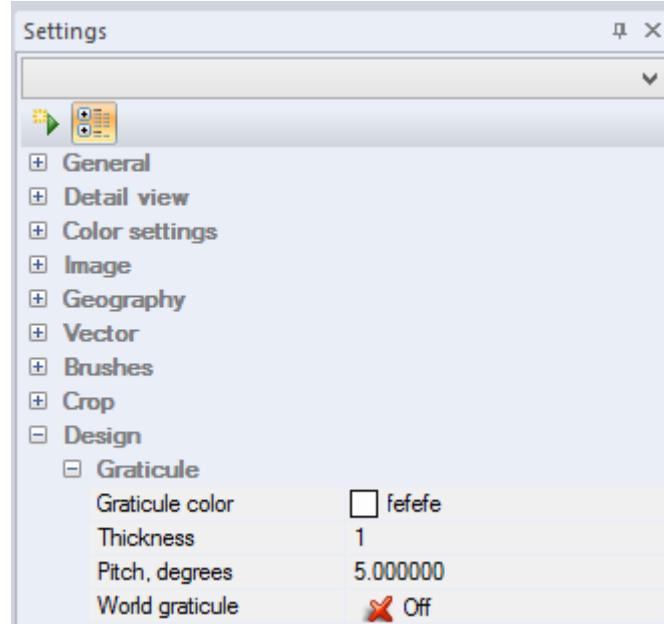


Fig. 141. «Design» section

4.3.9.10 «Google maps» section

«Google maps» section contains the «*Cash size*» parameter and allows user to adjust the size of intermediate buffer.

4.3.9.11 «Grid» section

«Grid» section contains a set of parameters for grid adjustment, such as color, style, measurements units, etc. (Fig. 142).

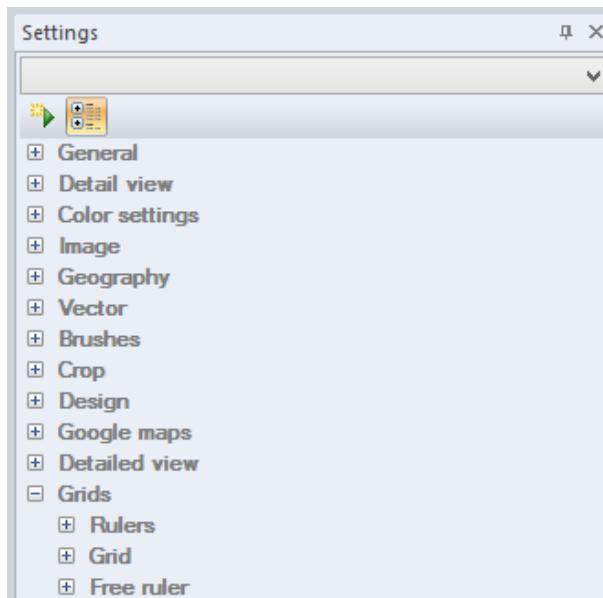


Fig. 142. «Grid» section

4.3.9.12 «Selection» section

«Selection» section contains the parameters of selection (Fig. 143).

«Selection» section consists of following sub-sections:

- «*Rectangle selection*» sub-section contains parameters of rectangular selection, such as width, height, style, and smoothing;
- «*Polygonal selection*» sub-section contains parameters of polygonal selection, such as smoothing;
- «*Circle selection*» sub-section contains parameters of circular selection, such as style radius;
- «*Ellipse selection*» sub-section contains parameters of elliptic selection, such as width height style smoothing;
- «*Arbitrary selection*» sub-section contains parameters of arbitrary selection, such as smoothing thinning out;
- «*Color range*» sub-section contains parameters of color range selection tool, such as smoothing threshold selection quality;
- «*Combine selections*» sub-section contains parameters of selection combination, such as thinning out.

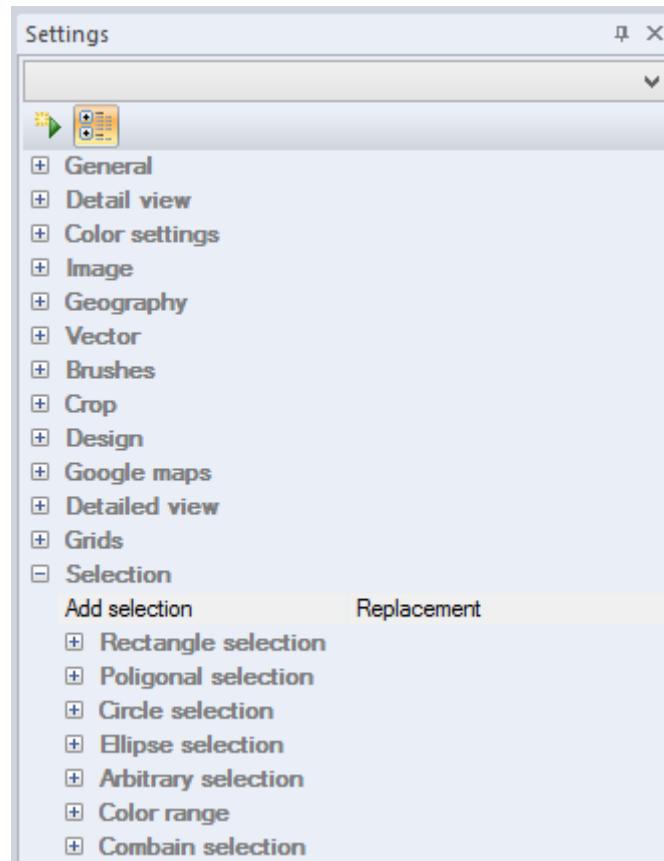


Fig. 143. «Selection» section

4.3.9.13 «Database of spectrogram» section

«Database of spectrogram» section allows user to adjust the spectrogram database connection settings, such as driver, server, port number, database name and user name (Fig. 144).

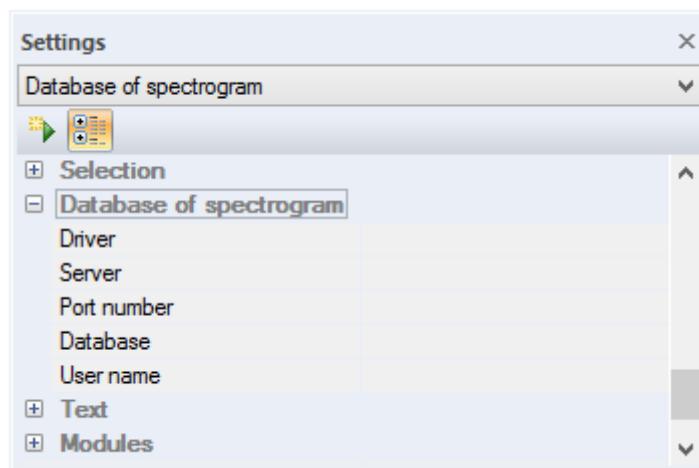


Fig. 144. «Database of spectrogram» section

4.3.9.14 «Text» section

«Text» section contains a set of parameters for text adjustment (Fig. 145).

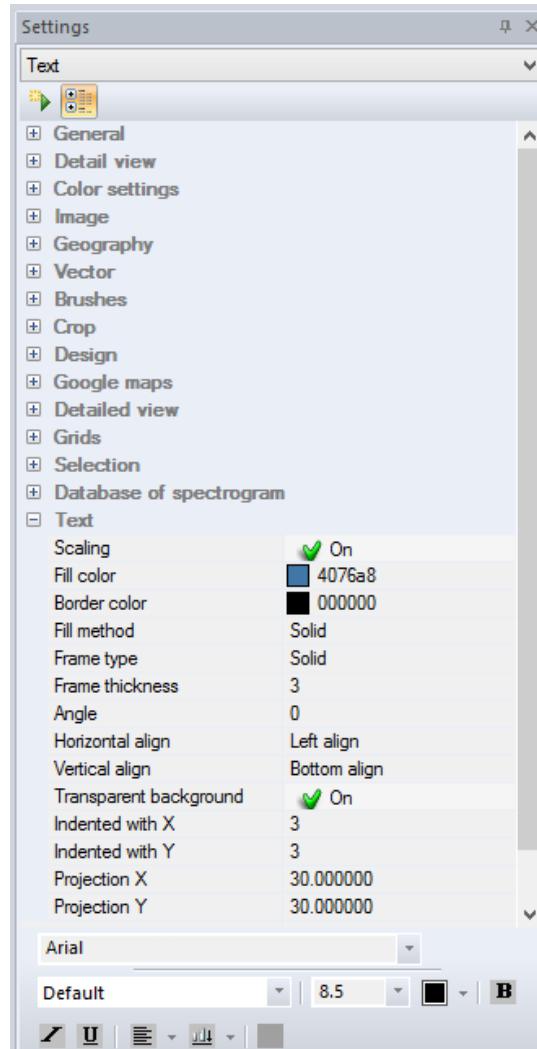


Fig. 145. «Text» section

4.3.10. Status panel

Status panel is designed to indicate the status of the current operations.

This panel contains the name of the active document **New document2**, and cursor coordinates **X: 12.314 Y: 1.995**.

If the «Type of process indicator» in «General» tab of «Settings» panel is set to «Status bar», status panel will display the information about the progress of current operation (Fig. 146).

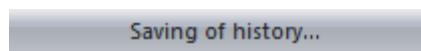


Fig. 146. Progress bar on the status panel

In the bottom right corner of the panel the information about *Caps Lock*, *Num Lock* and *Scroll Lock* modes is displayed 

4.3.11. «History» panel

«History» panel (Fig. 147) displays the list of recent user operations. User can set the number of entries of the log in the «General» tab of «Settings» panel.

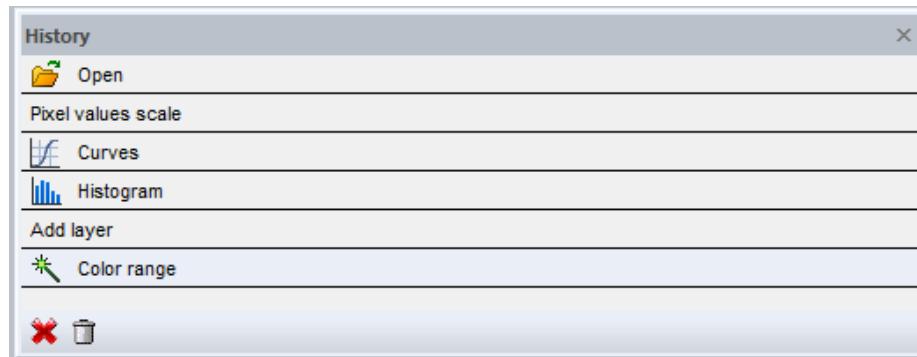


Fig. 147. «History» panel

TOOLS

5.1. «File» menu

«File» menu provides access to such general functions as opening, closing, creating, printing and saving documents (Fig. 148).

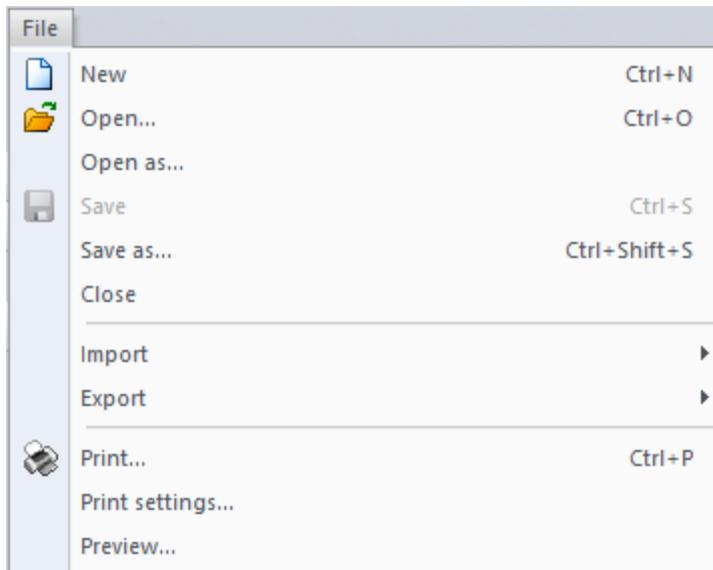


Fig. 148. «File» menu

5.1.1. Create new document

To create a new document, select «File» – «New» item or press button on «File» tool panel (Fig. 149).



Fig. 149. «File» tool bar

Enter the name of the document and set basic document's parameters, such as size, width, height and resolution in the opened dialog box (Fig. 150).

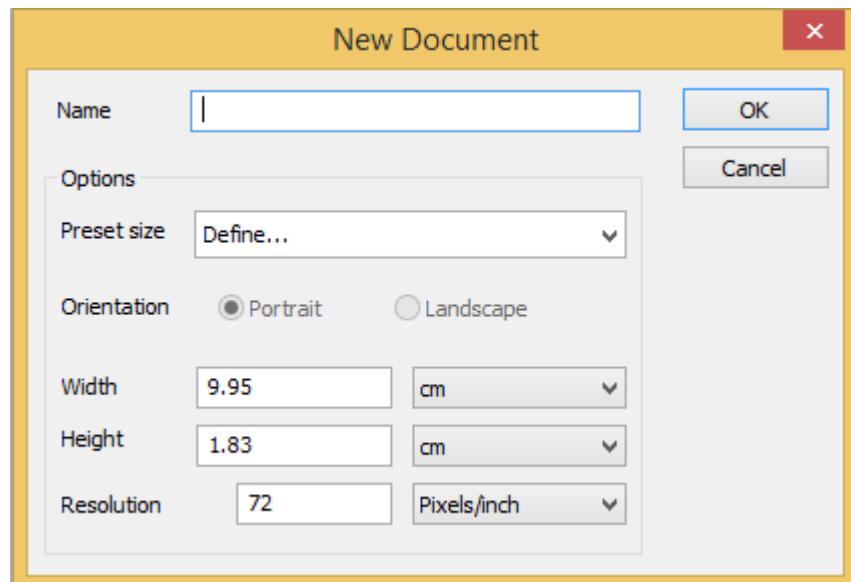


Fig. 150. «*New document*» dialog box

Select the size of the document from one of the options of the drop-down list (Fig. 151).

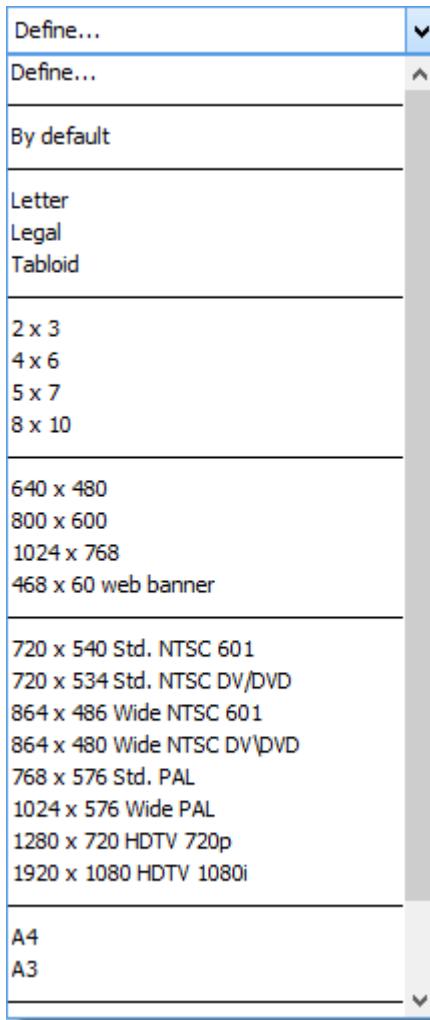


Fig. 151. «Size» options

Width and height of the document can be set in different units, such as centimeters, millimeters, inches and pixels. The default size equals to 16 cm height and 12 cm width.

Resolution is measured in pixel per centimeter or pixel per inch. The default resolution equals to 28.35 pixel/cm.

Press «OK» button to create a new document.

Press «Cancel» button to cancel the operation.

5.1.2. Open document

«Open...» item allows user to open an existing document. Select a necessary file in «Open» dialog box (Fig. 152).

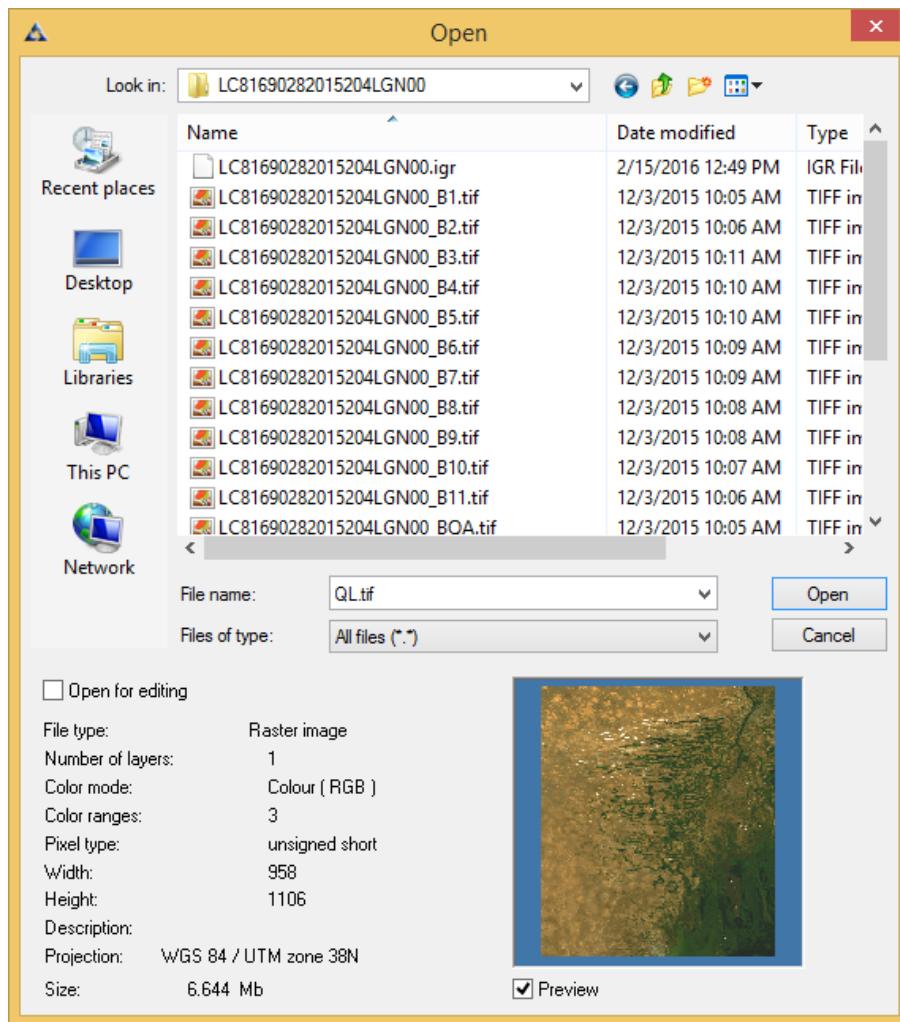


Fig. 152. «Open» dialog box

The information about the file will be displayed in the bottom left corner of the dialog box.

To preview the image before opening it, press «Preview» button.

Press «OK» button to create a new document.

Press «Cancel» button to cancel the operation.

«Open as...» item opens a copy of existing document

5.1.3. Save document

To save a file, select «File» – «Save» or «File» – «Save as» menu items.

«Save» command saves the current document with all changes. File must exist on the disk.

«Save as...» command saves document as a new file.

Enter the name of the file you want to save, its extension and destination folder in «Save as» dialog box (Fig. 153).

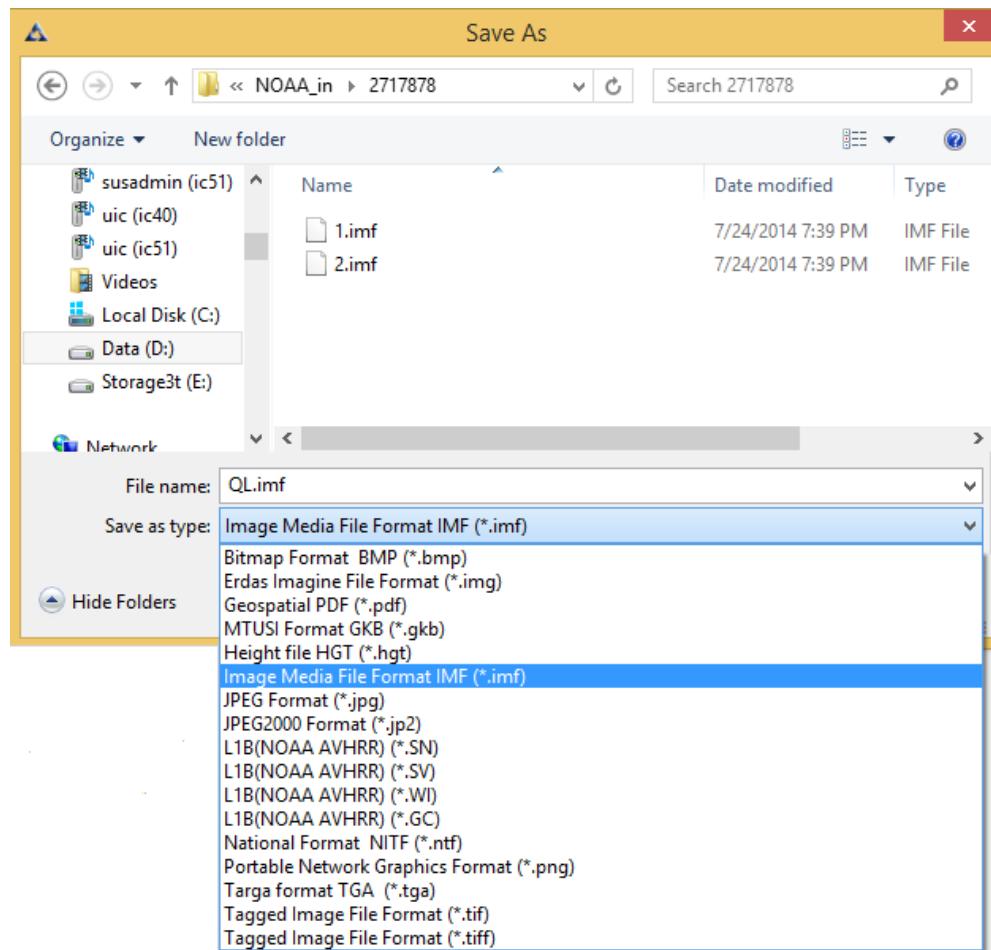


Fig. 153. «Save as» dialog box

Note:

If the document contains the layers of different types (raster and vector):

1. Saving the file in [*.imf](#) format will save all the layers as they are;
2. Saving the file in [*.tif](#) format will save visible  raster layers;
3. Saving the file in [*.shp](#) format will save editable  (or active ) vector layer with attribute information but without vector styles.

5.1.4. Print document

«Preview» command allows user to view what a printed version of the document would look like on the screen before printing a hard copy. User can adjust document's alignment, height, width, scale and other printing preferences in «Preview» dialog box (Fig. 154).

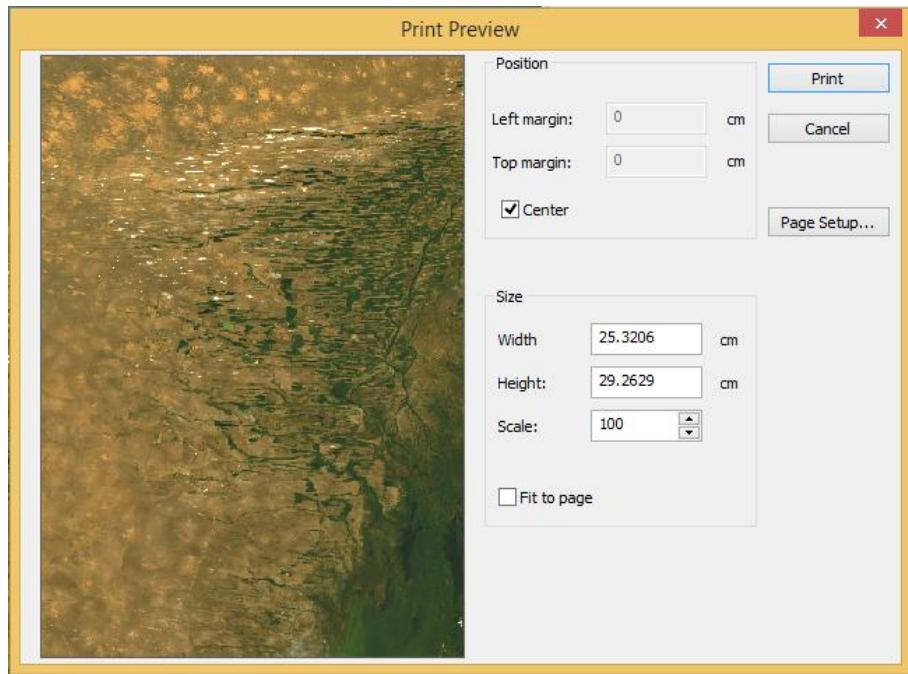


Fig. 154. «Preview» dialog box

5.1.5. Close document

«Close» command closes the current document.

5.1.6. View recently opened documents

«IMC» keeps information about last ten edited documents. User can open any of these documents from the «File» menu (Fig. 155).

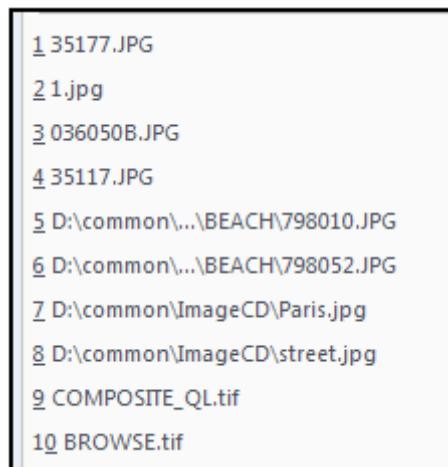


Fig. 155. List of the recent opened documents

5.1.7. Export (saving document in Geospatial PDF)

IMC provides an option of saving geospatial data in Geospatial PDF file format which stores geographic data, such as image's coordinates.

To export document in Geospatial PDF format, select «File»->«Export»->«Window» item (Fig. 156)

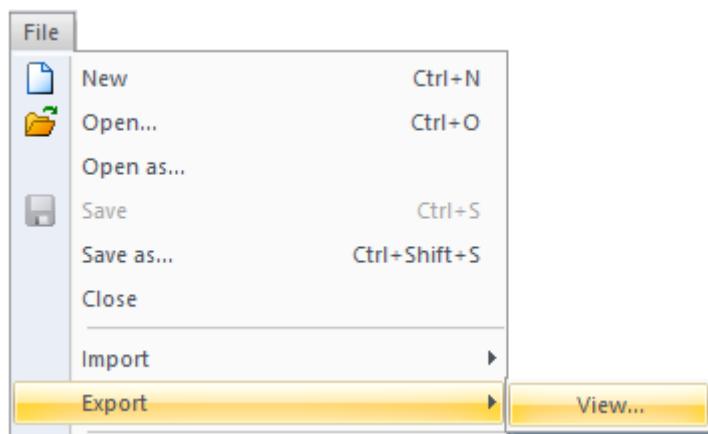


Fig. 156. «File» menu

Set the size of the image in «Export window» dialog box (Fig. 157).

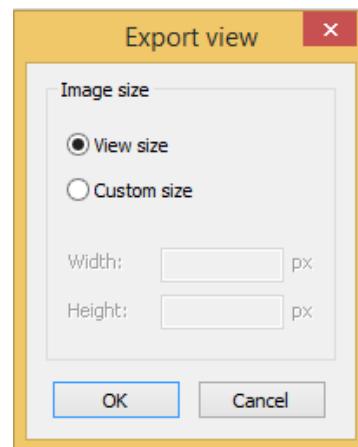


Fig. 157. Selecting the size of the image

Select the format of the document - Geospatial PDF (Fig. 158).

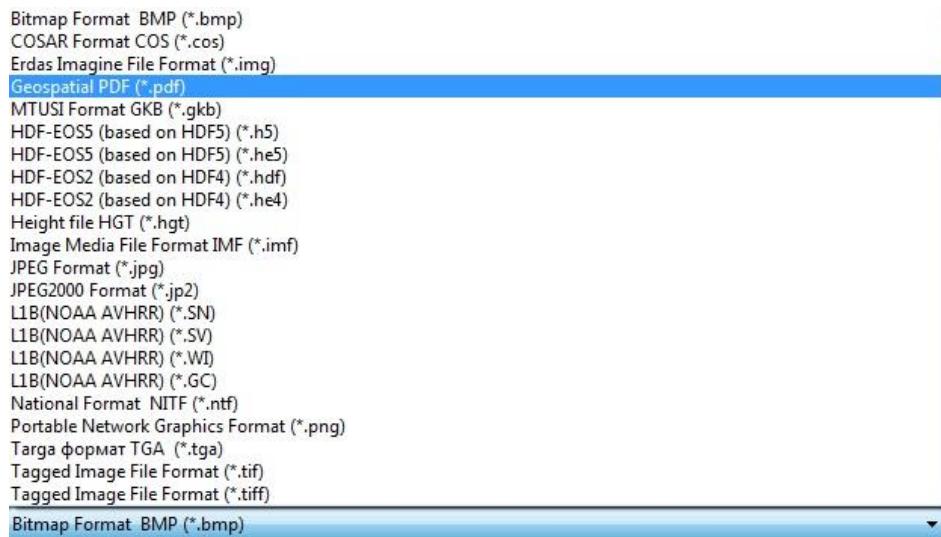


Fig. 158. Selecting file format

5.1.8. Exit program

«Exit» operation finishes the program work session.

5.2. «Edit» menu

«Edit» menu is designed for user operations and clipboard management (Fig. 159).

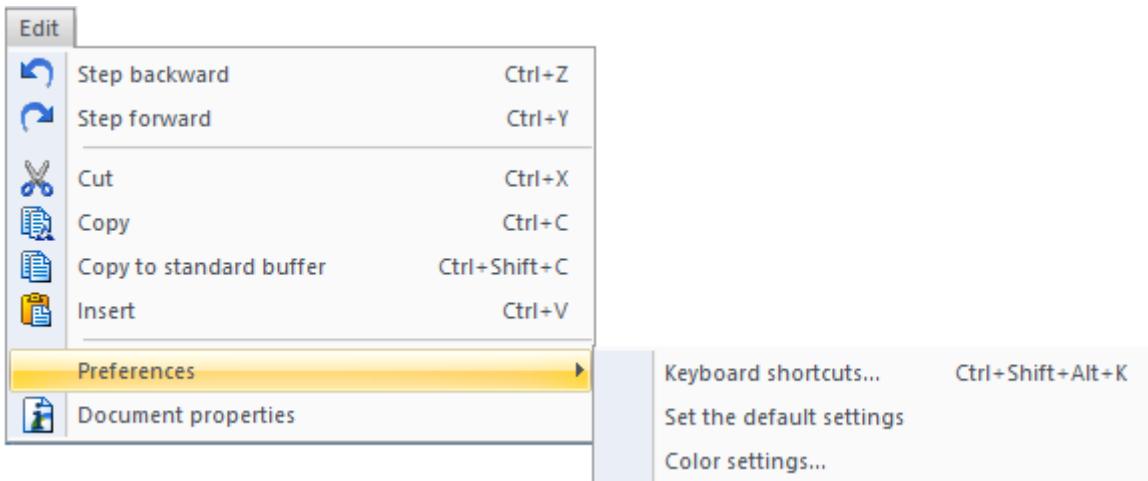


Fig. 159. «Edit» menu

«Undo» item is used to cancel last user operation (Short key «Ctrl+Z»). User can undo as many operations as history settings allows.

«Redo» item is used to restore the operation user undid previously (Short key «Ctrl+Y»).

«Cut» item is used to cut the selected area and save it to clipboard (Short key «Ctrl+X»).

«Copy» item is used to copy the selected area and save it to IMC clipboard (Short key «Ctrl+C»).

«Copy to standard buffer» item is used to copy the selected area and save it to standard clipboard, which makes it possible to use them in different programs (Short key «Ctrl+Shift+C»).

«Paste» item is used to insert the data from clipboard (Short key «Ctrl+ V»).

«Preferences» – «Keyboard shortcuts» item allows user to edit, add or delete short keys (Short key «Ctrl+Shift+Alt+K»).

«Preferences» – «Color settings» allows user to manage color preferences. (Fig. 160)

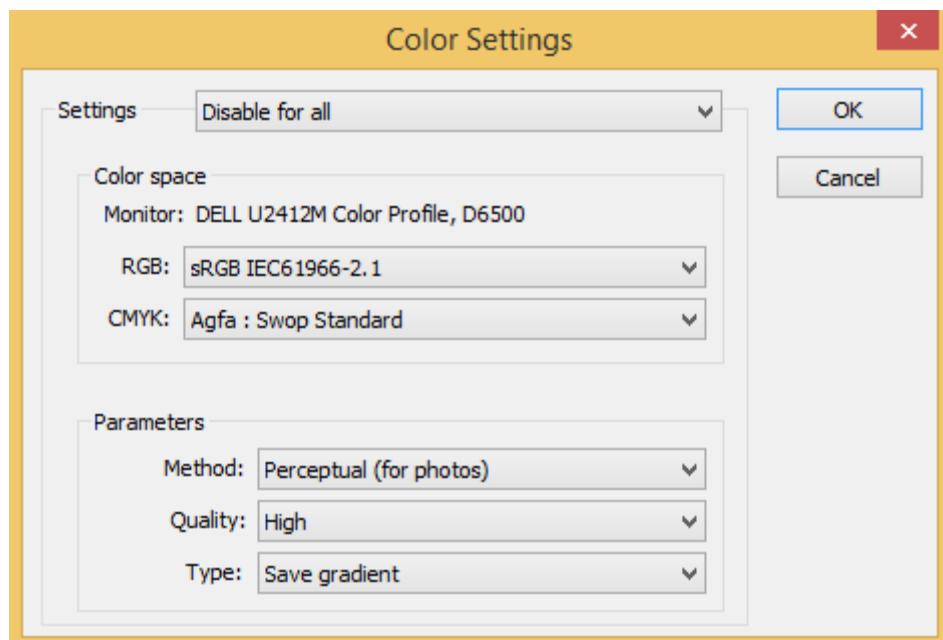


Fig. 160. «Color settings» dialog box

«Preferences» – «Set the default settings» item is used to reset all the custom settings. Press «OK» button to confirm the action, or «Cancel» button to cancel it. Standard settings will be applied after «IMC» restart.

«Document Properties» allows user to view and edit document properties.

5.3. «Image» menu

«Image» menu is designed for handling raster images. (Fig. 161).

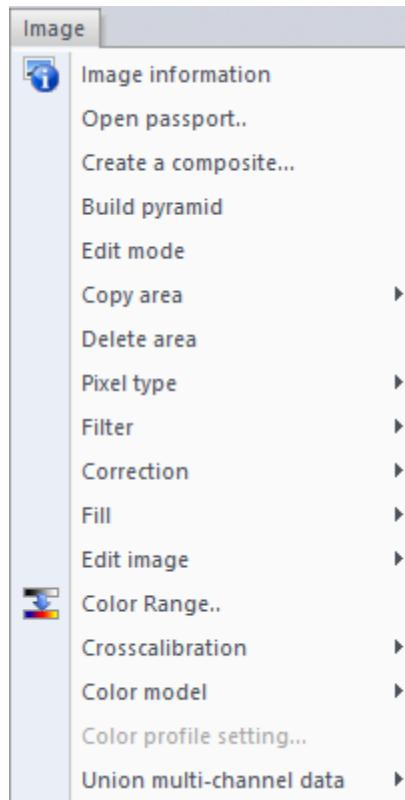


Fig. 161. «*Image*» menu

5.3.1. View image information

«*Image information*» item allows user to view the general information about the image. «*Image information*» dialog box contains following tabs: «*Image*», «*Description*», «*Geoinformation*», «*Metadata*», and «*Channels*».

«*Image*» tab contains image's characteristics, such as image type, width, height, color model, number of layers, pixel type, pyramid, compression type, print resolution, and units (Fig. 162).

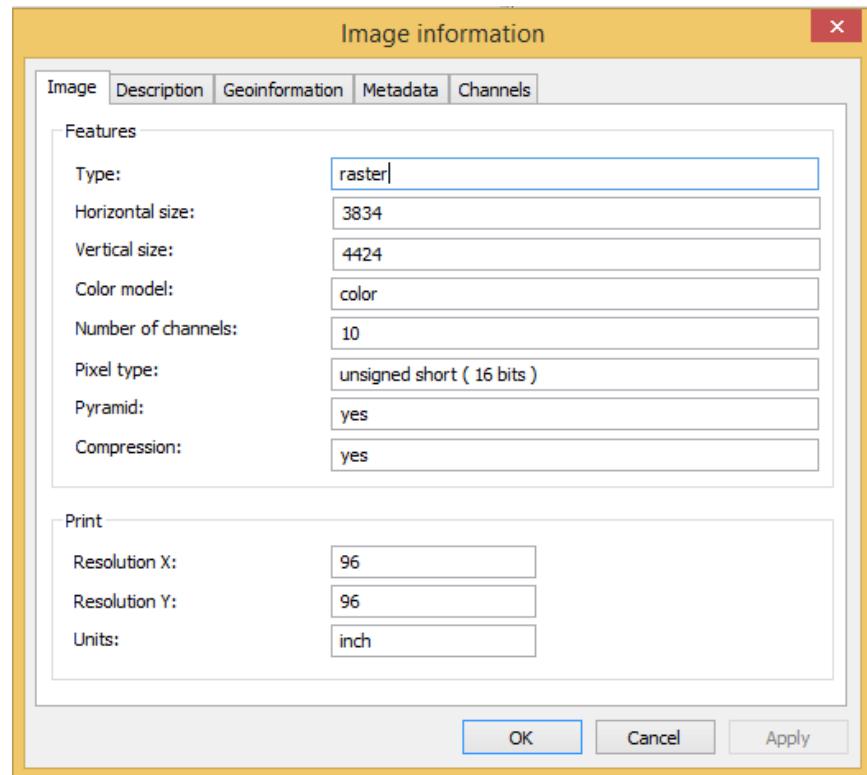


Fig. 162. «Image» tab

«Description» tab contains the name of the document, short description, name of the editor, author, software, PC and the copyright (Fig. 163). User can edit all the fields.

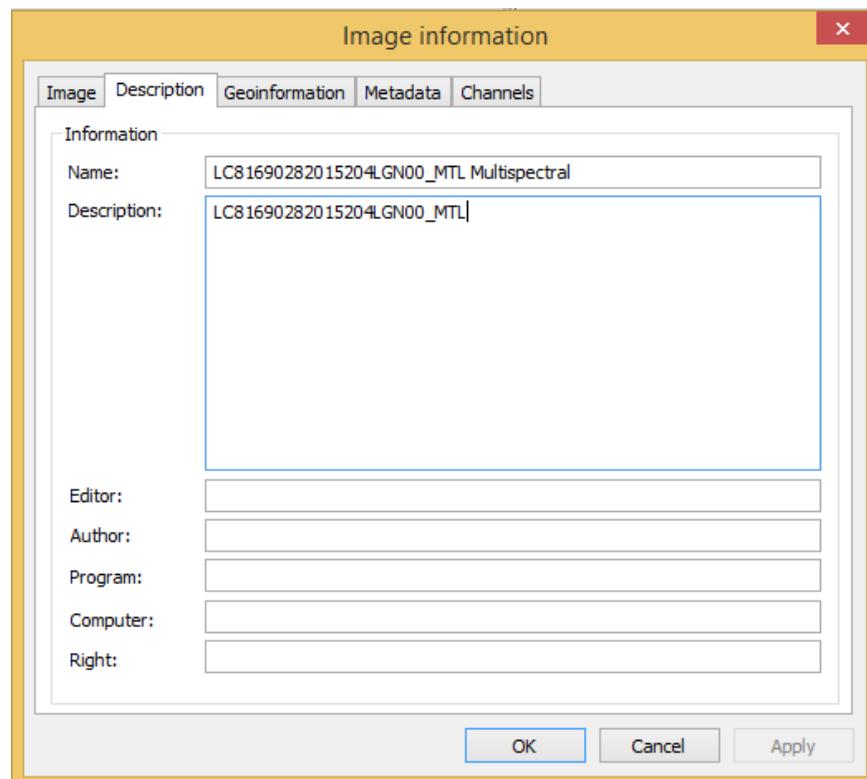


Fig. 163. «Description» tab

«*Geoinformation*» tab contains image projection, corner coordinates, pixel projection (Fig. 164).

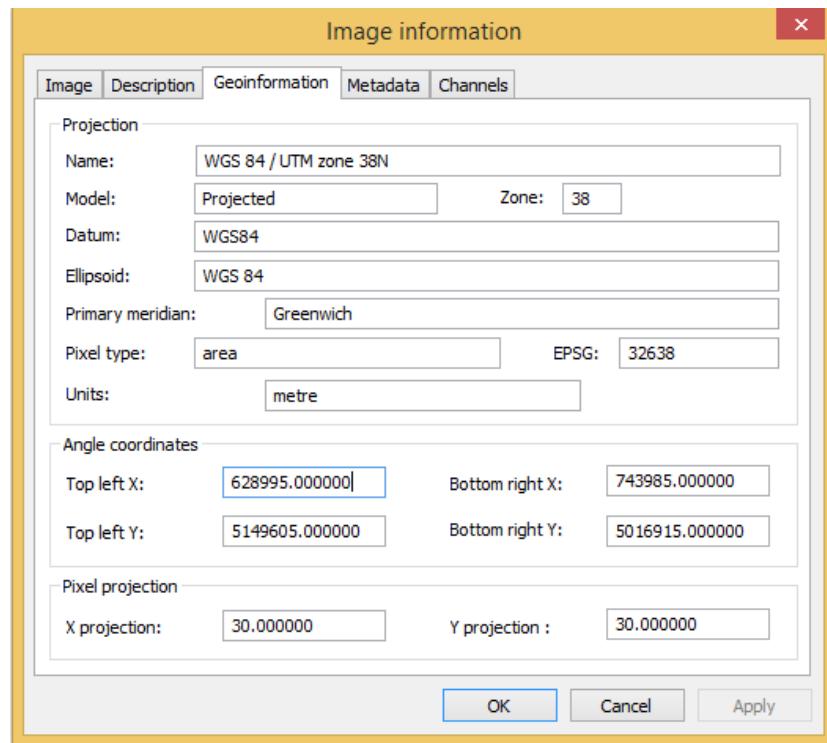


Fig. 164. «*Geoinformation*» tab

«*Metadata*» tab contains the information from image's metadata (Fig. 165).

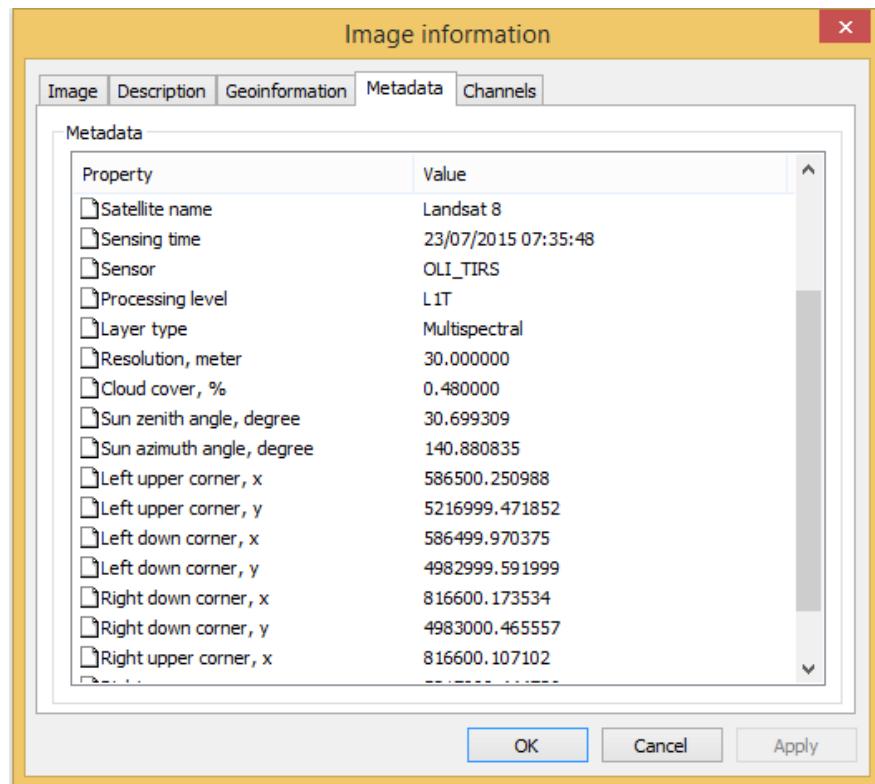


Fig. 165. «*Metadata*» tab

«*Channels*» tab contains information about band's range, width, gain, offset and coefficients (Fig. 166).

?	Name	Range	Width	Gain	Offset
✓ 1	LC8169028201...	0.4430000	0.0080000	0.0121650	-60.82257
✓ 2	LC8169028201...	0.4820000	0.0300000	0.0124570	-62.28306
✓ 3	LC8169028201...	0.5620000	0.0290000	0.0114790	-57.39331
✓ 4	LC8169028201...	0.6550000	0.0190000	0.0096795	-48.39727
✓ 5	LC8169028201...	0.8650000	0.0140000	0.0059233	-29.61672
✓ 6	LC8169028201...	1.6100000	0.0440000	0.0014731	-7.365410
✓ 7	LC8169028201...	2.2000000	0.0940000	0.0004965	-2.482540
✓ 8	LC8169028201...	1.3750000	0.0120000	0.0023150	-11.57488
✓ 9	LC8169028201...	10.9000000	0.3000000	0.0003342	0.100000
✓ 10	LC8169028201...	12.0000000	0.5000000	0.0003342	0.100000

Fig. 166. «*Channels*» tab

«Units» field displays the units of wavelength. User can save the information about image's bands in *.txt or *.xml file formats.

User can edit information about color bands manually.

Press «OK» button to apply changes.

Press «Cancel» button to close the dialog box without saving changes.

5.3.2. Open passport

To open an image by reading its metadata file, select «Image» – «Open passport» item. Then select the metadata file in *.txt, *.xml or other formats. In the «Open satellite data» dialog box user can view the information about the image such as satellite type, sensor, date and time, projection, resolution, etc (Fig. 167). There is a window where user can look at the preview of the image and the list of spectral bands where it is possible to pick some particular bands. After selecting necessary spectral bands press «Load» button and the satellite composite image will be formed (Fig. 168, 169).

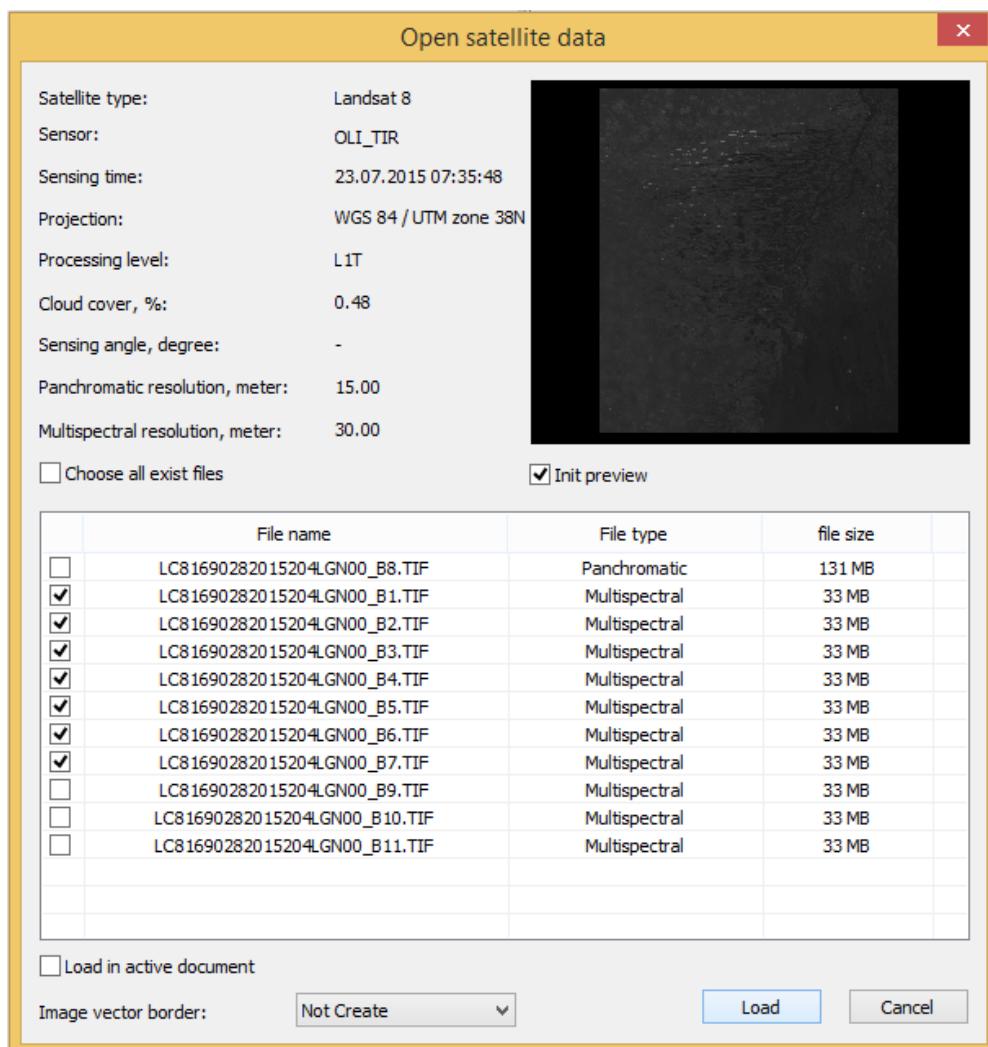


Fig. 167. Selecting spectral bands

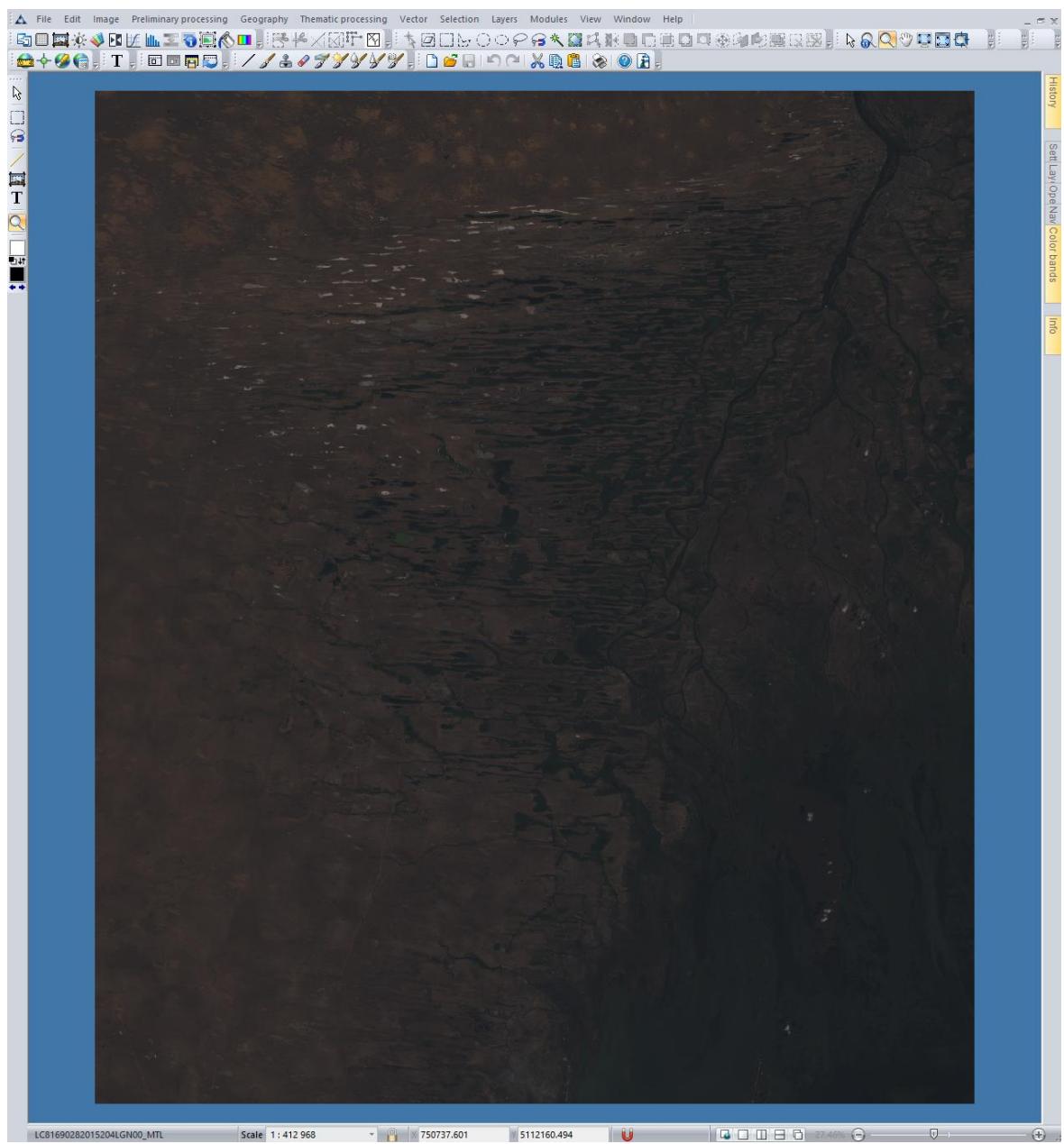


Fig. 168. *Landsat 8 composite image*

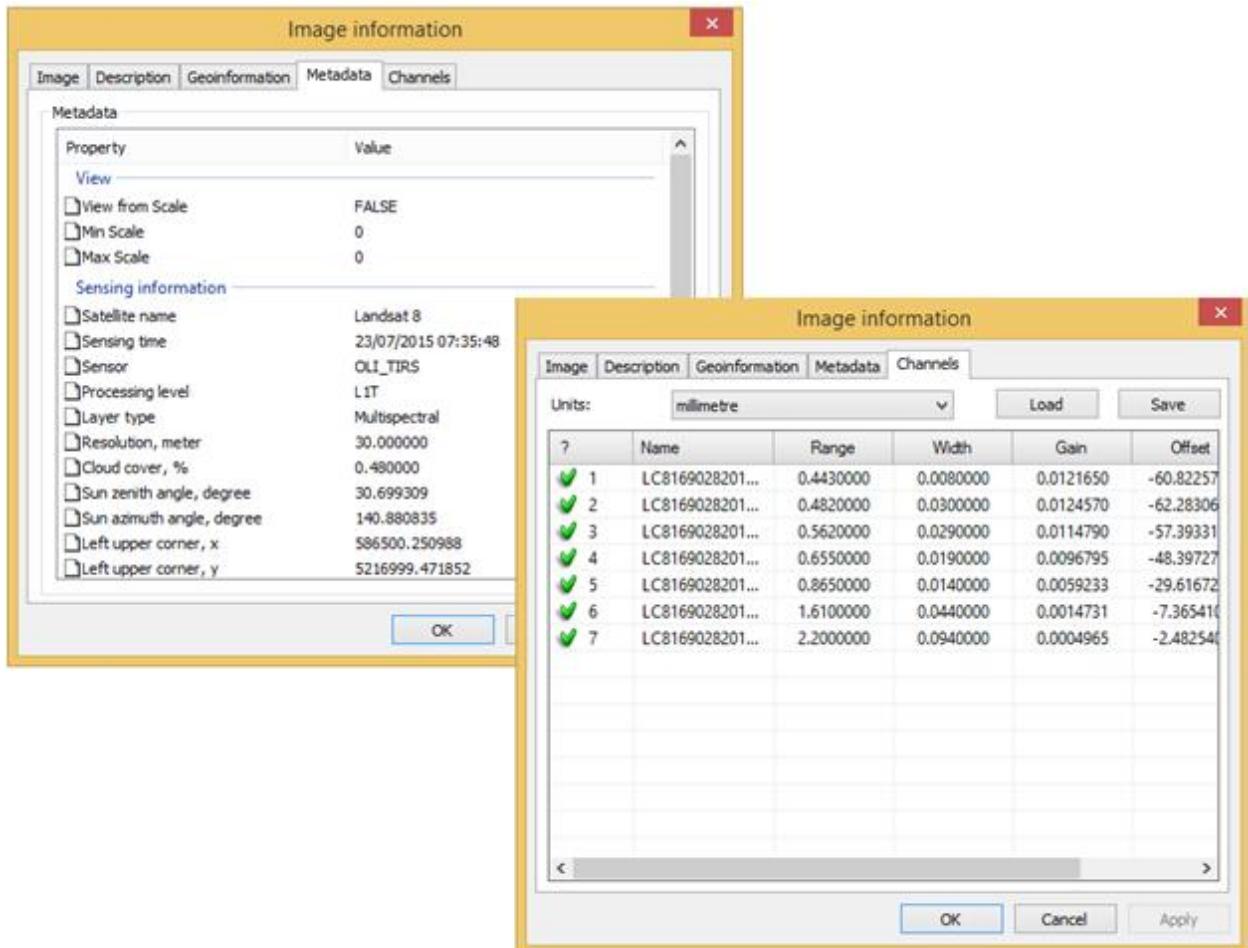


Fig. 169. *Image's metadata*

Color components of the image will be assigned according to the information from metadata file. If the composite image doesn't contain color bands belonging to the visible range of the spectrum, the color components will be assigned in the following order: RGB (Table. 14).

Table. 14. *Color components assignment*

Selected bands	Color components																														
Landsat 8: Red – 4 band, Green – 3 band, Blue – 2 band																															
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5.3.3. Create composite

To create a composite, open a new document (*«File» - «New»*) (Fig. 170).

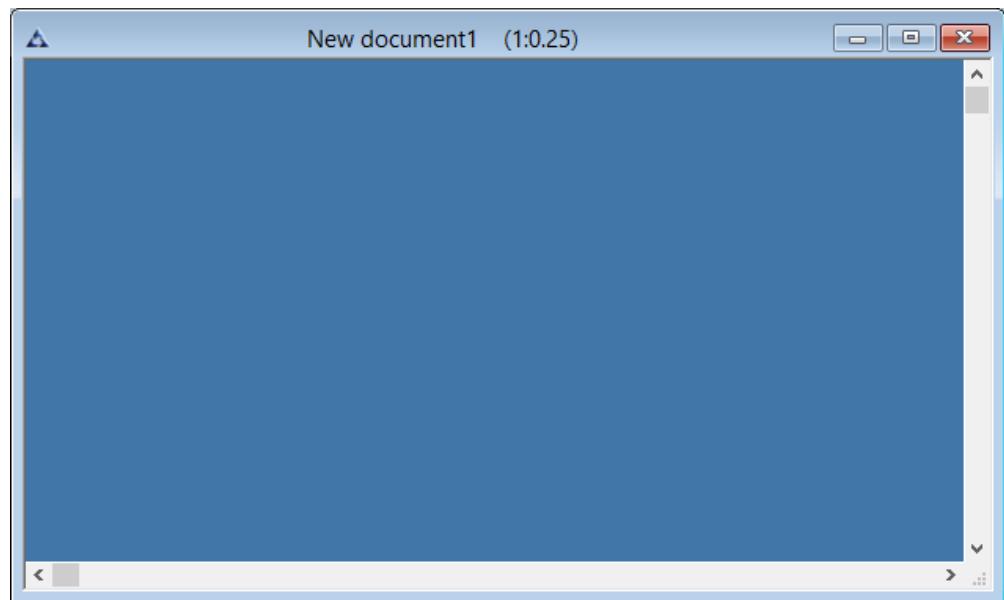


Fig. 170. «*New document*»

After that select «*Image*» – «*Create a composite...*» item (Fig. 171).

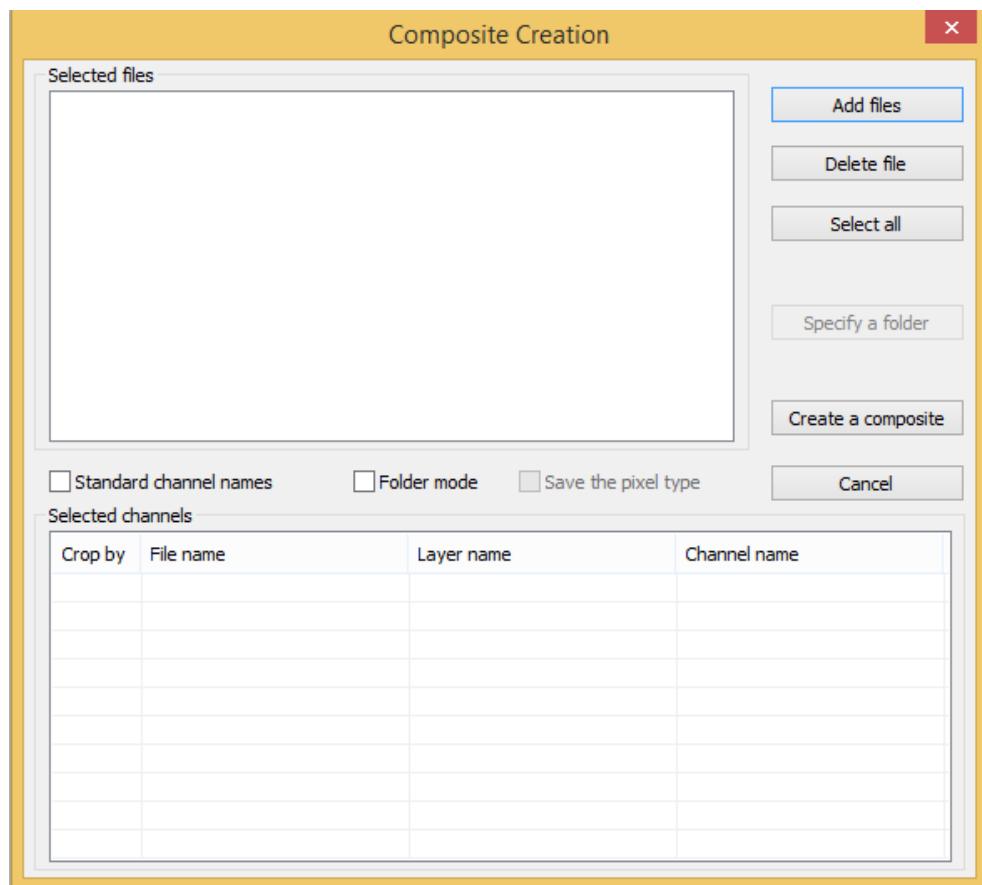


Fig. 171. «*Composite creation*» dialog box

In the opened dialog box, press «Add files» button. Select necessary files in the «Open» dialog box (Fig. 172), press *Ctrl* or *Shift* keys to select multiple files.

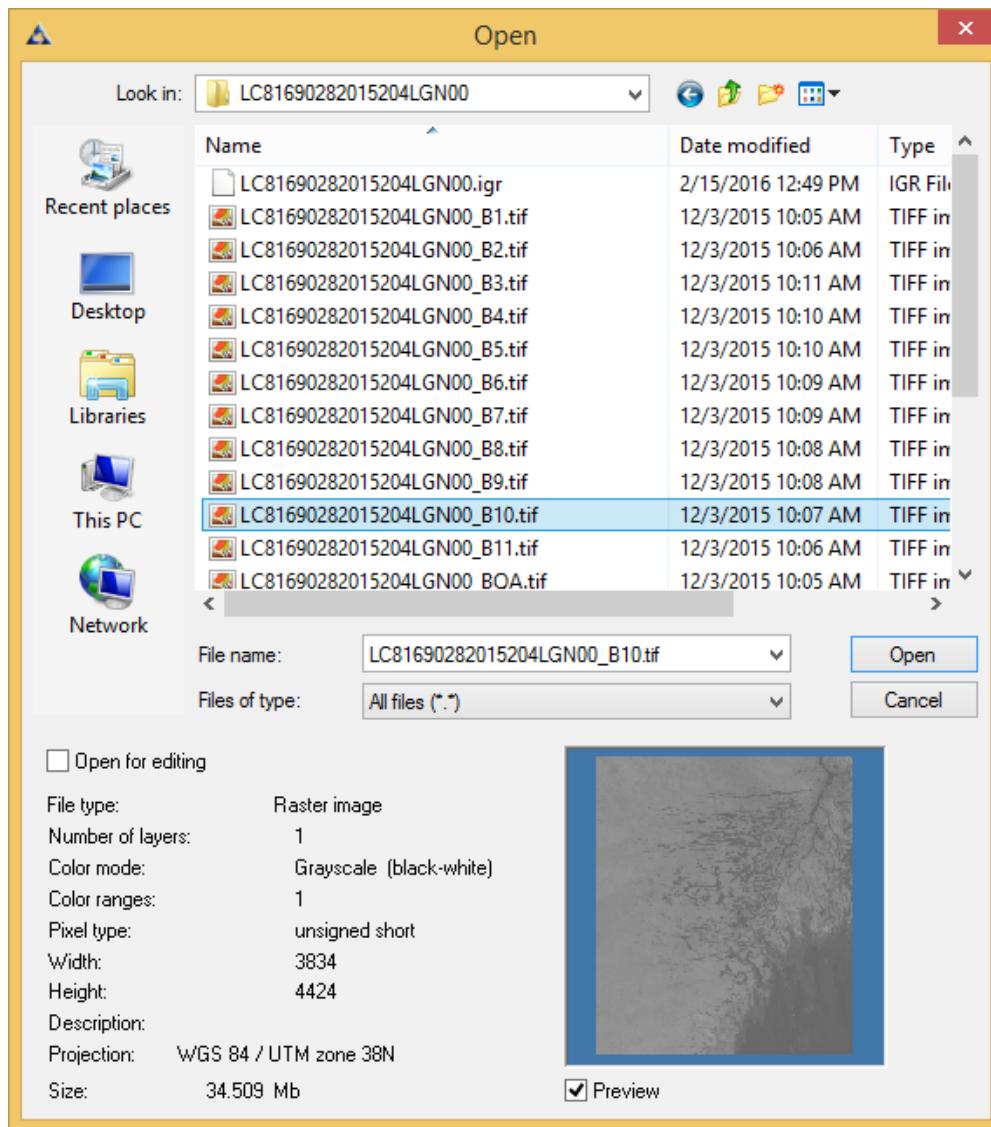


Fig. 172. «Open» dialog box

After all the necessary files are selected, the file structure with corresponding color bands will be displayed in «Composite creation» dialog box (Fig. 173). Select any particular color bands or press «Select all» button. The color bands will be displayed in «Selected channels» field in the order of selection. Press «Standard channels name» button to number bands in order (Fig. 174). Press «Create composite » button to begin the process.

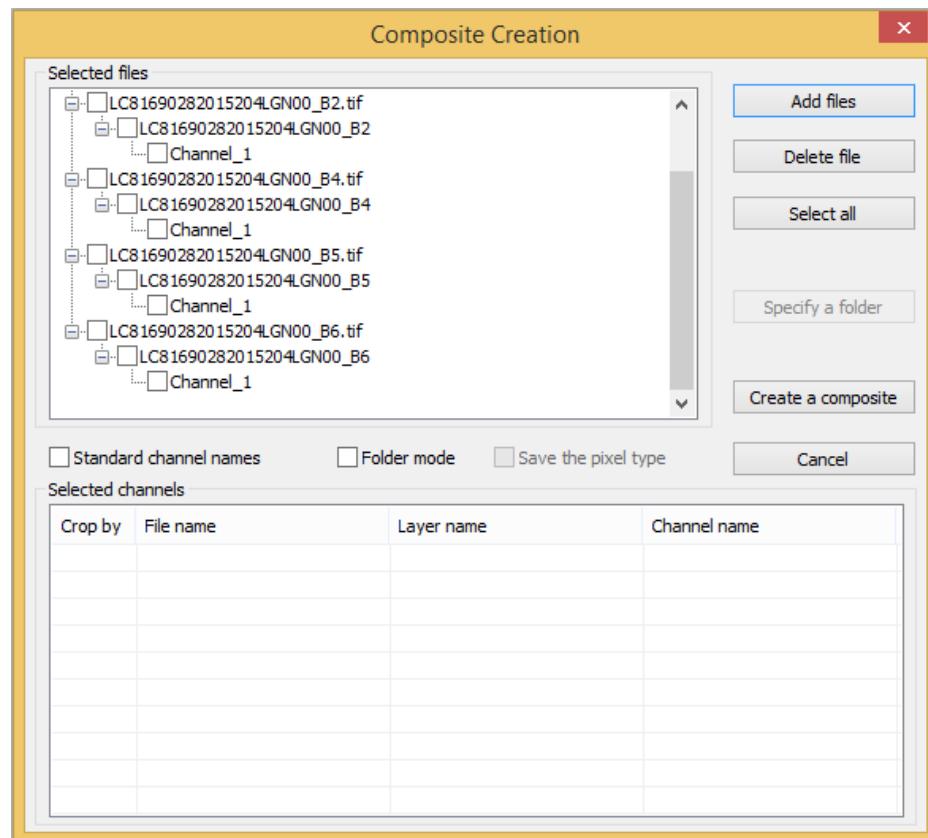


Fig. 173. The list of selected files

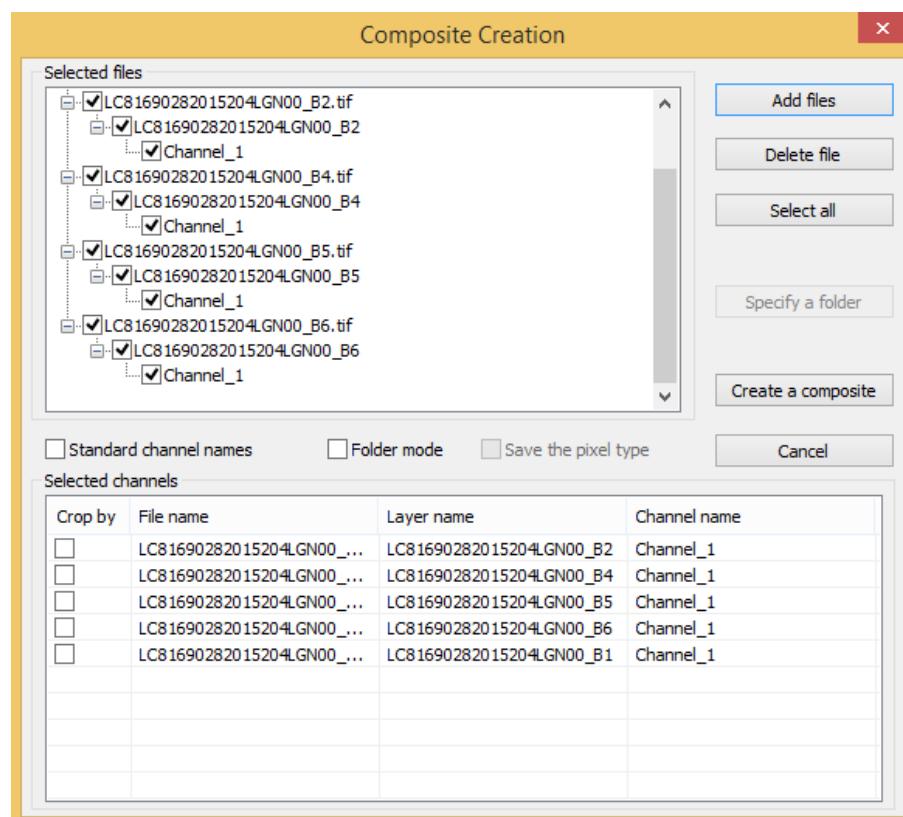


Fig. 174. The list of selected bands

New composite image will be displayed in the «*Layers*» panel (Fig. 175.)



Fig. 175. «*Layers*» panel

5.3.4. Copy area

«Copy area» operation copies the selected area of the image and opens it in the new window (Fig. 176). If nothing is selected, the whole image will be copied.

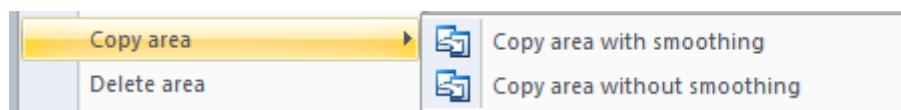


Fig. 176. «*Copy area*» item

«Copy with smoothing» option creates a transparency mask outside of the border of selection while copying the area.

«Copy without smoothing» option copies the area without creating a transparency mask

The result of the copying is shown on the Fig.177.

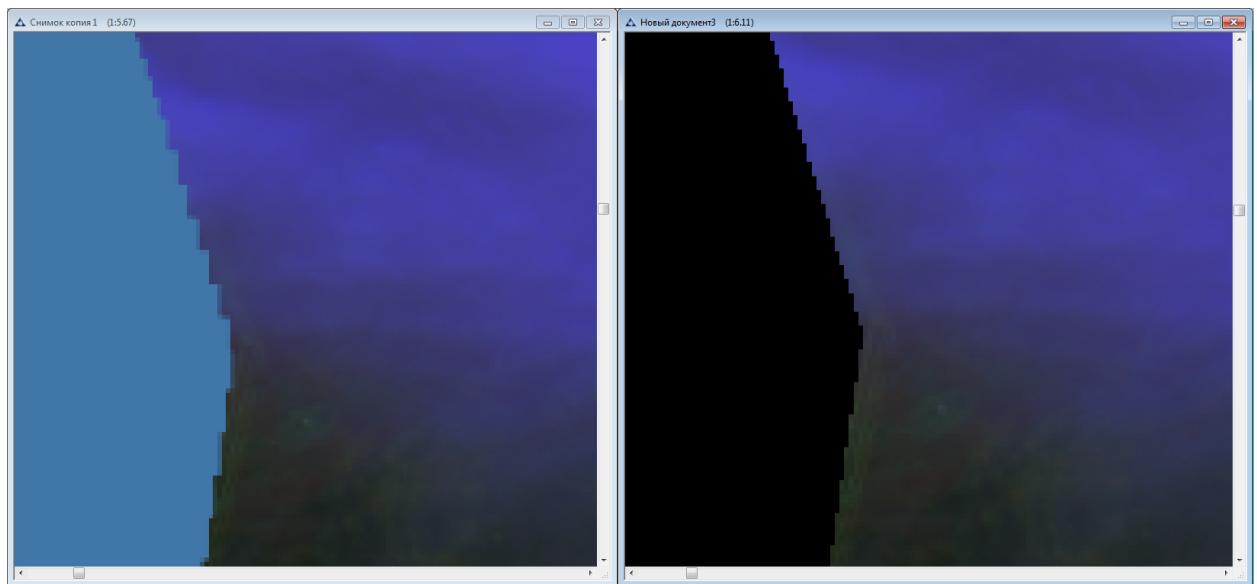


Fig. 177. The result of the area copying. «With smoothing» on the left; «Without smoothing» on the right

5.3.5. Delete area

«Delete area» item is used to delete the selected area of the raster layer or delete the whole layer if nothing is selected.

5.3.6. Pixel type

«Pixel type» item is used to change the type of the pixel (Fig. 178).

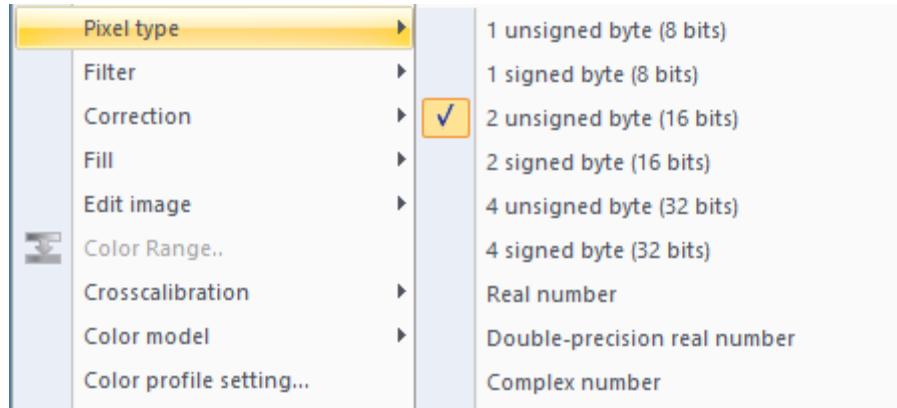


Fig. 178. «Pixel type»

5.3.7. Apply filters

Menu item «Filter» allows user to choose one of the available filters, namely, to adjust sharpness, blur, to impose random mask, noise, to make a correction of specific pixels and etc. (Fig. 179).

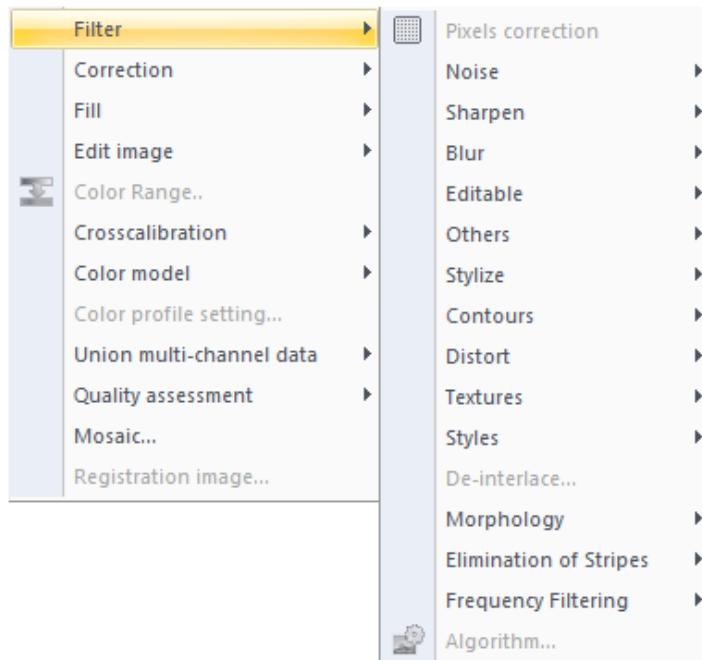


Fig. 179. Menu item «Filter»

5.3.7.1 Pixels correction

Menu item «Pixels correction» serves to display and correct values of specific pixels on the given bands. When choosing this menu item, the dialog window «Pixels correction» with values of the pixels will open (Fig. 180).

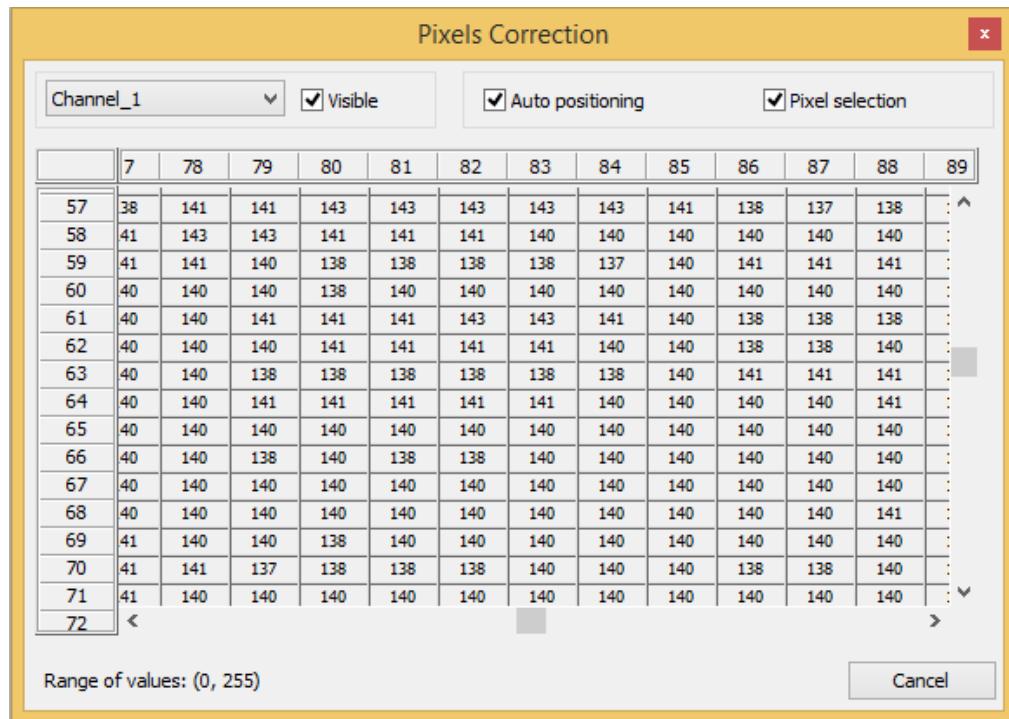


Fig. 180. *Dialog window «Pixels correction»*

To select another band, press the left mouse button on the window with name of the current band and select in the drop-down list.

To display only visible bands, set the «tick» in «Visible», by pressing the left mouse button (Fig. 181). To view the values of the pixels of all existing bands remove the «tick».

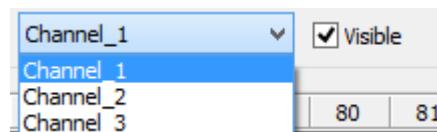


Fig. 181. *Displaying only visible bands*

To automatically shift the table of values that the value of chose pixel will be in the center, when selecting a point on the image, set the «tick» in «Auto positioning» by pressing the left mouse button. The selected pixel will be highlighted in the table.

For highlighting the chose pixels on the image by frame, set the «tick» in «Pixel selection» by pressing the left mouse button. The frame will be blink around the pixel.

To change the pixel value, press left mouse button on the window with the value and write the required value (Fig. 182).

42	41	41	41	41	41	41	42	42	42	42	42
42	42	41	42	41	41	41	41	42	43	43	
42	42	41	41	42	41	41	42	42	41	55	
42	42	41	42	42	41	41	43	43	47	117	
42	42	42	42	42	42	42	45	46	109	171	
42	43	42	42	42	41	41	54	122	170	177	
41	41	41	42	40	56	91	144	181	179	178	
52	61	63	74	113	143	170	177	181	182	181	
151	144	156	173	173	163	160	160	150	149	157	
179	182	177	160	135	123	115	108	113	117	114	
181	172	145	112	111	109	110	113	115	113	110	
167	129	108	109	110	111	114	114	114	115	116	
122	105	109	110	112	113	113	115	114	115	117	
113	110	112	113	114	112	111	112	114	115	115	
112	111	111	112	111	111	111	112	113	114	114	

Fig. 182. *Selecting pixel for changing value*

The column and row above and to the left of the table with values displays numbers of pixels on the image width and height, respectively.

The range of values shows in the lower left corner depending of the type of pixel.

To close the table of pixels correction, press the left mouse button on the «Close» button.

5.3.7.2 Noise

Menu item «Noise» is meant to be used for adding/remove noise on the image (Fig. 183).

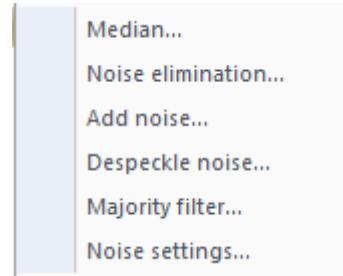


Fig. 183. *Menu item «Noise»*

5.3.7.2.1 Median

To add median noise, open menu item «Median noise». Set the radius of noise in the opened window (Fig. 184).

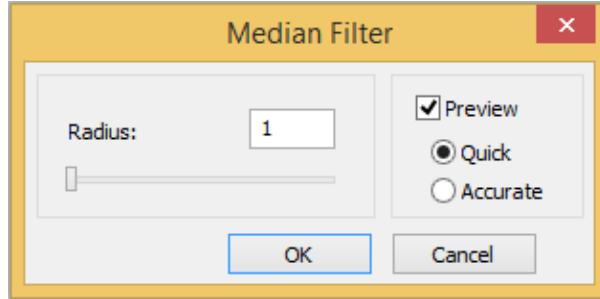


Fig. 184. *Dialog window «Median filter»*

To do this, either move the cursor to the needed point on the slider scale and press the left mouse button or move the cursor to slider, press the left mouse button, hold down the button and move the slider to the needed position.

To see the changes, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

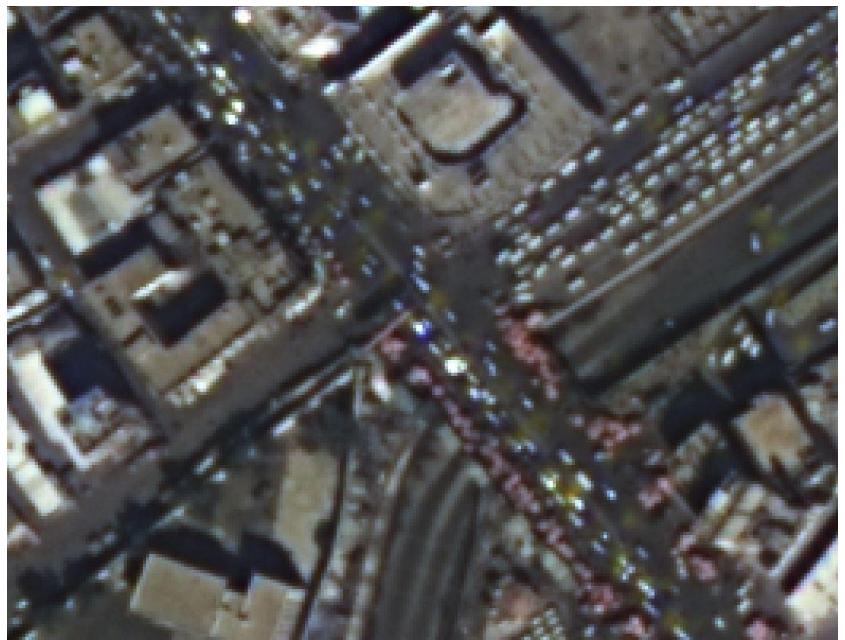
If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview.

To apply the changes and go back to the image, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of using the median noise is shown in Figure 185.

Before applying «Median» filter



After applying «Median» filter

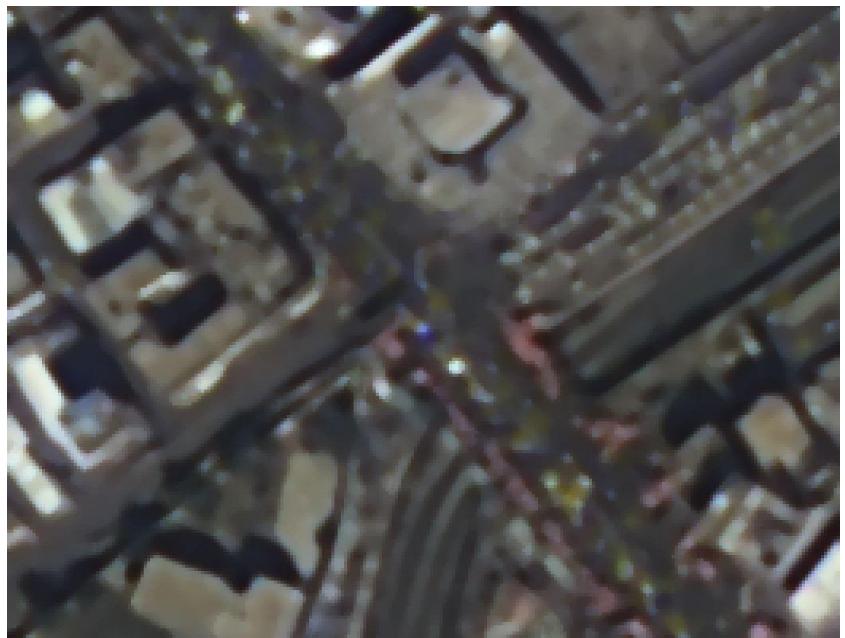


Fig. 185. *Applying «Median» filter*

5.3.7.2.2 Noise Elimination

To reduce noise, select the «Noise Elimination ...» and in the opened dialog, set the required parameters (Fig. 186).

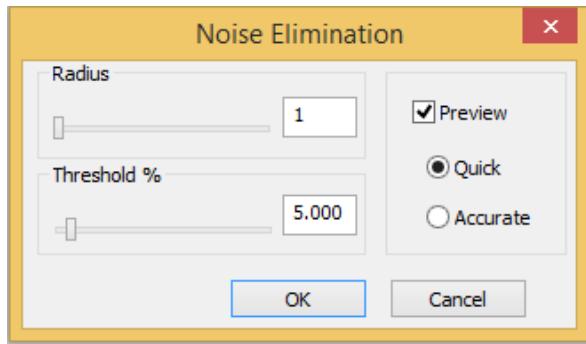


Fig. 186. *Dialog window «Noise Elimination»*

The parameter «Radius» sets step radius. The parameter «Threshold» sets sensitivity of threshold brightness. To change these values, either move the cursor to the needed point on the slider scale and press the left mouse button or move the cursor to slider, press the left mouse button, hold down the button and move the slider to the needed position or press the left mouse button in the window with value and set the number.

To see the changes, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview. To apply the changes and go back to the image, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of using «Noise Elimination ...» filter is shown in Figure 187.

**Before applying
«Noise Elimination» filter**



**After applying
«Noise Elimination» filter**



Fig. 187. *Applying «Noise Elimination» filter*

5.3.7.2.3 Add Noise

To add noise, select the «Add noise...» and in the opened dialog, set the required parameters (Fig. 188).

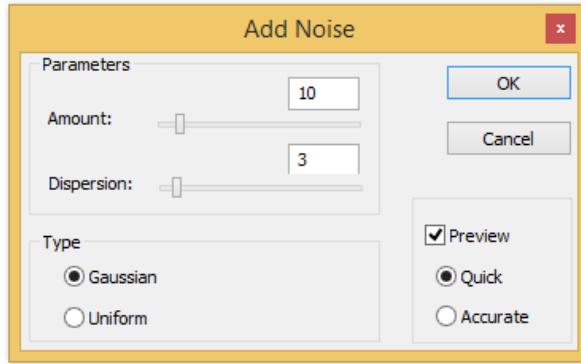


Fig. 188. *Dialog window «Add noise»*

The parameter «Amount» defines the amount of noise. The parameter «Dispersion» sets the value of dispersion. To change these values, either move the cursor to the needed point on the slider scale and press the left mouse button or move the cursor to slider, press the left mouse button, hold down the button and move the slider to the needed position or press the left mouse button in the window with value and set the number.

In the section «Type», select the type of add noise.

To see the changes, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

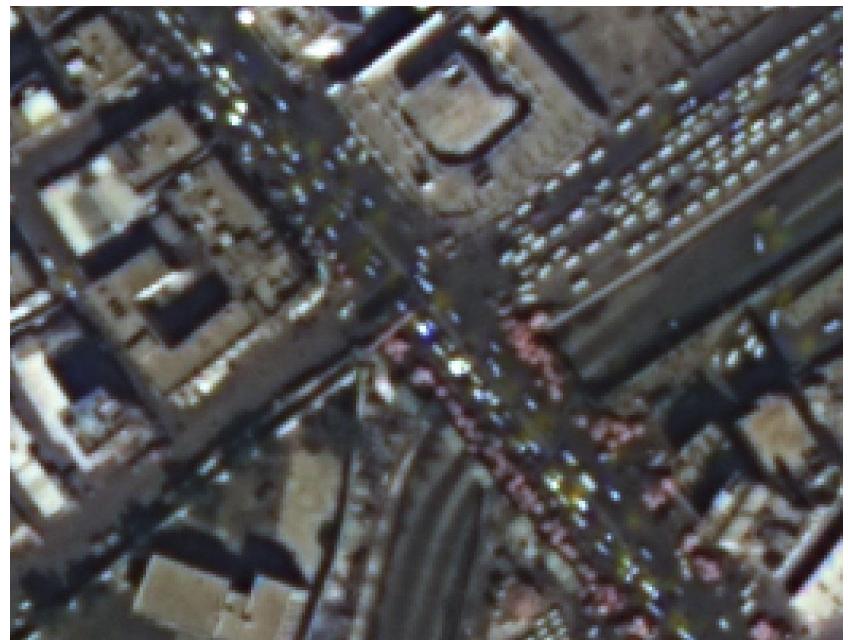
If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview.

To apply the changes and go back to the image, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of using «Add Noise...» filter is shown in Figure 189.

**Before applying «Add
Noise» filter**



**After applying «Add
noise» filter**

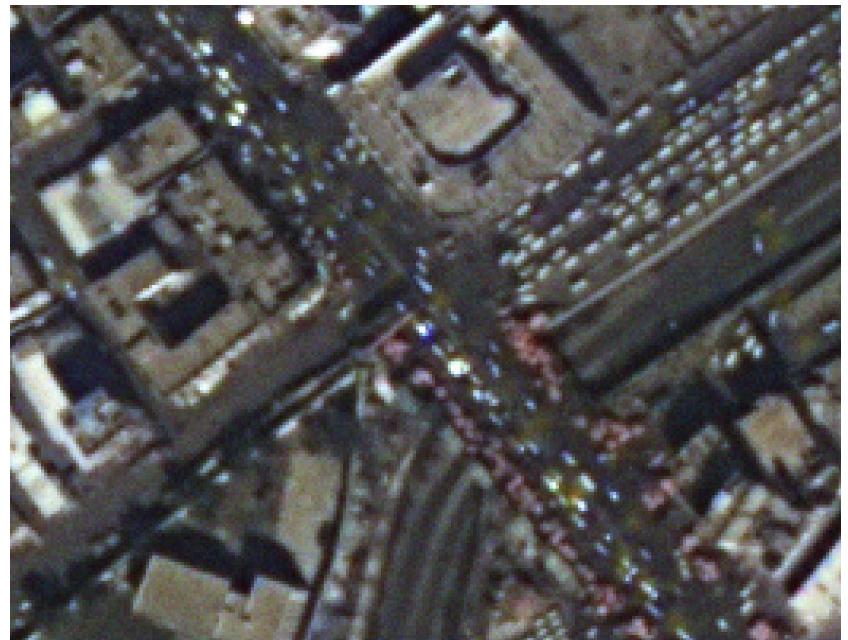


Fig. 189. *Applying «Add Noise» filter*

5.3.7.2.4 Speckle noise

To despeckle noise user could choose neither Lee filter nor Kuan filter. The radius of the window sets in the dialog box, the noise variance may be corrected if required. In case of the noise elimination, set the «tick» in «Image Phase» (Fig. 190). The display modes «Quick» and «Accurate» are similar to those described in the paragraphs above.

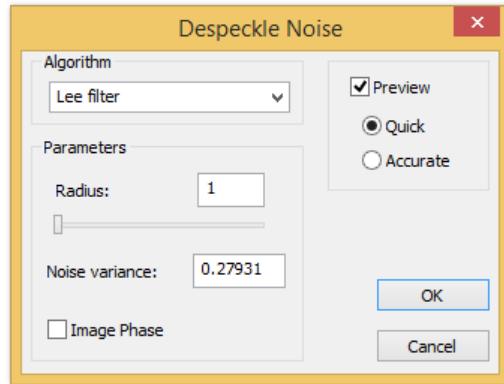


Fig. 190. *Dialog window «Despeckle noise»*

5.3.7.2.5 Majority filter

Majority filter is used to eliminate the noise on the black-and-white (binary) images. The filter parameters are similar to those described in the paragraphs above (Fig.191).

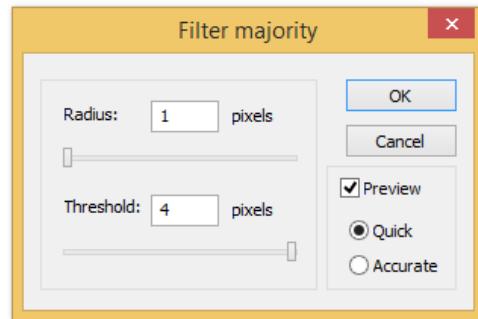
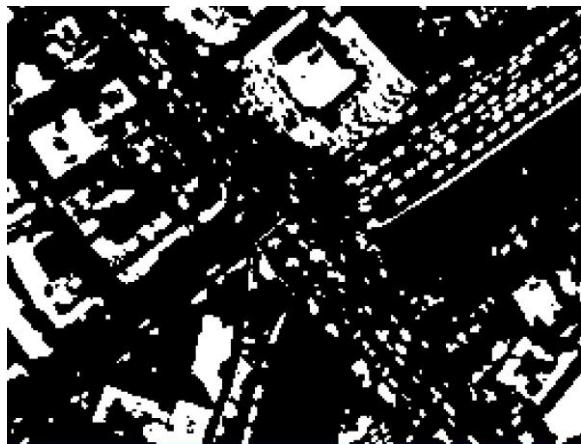
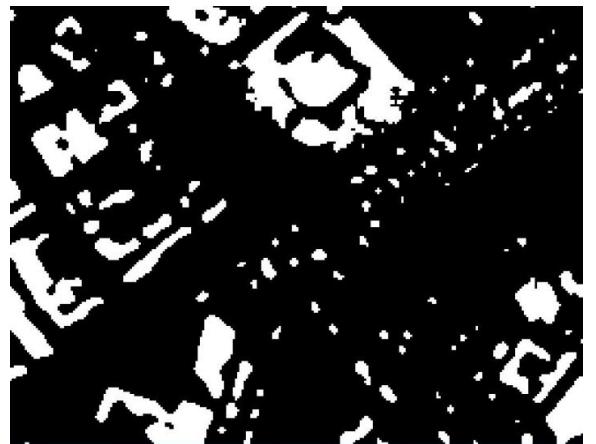


Fig. 191. *Dialog window «Filter majority»*

The result of image processing by the majority filter is shown in Figure 192.



Before applying majority filter



After applying majority filter

Fig. 192. *Applying «Filter majority» filter*

5.3.7.2.6 Noise Setting

To calculate parameters, set parameters in the dialog box «Noise Setting» and press the button «Calculate». After that, in the table on the right parameters will be displayed (Fig.193), which user could export in *.csv format, by pressing the button «Export».

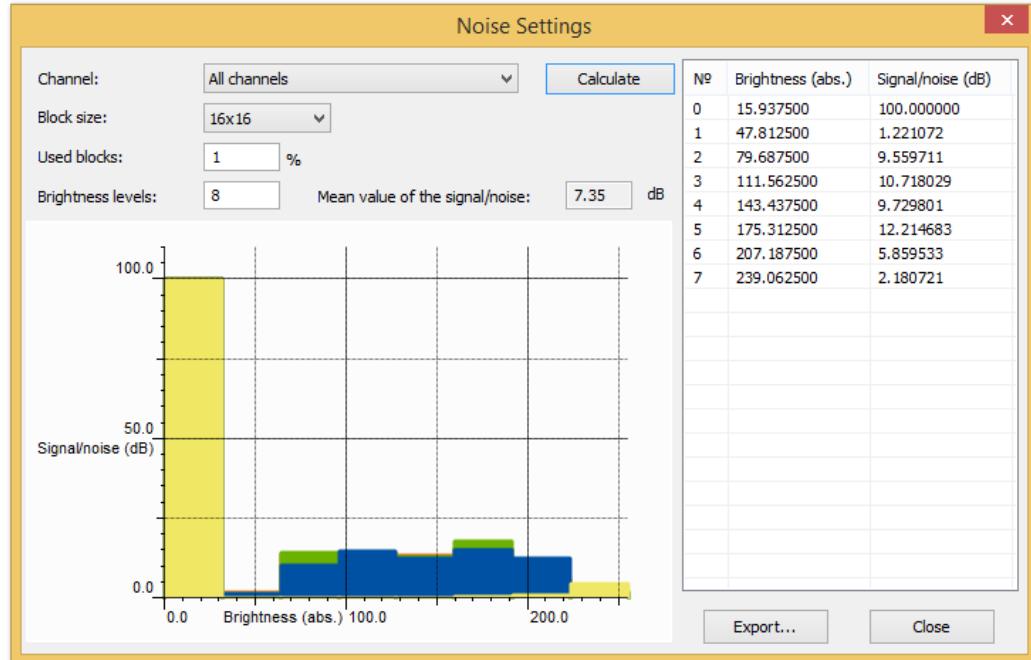


Fig. 193. *Dialog window «Noise Setting»*

5.3.7.3 Sharpen

In menu item «Sharpen» user could change the clarity and sharpness of the image (Fig. 194). To do this, place the cursor to the menu item «Sharpen» and in opened menu choose the suitable action.



Fig. 194. *Menu item «Sharpen»*

5.3.7.3.1 Sharpen

To change the sharpness, select menu item «Sharpen...» by pressing the left mouse button. Dialog window «Sharpen» will open for changing the value of sharpness (Fig. 195).

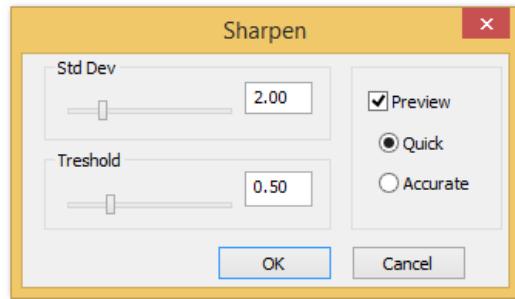


Fig. 195. *Dialog window «Sharpen»*

To change the standard deviation (Std Dev), place the cursor on the slider of Std Dev, hold the left mouse button and move the slider to the needed position, or click on the needed point on the scale of Std Dev.

To change the threshold value, place the cursor on the slider of the threshold, hold the left mouse button and move the slider to the needed position, or click on the needed point on the scale.

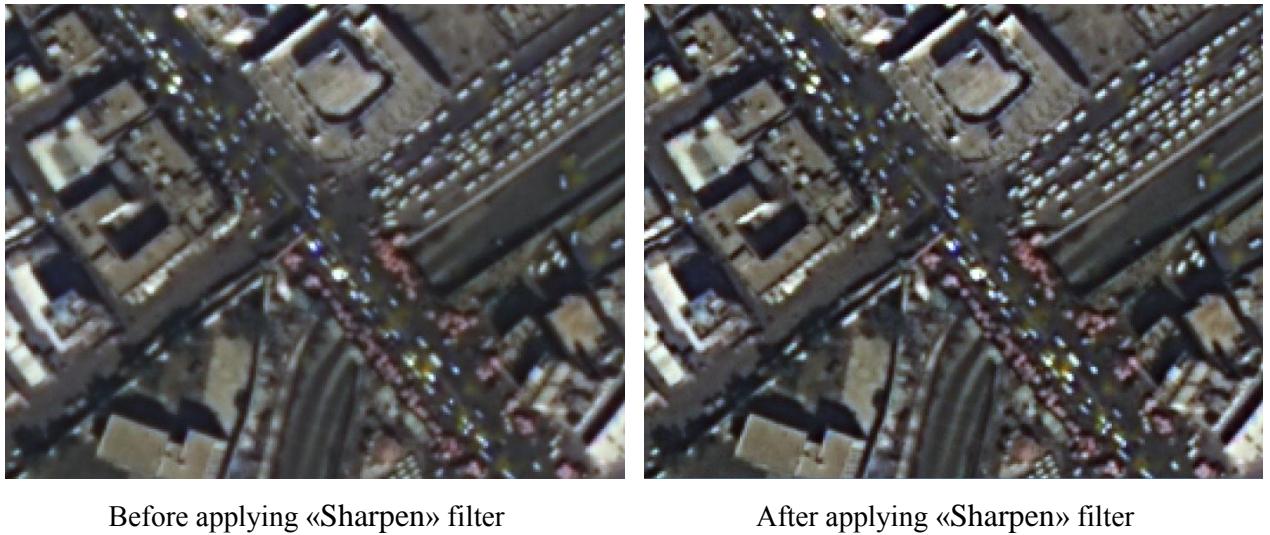
To see the changes, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview. To apply the changes and go back to the image, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of image enhancement is shown in Figure 196.



Before applying «Sharpen» filter

After applying «Sharpen» filter

Fig. 196. *Applying «Sharpen» filter*

5.3.7.3.2 Sharpen More

To change sharpness, press the left mouse on menu item «Sharpen More...». Set the required parameters in opened window (Fig. 197).

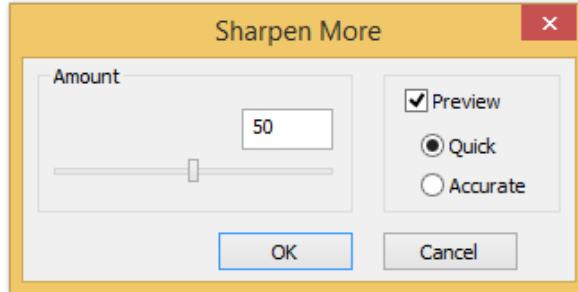


Fig. 197. *Dialog window «Sharpen More»*

To change the sharpness in opened window, place the cursor on the slider of the threshold, hold the left mouse button and move the slider to the needed position, or place the cursor on the needed point on the scale and press the left mouse button.

To see the results on the image, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item and set the «tick» .

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will

be different from the image preview. To apply the changes and go back to the image, press the left mouse button on the «OK» button. To cancel the changes, press the left mouse button on the «Cancel» button.

An example of image sharpening is shown in Figure 198.



Fig. 198. *Applying «Sharpen More» filter*

5.3.7.3.3 Sharpen More (Laplacian)

For image sharpening with Laplacian operator, select menu item «Sharpen More (Laplacian)...», and in dialog window (Fig. 199) set parameters similar to those described in the paragraph above. The result of filtration is shown in Figure 200.

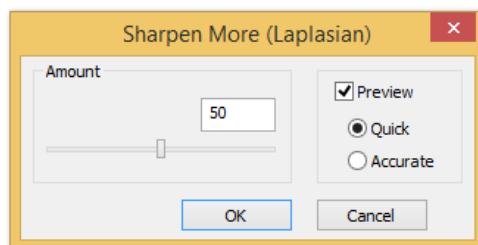


Fig. 199. *Dialog window «Sharpen More (Laplacian)»*

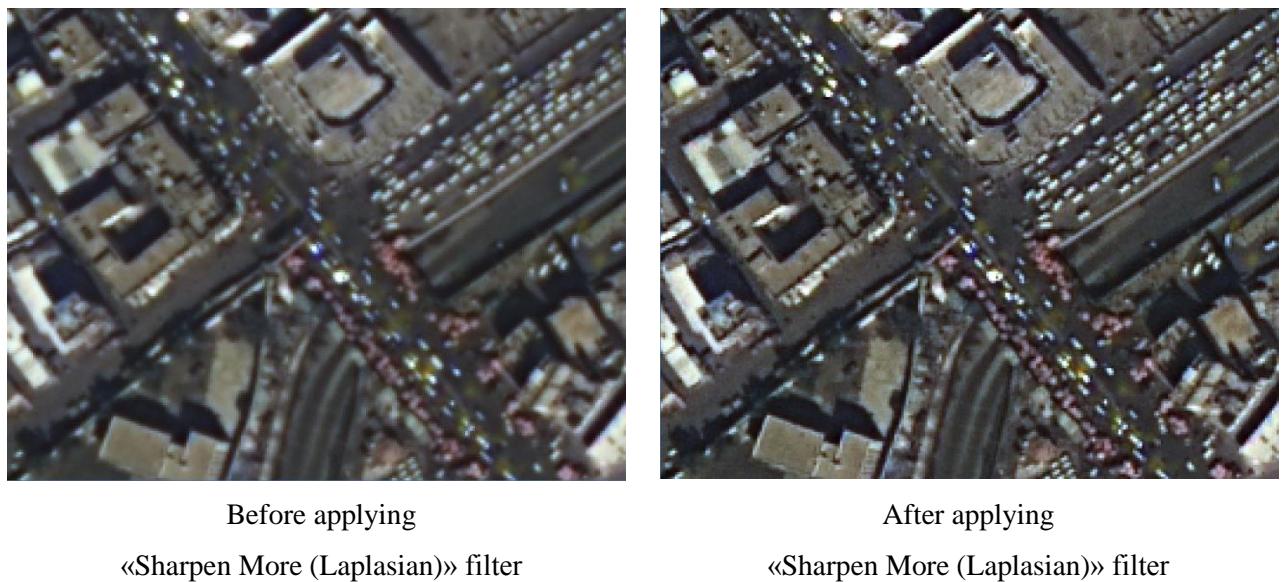


Fig. 200. *Applying «Sharpen More (Laplacian)» filter*

5.3.7.3.4 Unsharp Mask

«Unsharp Mask» filter allows user to increase contrast between tonal transitions on the images. The filter parameters (Fig. 201) are configured similar to those described above.

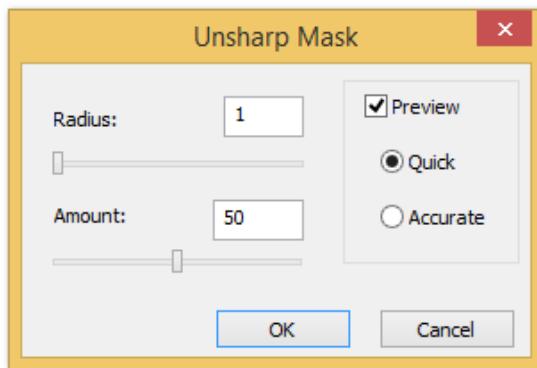


Fig. 201. *Dialog window «Unsharp Mask»*

5.3.7.4 Blur

To add a blur, select the menu item «Blur» (Fig. 202).



Fig. 202. *Menu item «Blur»*

Dialog window «Blur» will open for editing the blur parameters (Fig. 203).

5.3.7.4.1 Blur

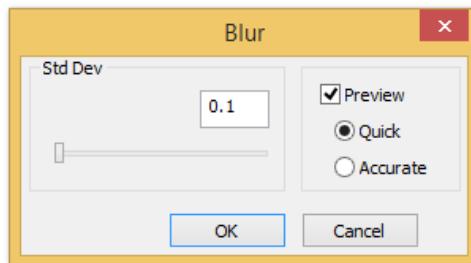


Fig. 203. *Dialog window «Blur»*

To change the standard deviation (Std Dev), place the cursor on the slider of Std Dev, hold the left mouse button and move the slider to the needed position, or place the cursor on the needed point on the scale and press the left mouse button.

To change the threshold value, place the cursor on the slider of the threshold, hold the left mouse button and move the slider to the needed position, or click on the needed point on the scale.

To see the changes, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button in the box to the left of the needed value .

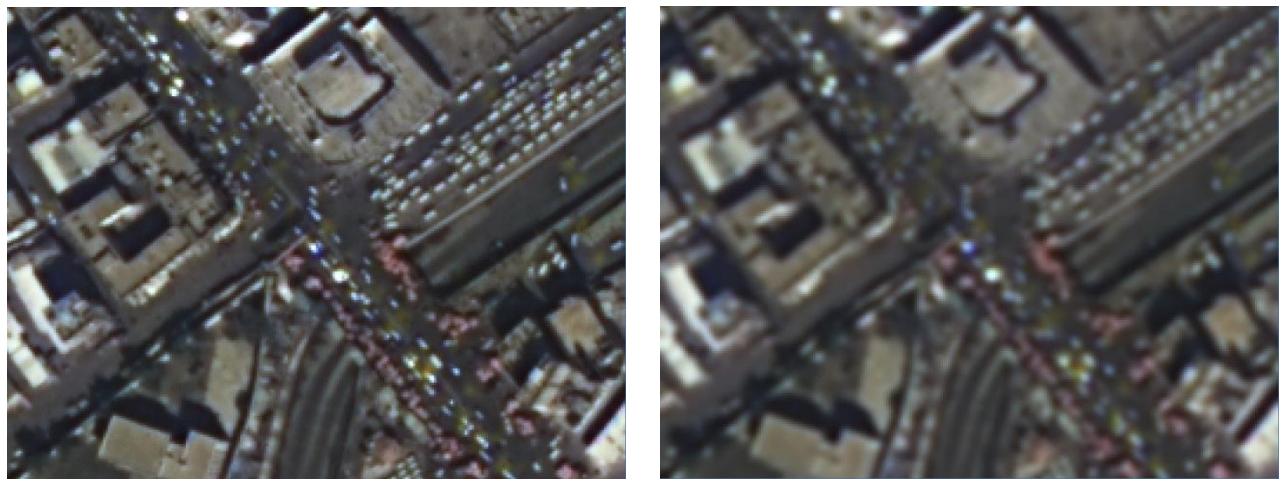
If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview.

To apply the changes and go back to the image, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of using «Blur» filter is shown in Figure 204.



Before applying «Blur» filter

After applying «Blur» filter

Fig. 204. Applying «Blur» filter

5.3.7.4.2 Motion Blur

When choosing menu item «Motion Blur», the dialog window «Motion Blur» will open (Fig. 205).

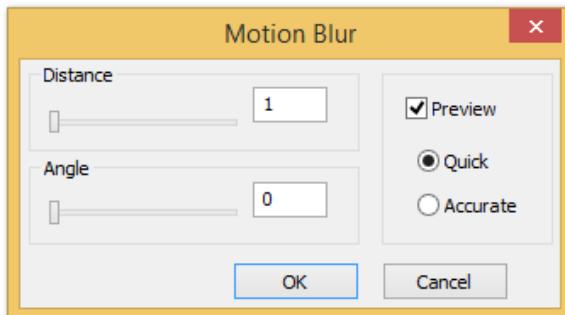


Fig. 205. Dialog window «Motion Blur»

In the «Distance» parameter set the distance at which motion blur is made.

In the «Angle» parameter set the motion blur.

5.3.7.4.3 Radial Blur

When choosing menu item «Radial Blur», the dialog window «Radial Blur» will open (Fig. 206).

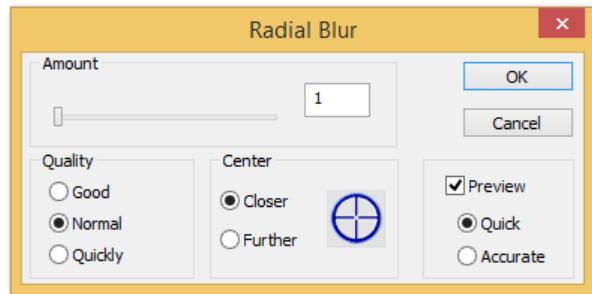


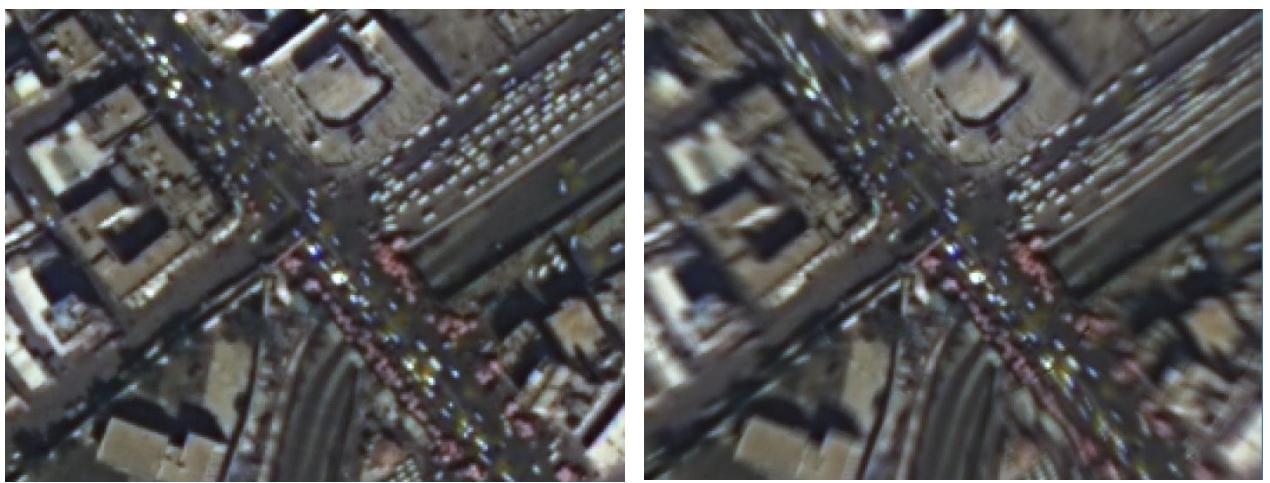
Fig. 206. *Dialog window «Radial Blur»*

In the parameter «Amount» user sets amount of radial blur.

In the section «Quality» user selects the quality of radial blur.

In the section «Center» user defines the position of center – closer or further. To choose the center of a radial blur, press on icon and select center on the image.

An example of using «Radial Blur» filter is shown in Figure 207.



Before applying «Radial Blur» filter

After applying «Radial Blur» filter

Fig. 207. *Applying «Radial Blur» filter*

5.3.7.4.4 Removal Blurring

Removal Blurring on the image can be done in both horizontal and vertical direction, based on the noise characteristics and the size of the signal. After selecting the settings, user could see the image preview (Fig. 208).

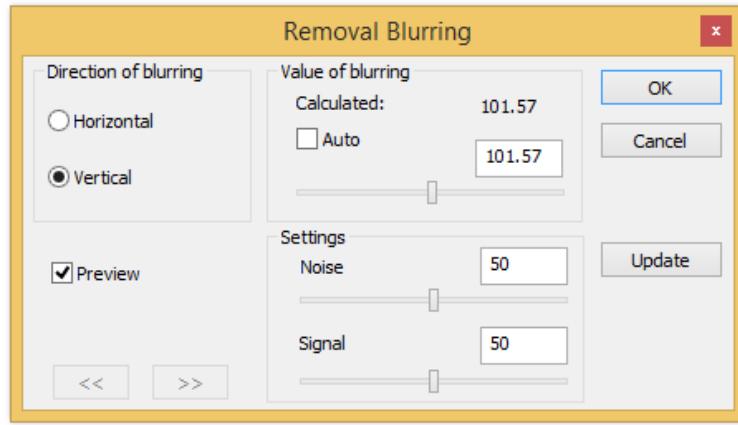


Fig. 208. *Dialog window «Removal Blurring»*

5.3.7.5 Editable filter

In menu item «Editable» (Fig. 209) user can set the arbitrary mask filter, if the algorithm of its formation is known. To do this, in the opened list press the left mouse button on item «Arbitrary mask...».



Fig. 209. *Menu item «Editable»*

Filter is based on pixel conversation, using information about the nearby pixels.

When choosing this menu item, the dialog window «Arbitrary mask» will open (Fig. 210).

To set the mask radius, place the cursor in the spin box with the values and set the needed value in the field «Radius» by pressing the left mouse button.

To change the values of the mask coefficients, press the left mouse button in the corresponding window and enter the needed value.

To see the results on the image, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview.

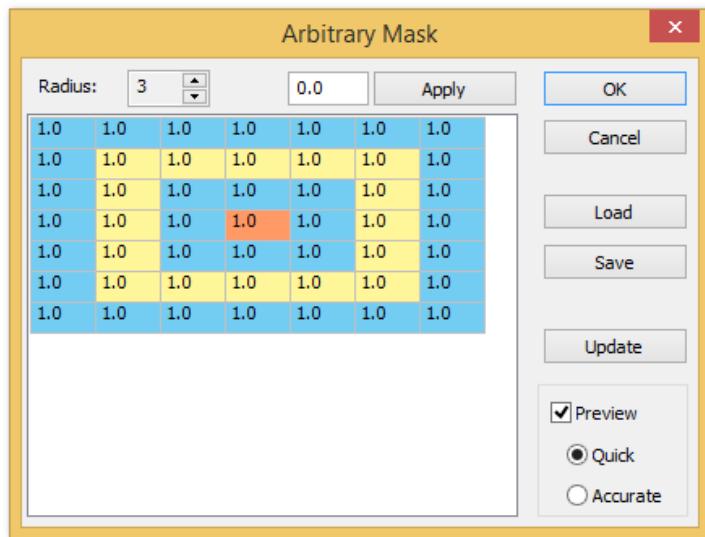


Fig. 210. *Dialog window «Arbitrary mask»*

To apply a mask to the image, press the left mouse button on the «Apply» button.

To load an existing mask, press the left mouse button on the «Load» button and in the opened window select the required file with the mask coefficient (*.msk).

To save the created mask in format *.msk, press the left mouse button on the «Save» button and in the opened window set the name of the mask in the field «Filename», choose folder for saving in the field «Folder» and press the left mouse button on «Save» button. To cancel saving, press the «Cancel» button.

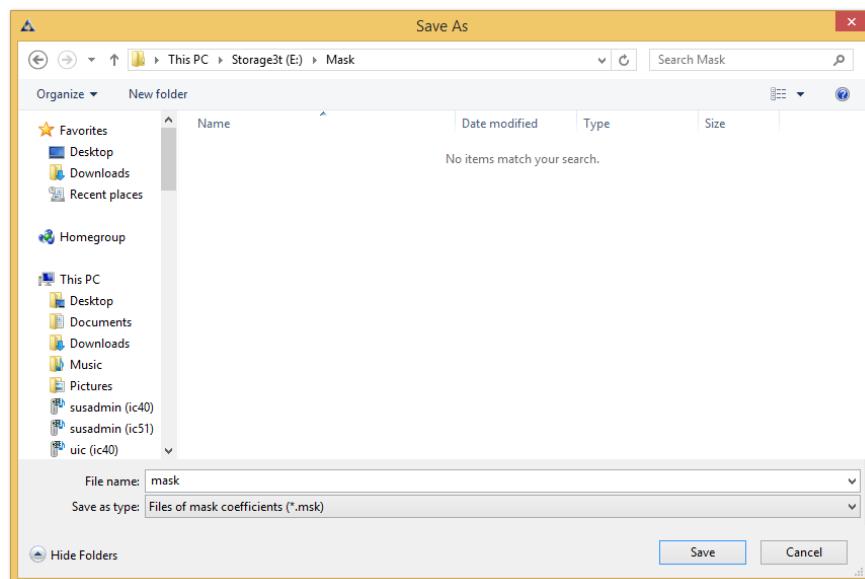


Fig. 211. *Load file of the mask coefficient*

To apply the mask and go back to the changed image, press the left mouse button on «OK» button.

To exit from the mode of creating mask, press the left mouse button on «Cancel» button.

Examples of arbitrary masks and their using are shown in Figures 212-217.

5.3.7.5.1 Enhancement

-0.250	-0.250	-0.250
-0.250	3.000	-0.250
-0.250	-0.250	-0.250

Fig. 212. *Mask for the enhancement filter*

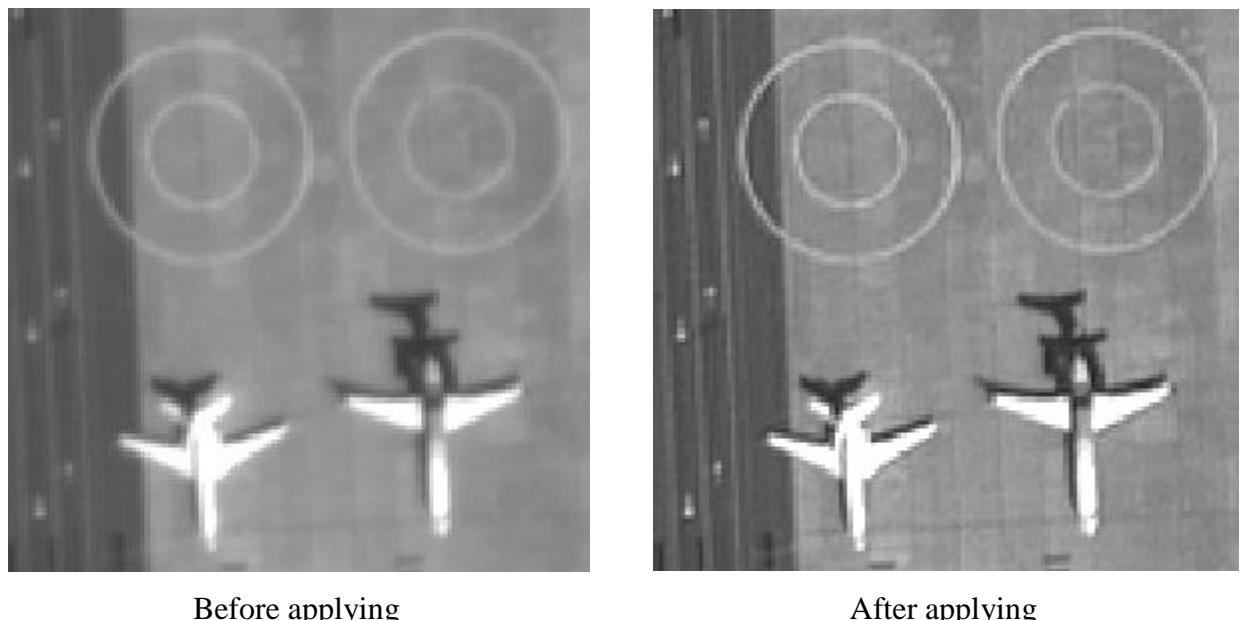


Fig. 213. *Example of applying the enhancement filter*

5.3.7.5.2 Texture

-1.000	0.000	0.000	0.000	-1.000
0.000	-1.000	0.000	-1.000	0.000
0.000	0.000	9.000	0.000	0.000
0.000	-1.000	0.000	-1.000	0.000
-1.000	0.000	0.000	0.000	-1.000

Fig. 214. *Mask for the «Texture» filter*



Fig. 215. *Example of applying the «Texture» filter*

5.3.7.5.3 Borders

-0.500	-0.500	-0.500	-0.500	-0.500
-0.500	-0.100	-0.100	-0.100	-0.500
-0.500	-0.100	9.000	-0.100	-0.500
-0.500	-0.100	-0.100	-0.100	-0.500
-0.500	-0.500	-0.500	-0.500	-0.500

Fig. 216. *Mask for the borders filter*

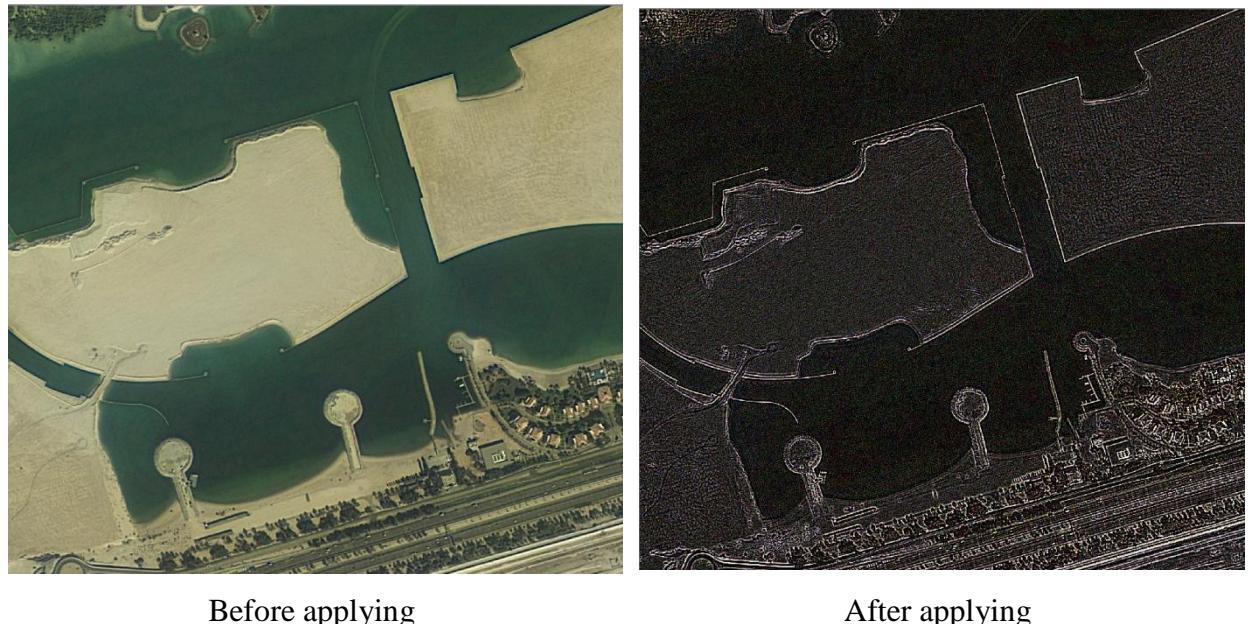


Fig. 217. *Example of applying the borders filter*

5.3.7.6 Others filters

Menu item «Others...» contains the additional filters for the images correcting (Fig. 218).



Fig. 218. *Menu item «Others»*

5.3.7.6.1 High pass

Menu item «High pass» is used to call the filter that subtracts the low-frequency region of the image, isolating the high frequency details. When choosing this menu item, the dialog window « High pass » will open (Fig. 219).

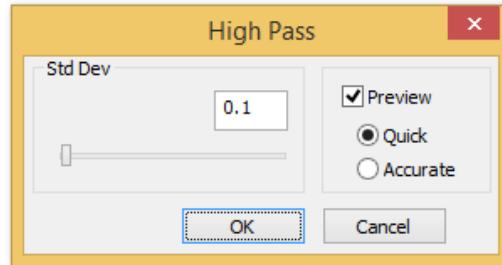


Fig. 219. *Menu item «High pass»*

To change the standard deviation (Std Dev), place the cursor on the slider, hold the left mouse button and move the slider to the needed position, or place the cursor on the needed point on the scale and press the left mouse button.

To see the results on the image, set the «tick» in «Preview» by pressing the left mouse button. There are two display modes: «Quick» and «Accurate». To select one of them, press the left mouse button on needed item.

If user select «Accurate» mode, the image preview in the document window will display the result of applying filter to the whole raster layer, i. e. to the zero pyramid level (on the source image).

If user select «Quick» mode, the image preview will display the result of the filter to the current pyramid level of editable image, and after pressing «OK» button, the resulting image will be different from the image preview.

To apply the changes, press the left mouse button on the «OK» button.

To cancel the changes, press the left mouse button on the «Cancel» button.

An example of using «High pass» filter is shown Figure 220.

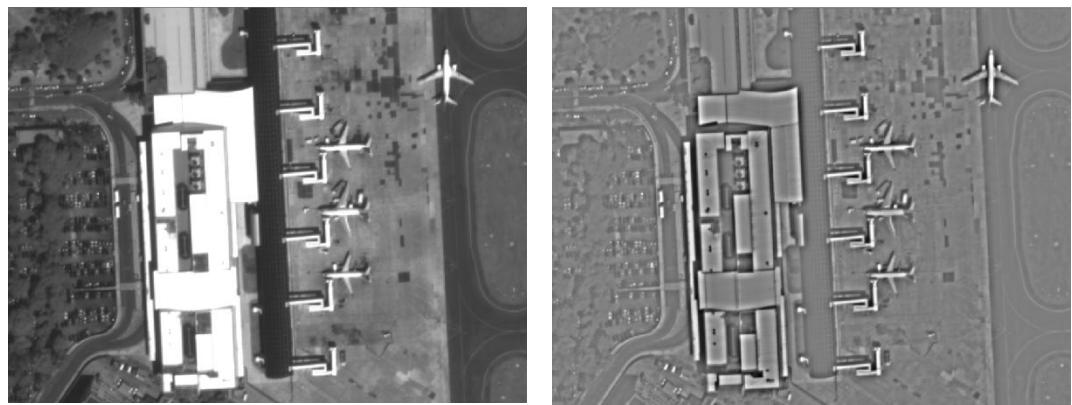


Fig. 220. *Applying «High pass» filter*

5.3.7.6.2 Minimum

«Minimum» filter allows user to increase the number of the dark areas on the image, it is possible, because the brightness value of the current pixel in the sliding window is replaced by the lowest brightness value of the pixels located within the radius of the sliding window (Fig. 221).

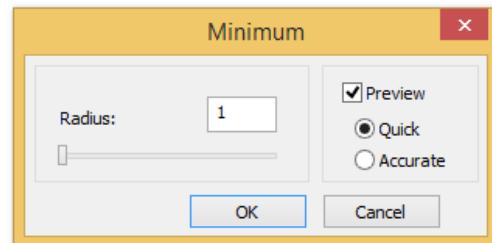
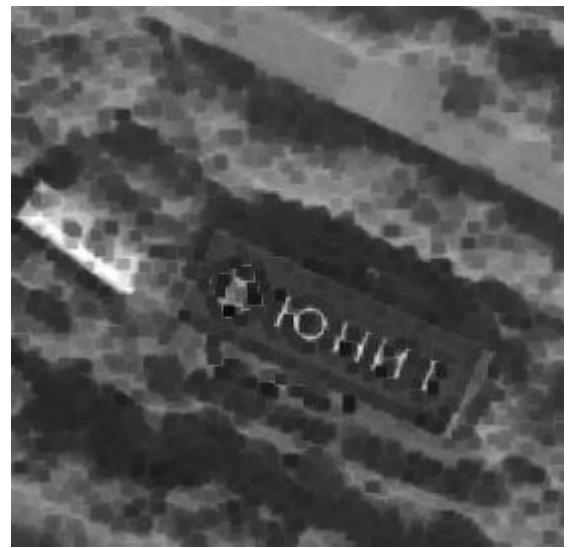


Fig. 221. *Menu item «Minimum»*



The source image



After applying «Minimum» filter

Fig. 222. *An example of applying «Minimum» filter*

5.3.7.6.3 Maximum

«Maximum» filter allows user to increase the number of the light areas on the image, it is possible, because the brightness value of the current pixel in the sliding window is replaced by the highest brightness value of the pixels located within the radius of the sliding window (Fig. 223).

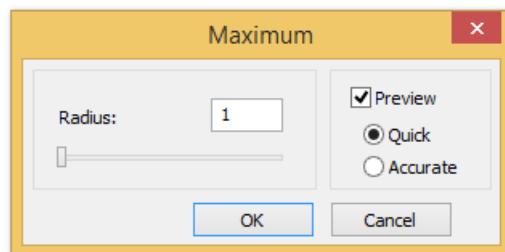


Fig. 223. *Menu item «Maximum»*

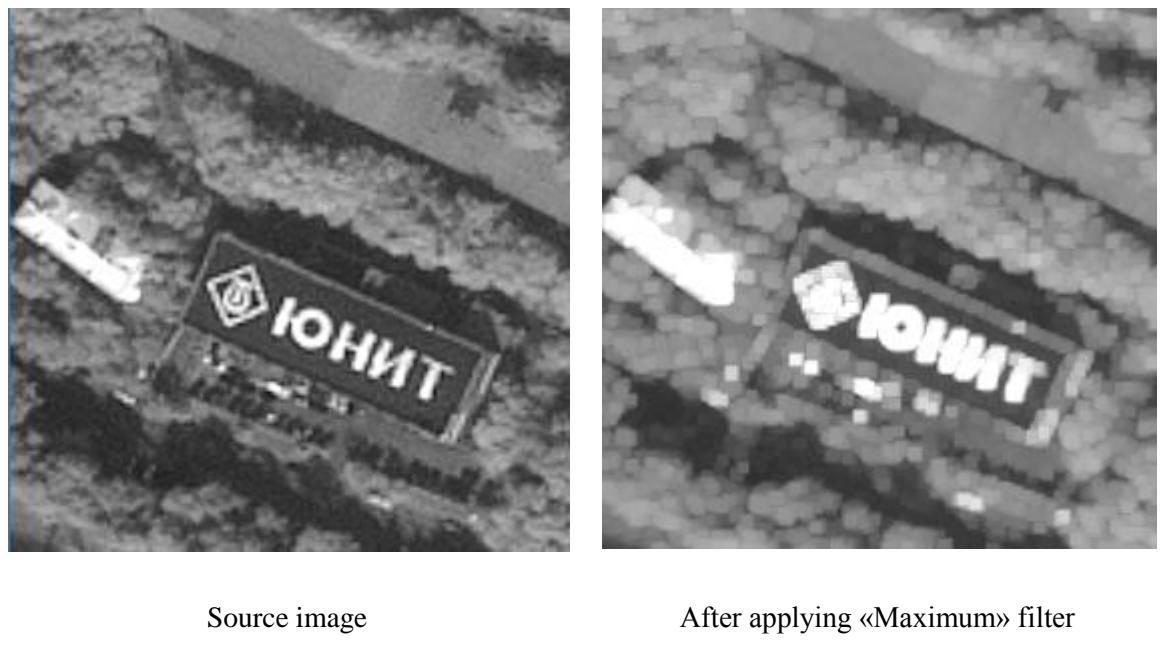


Fig. 224. *An example of applying «Maximum» filter*

5.3.7.6.4 Average

«Average» filter replace the brightness value of the current pixel by the average brightness value of the pixels located within the radius of the sliding window (Fig. 225).

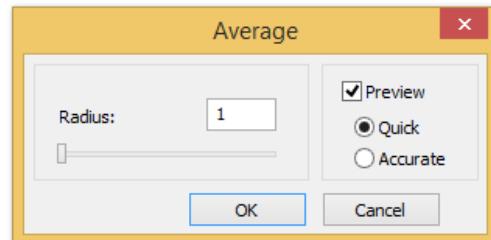


Fig. 225. *Menu item «Average»*



Source image



After applying «Average» filter

Fig. 226. *An example of applying «Average» filter*

5.3.7.7 Stylize

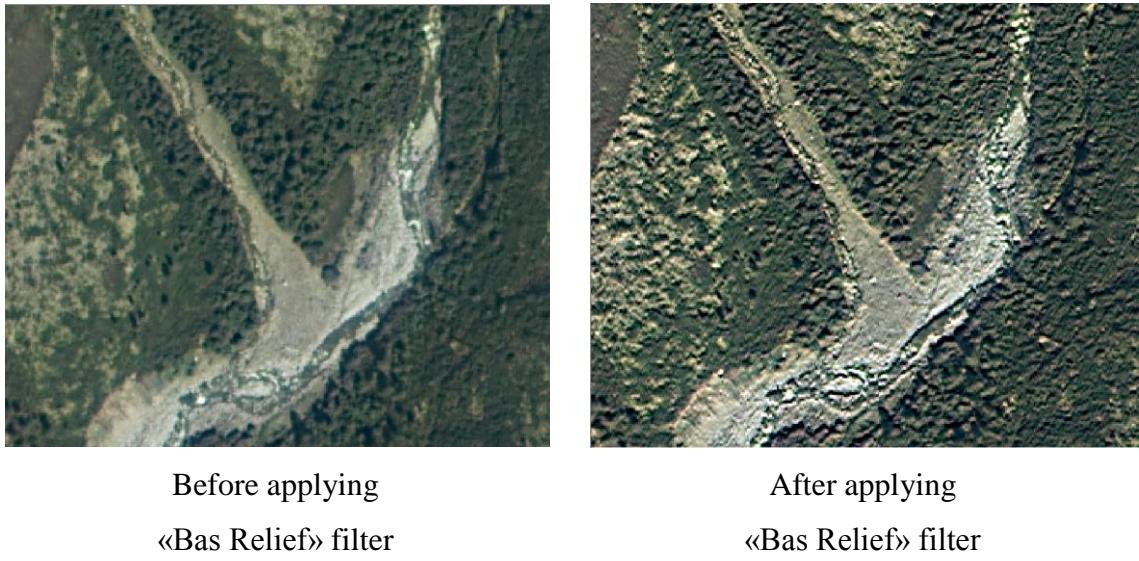
Menu item «Stylize» allows user to create artistic effects (Fig. 227).



Fig. 227. *Menu item «Stylize»*

5.3.7.7.1 Bas Relief

Filter is designed to create an artistic effect «Bas Relief» (Fig. 228).



Before applying

«Bas Relief» filter

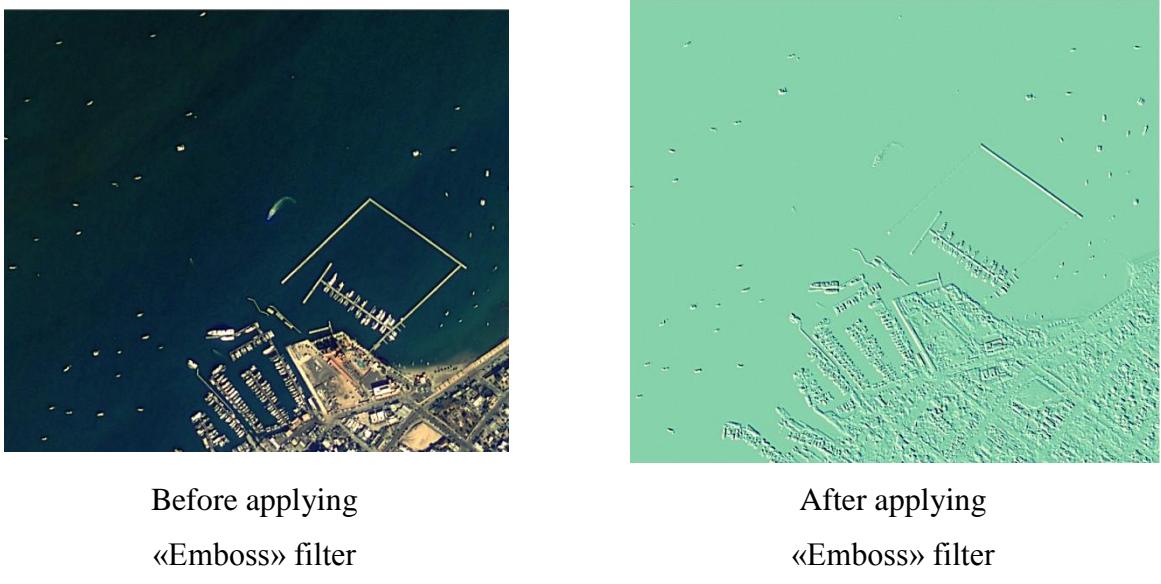
After applying

«Bas Relief» filter

Fig. 228. *An example of applying «Bas Relief» filter*

5.3.7.7.2 Emboss

Filter is designed to create an artistic effect «Emboss» (Fig. 229).



Before applying

«Emboss» filter

After applying

«Emboss» filter

Fig. 229. *An example of applying «Emboss» filter*

5.3.7.8 Contours

Menu item «Contours» allows user to select the image contours (Fig. 230).



Fig. 230. *Menu item «Contours»*

Each filter is configured in a standard dialog window (Fig. 231).

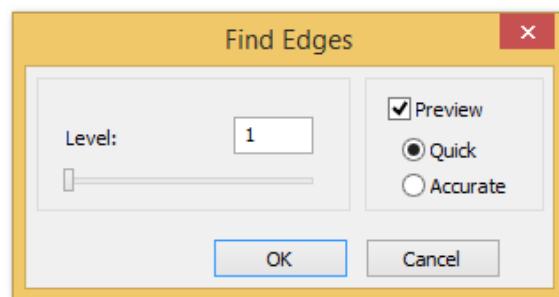


Fig. 231. *Dialog window «Find edges»*

The results of the algorithms presented in the figures below.



Fig. 232. *An example of applying «Find edges» filter*

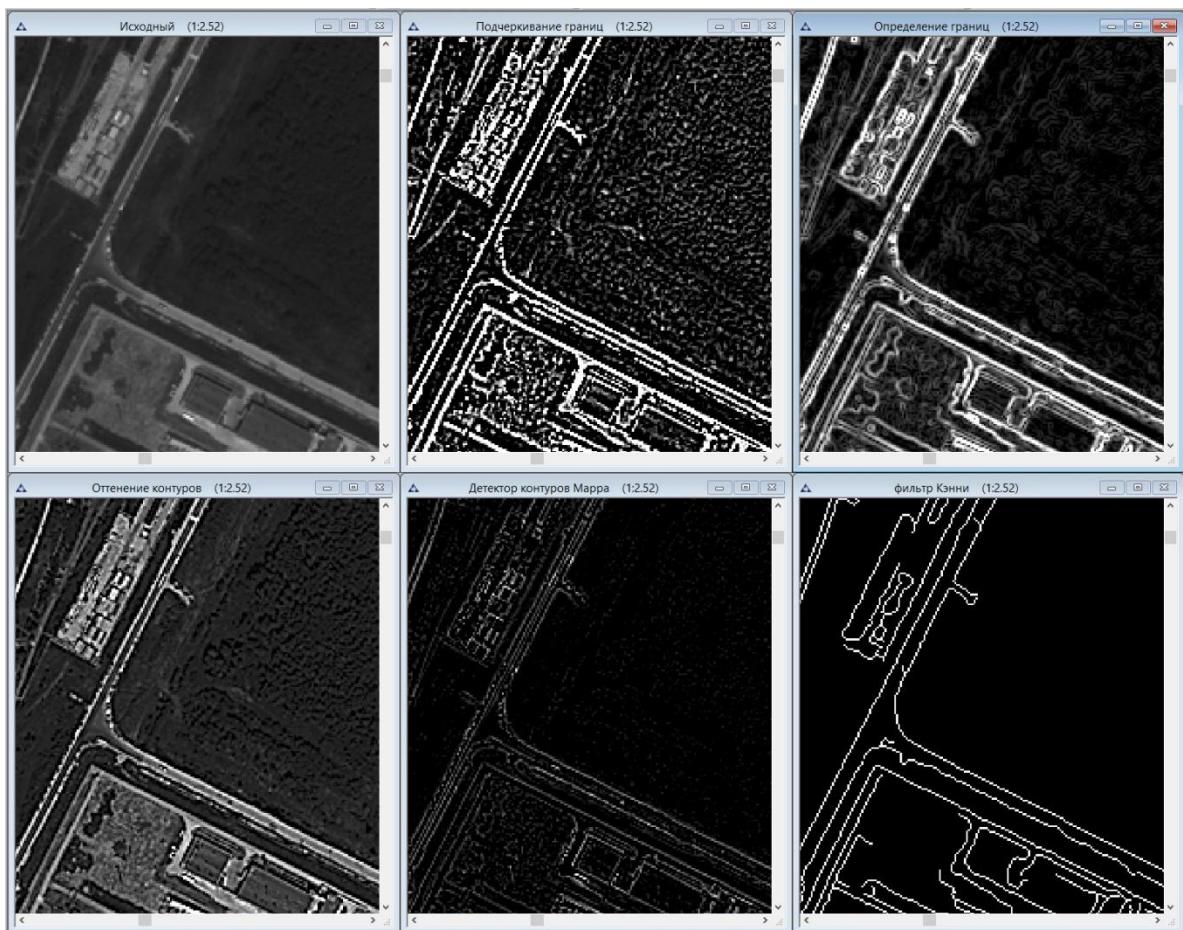


Fig. 233. Comparison of the results of «Contours» filters

5.3.7.9 Distort

Menu item «Distort» contains filters that add the direct flow for changing the color lines (Fig. 234).



Fig. 234. Menu item «Distort»

The examples of the applying «Distort» filters presented in the figures below.

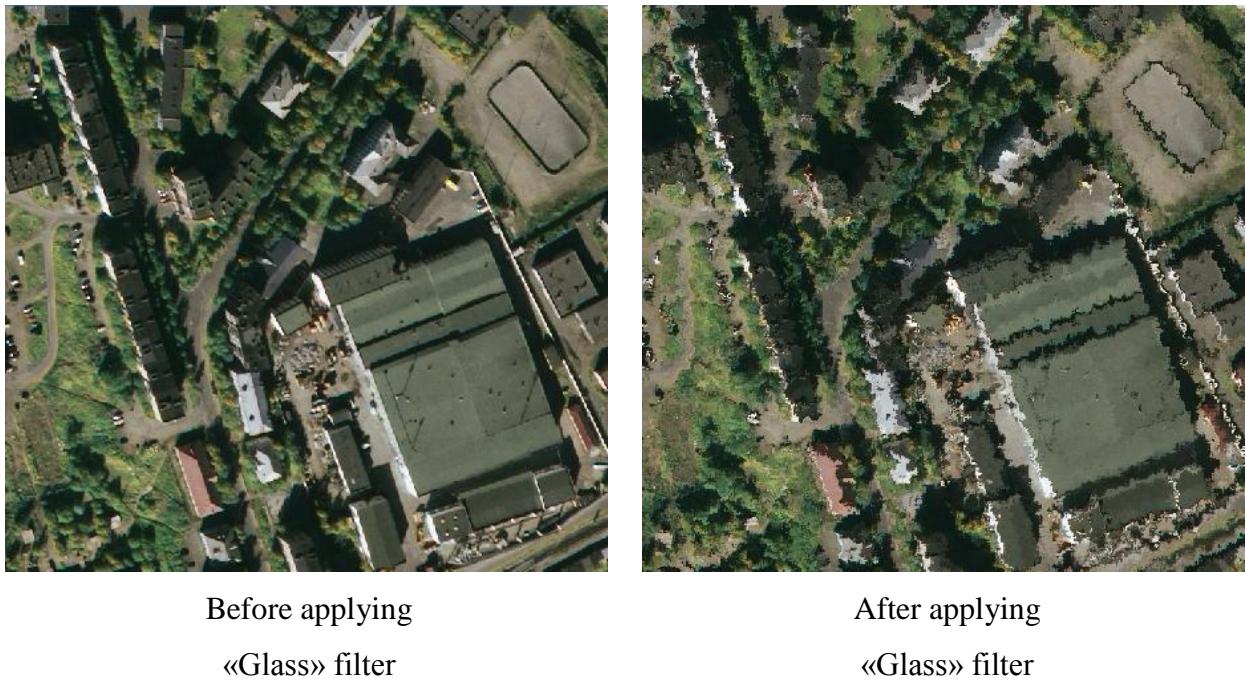


Fig. 235. *An example of applying «Glass» filter*

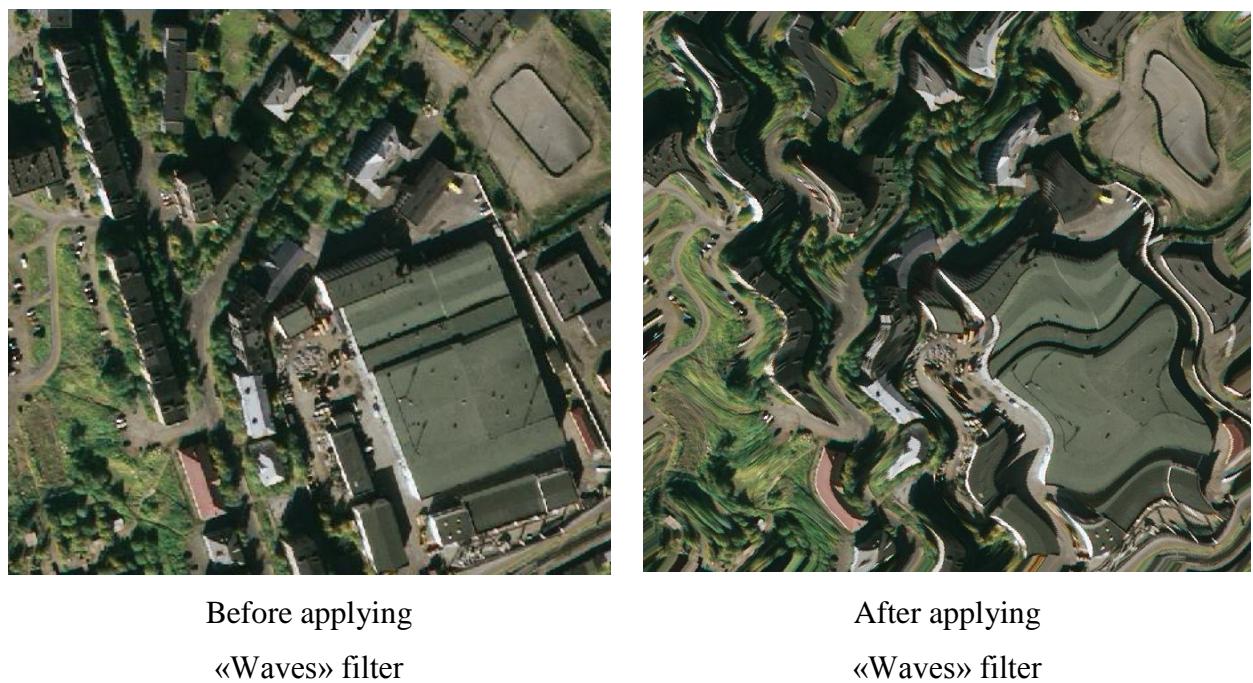


Fig. 236. *An example of applying «Waves» filter*

5.3.7.10 Texture

Menu item «Texture» contains filters with different textures, shapes, mosaics that applied to the image (Fig. 237).

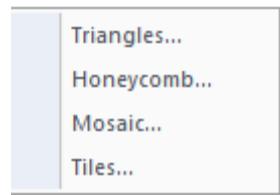
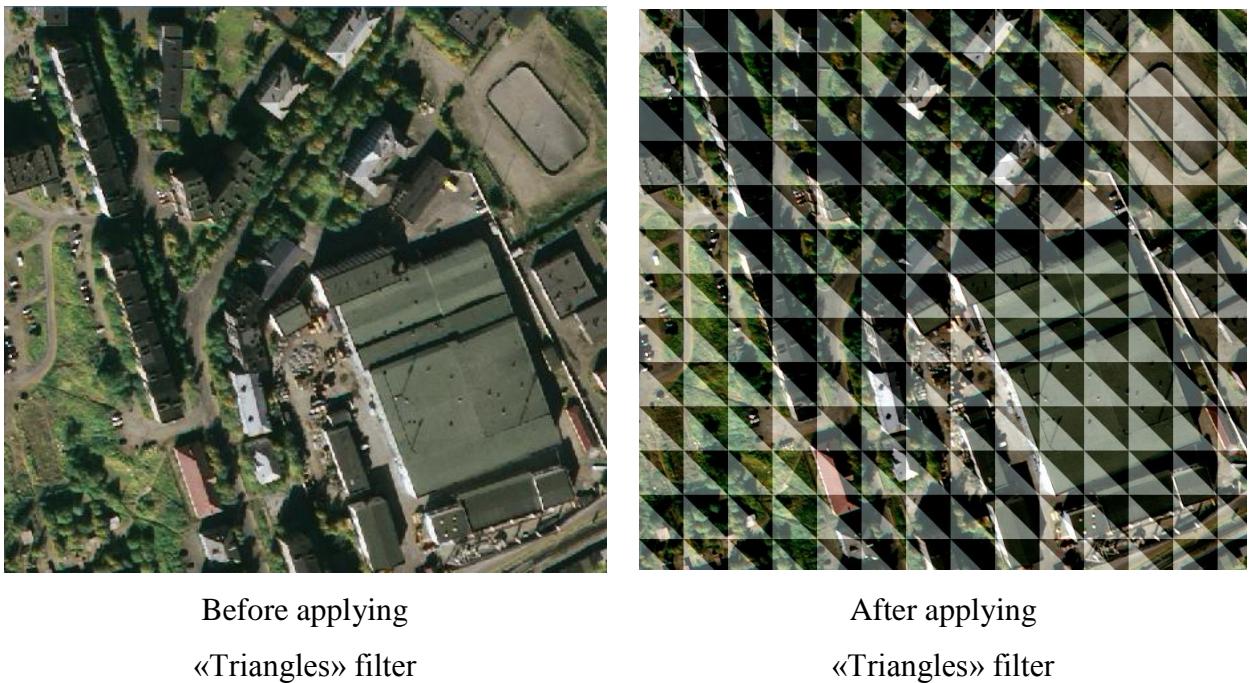


Fig. 237. *Menu item «Texture»*

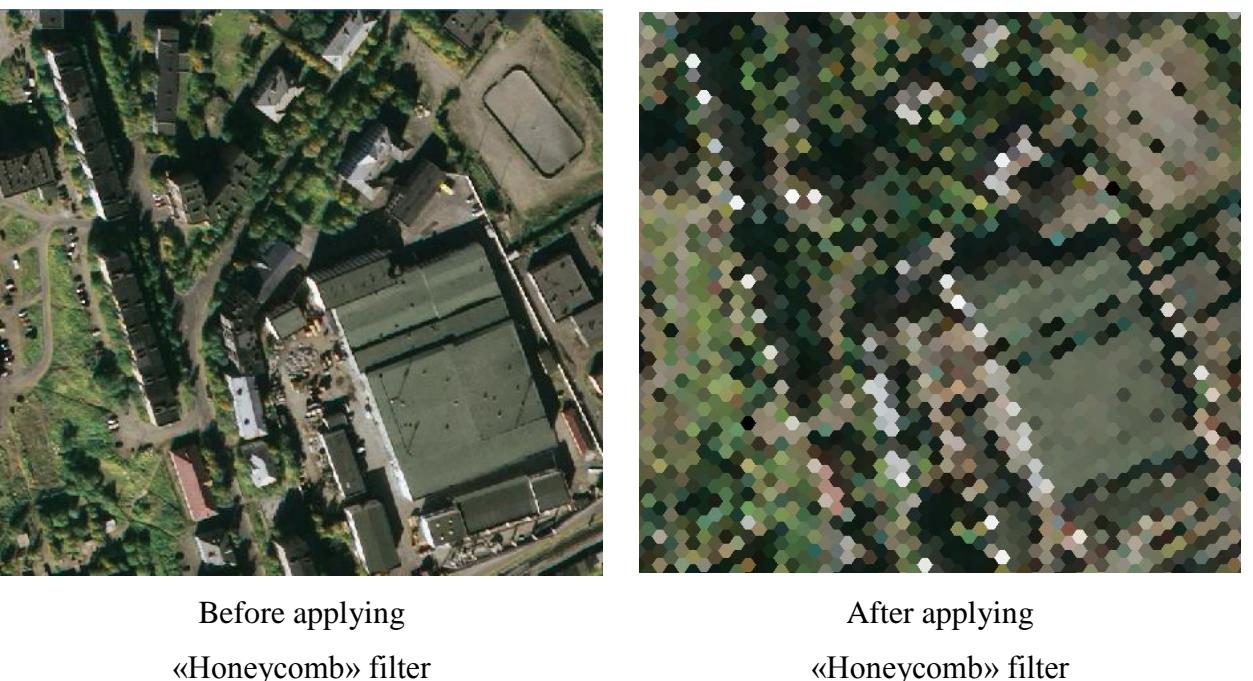
The examples of the applying texture filters presented in the figures below.



Before applying
«Triangles» filter

After applying
«Triangles» filter

Fig. 238. *An example of applying «Triangles» filter*



Before applying
«Honeycomb» filter

After applying
«Honeycomb» filter

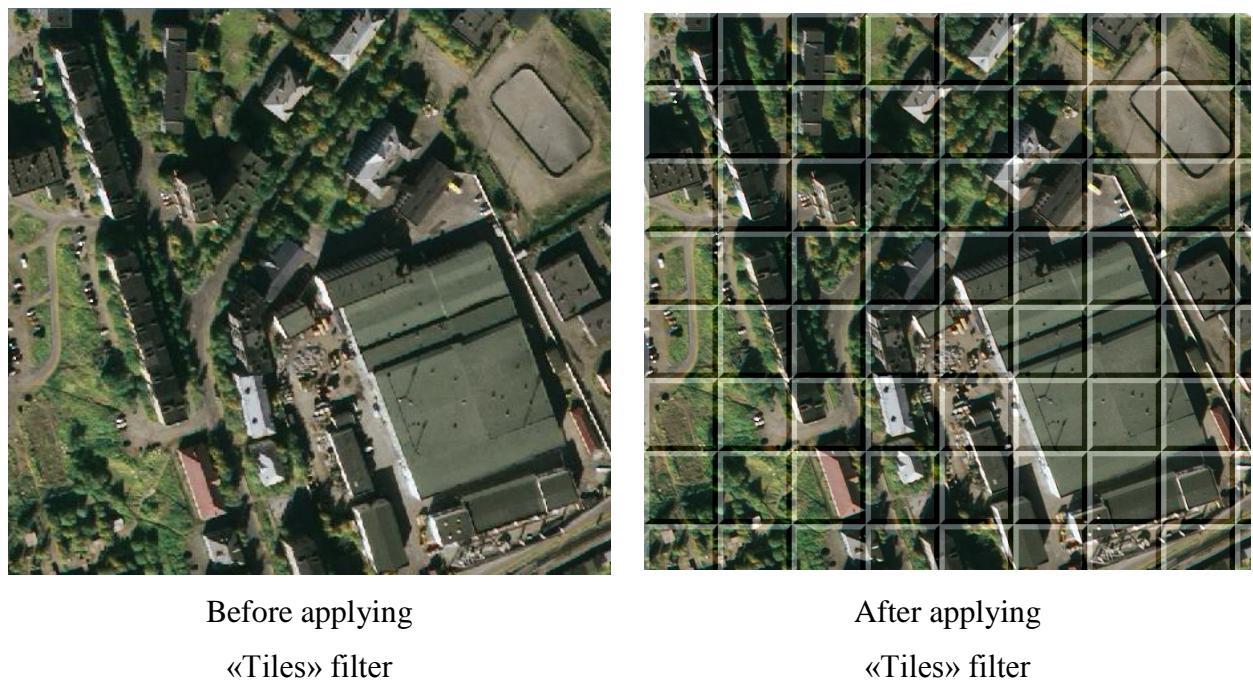
Fig. 239. An example of applying «Honeycomb» filter



Before applying
«Mosaic» filter

After applying
«Mosaic» filter

Fig. 240. An example of applying «Mosaic» filter



Before applying
«Tiles» filter

After applying
«Tiles» filter

Fig. 241. An example of applying «Tiles» filter

5.3.7.11 Cutout

Menu item «Styles» contains «Cutout» filter, which allows user to select the color of the given level (Fig. 242).



Fig. 242. *Menu item «Cutout»*



Fig. 243. *An example of applying «Cutout» filter*

5.3.7.12 De-Interlace

Menu item «De-Interlace» is used to improve images from the video cameras (Fig. 244).



Before applying
«De-Interlace» filter After applying
«De-Interlace» filter

Fig. 244. *An example of applying «De-Interlace» filter*

5.3.7.13 Morphology

The group of «Morphology» filters includes segmentation, skeletonization and skeleton vectorization.

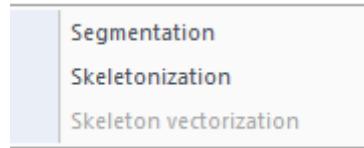


Fig. 245. «*Morphology*» section

5.3.7.13.1 Segmentation

Segmentation of the raster image is used to detect homogenous areas of the same color. Each area is assigned an index number. Segmentation algorithm detects contrast borders between homogenous areas, where the contrast between adjacent pixels is more than half the brightness gradation unit of one of the active color bands.

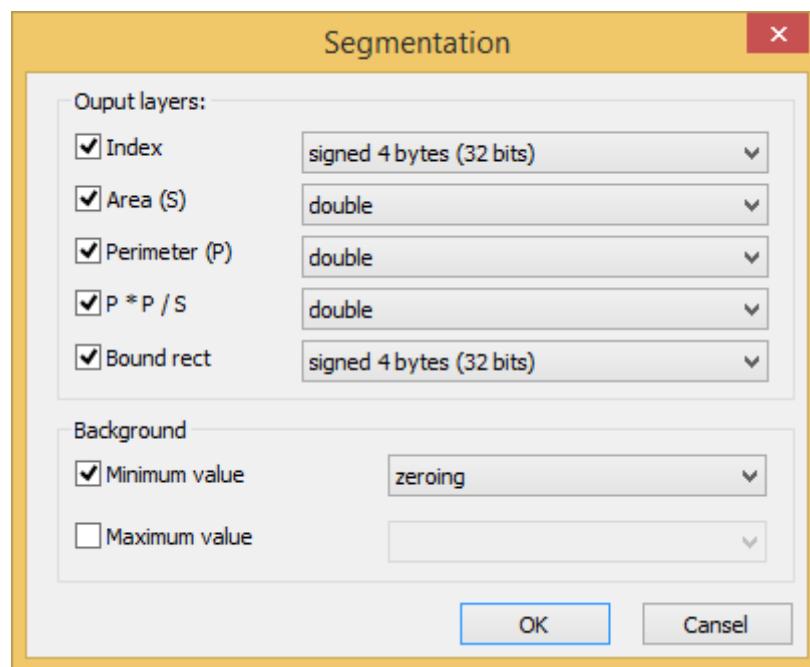


Fig. 246. «*Segmentation*» dialog box

Segmentation algorithm can generate different results:

«Index» – serial number of the segment.

«Area» – area of the segment in pixels.

«Perimeter» – perimeter of the area in pixels.

« $P * P / S$ » – square perimeter to area ratio. The lower the value, the closer the shape of the segment is to the circle. The greater value means that the segment is stretched or has a complex shape.

«Bound rect» – a pair of coordinates (the upper left corner and lower right corner) of a rectangle which circumscribes the segment.

5.3.7.13.2 Skeletonization

Skeletonization algorithm is used to detect the skeleton of the objects on the binary image. Skeleton means the set of points equidistant from the borders of the figure.

If the image contains multiple color bands, each of them will be processed separately.

5.3.7.13.3 Skeleton vectorization

To perform skeleton vectorization, select «Image» – «Filter» – «Morphology» – «Skeleton vectorization» menu item. To perform the vectorization, use Grayscale images as an input data. New vector layer will be formed as the result (Fig. 247).

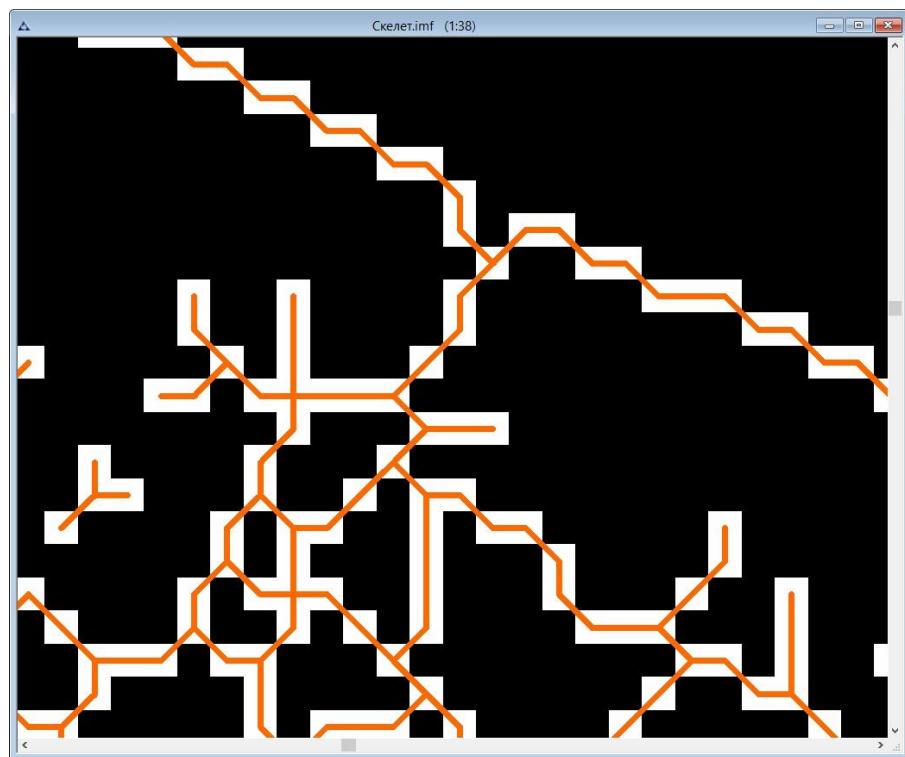
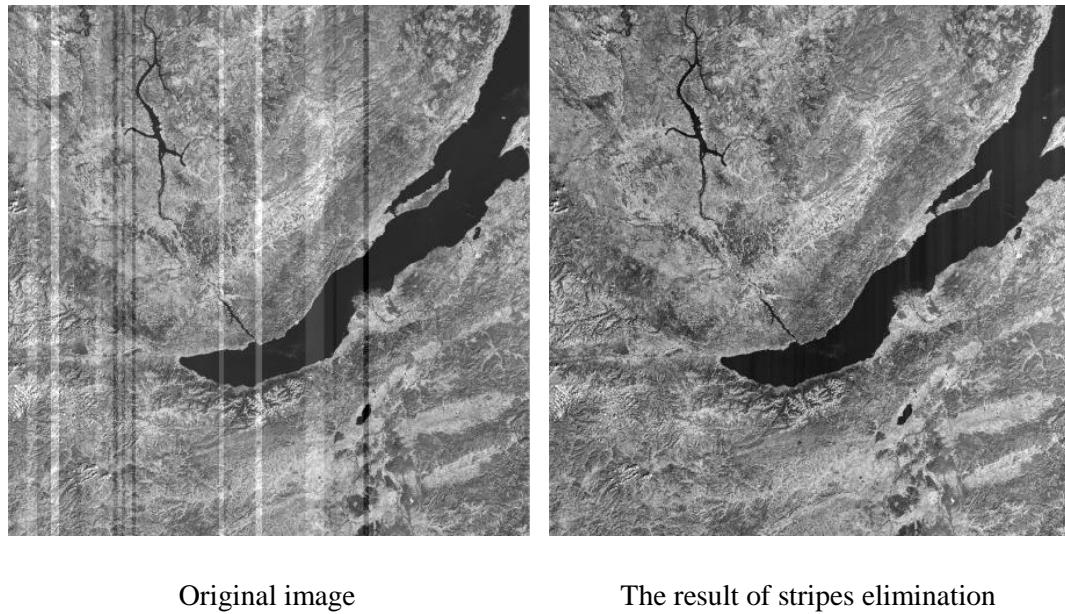


Fig. 247. *Skeleton vectorization*

5.3.7.14 Elimination of stripes

«Elimination of stripes by average» filter is designed to eliminate vertical or horizontal stripes of different brightness on the image (Fig. 248).



Original image

The result of stripes elimination

Fig. 248. *The result of stripes elimination example*

5.3.8. Color and tonal image correction

«Correction» menu item contains set of tools for image correction (Fig. 249).

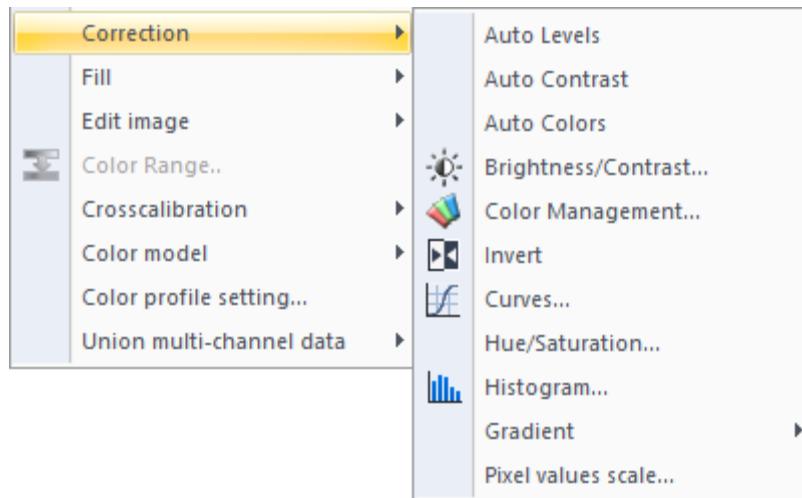


Fig. 249. *«Correction» item*

«Auto levels» tool performs an automatic adjustment of color bands.

«Auto contrast» tool automatically adjusts contrast of the image.

«Auto colors» tool automatically adjusts colors of the image.

Use «Brightness / Contrast» tool to adjust brightness or contrast of the image (Fig. 250).
 «Brightness / Contrast» dialog box

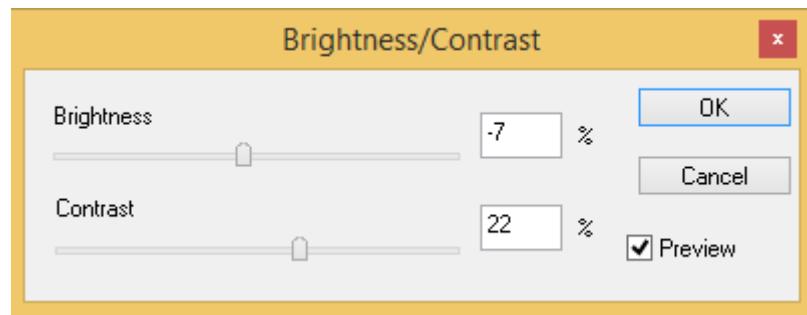


Fig. 250. «Brightness / Contrast» dialog box

«Invert» tool changes the colors of the image to the opposite colors.
 «Hue/Saturation» tool is designed to adjust hue, saturation or luminosity of the image. In the opened «Hue/Saturation» dialog box move the sliders to adjust corresponding parameters of the image (Fig. 251).

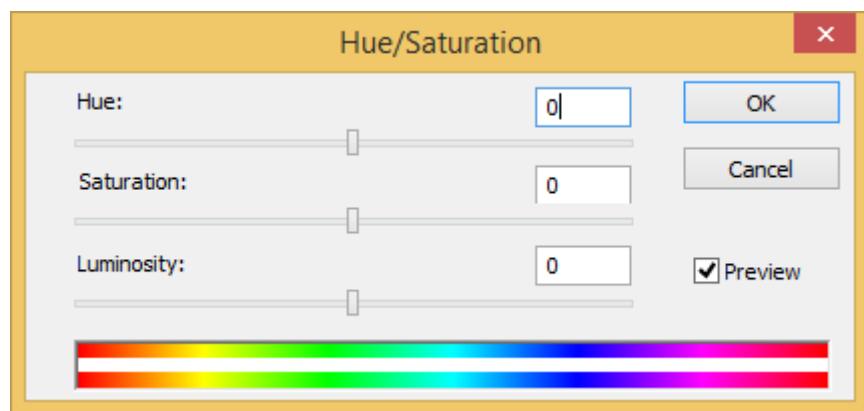


Fig. 251. «Hue/Saturation» dialog box

5.3.8.1 Histogram adjustment for multispectral images

A «Histogram» tool illustrates how pixels in an image are distributed by graphing the number of pixels at each color intensity level. The histogram shows detail in the shadows (shown in the left part of the histogram), midtones (shown in the middle), and highlights (shown in the right part) A histogram can help you determine whether an image has enough detail to make a good correction. Choose «Image» – «Correction – Histogram» or press  button on the «Image» tool box to open «Histogram» dialog window (Fig. 252).

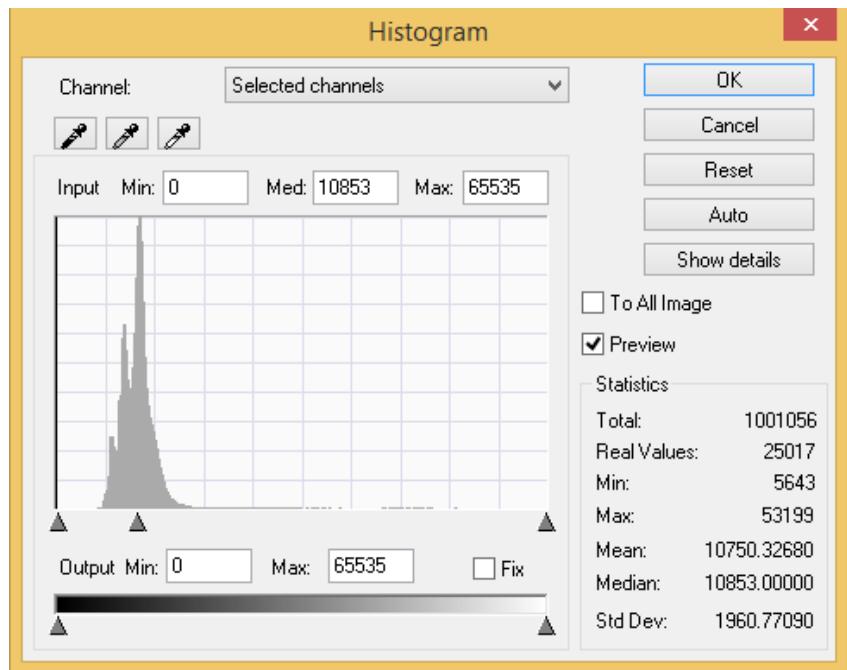


Fig. 252. «Histogram» dialog box

In the window user can see the graphical representation of pixel brightness distribution. User can adjust the graph by moving cursors for minimum medium and maximum brightness values. It can be done for each particular band separately.

To edit histogram of big images quickly, perform following operations:

- Before opening «Histogram» dialog box select an area on the image with the «Selection» tool;
- in «Histogram» dialog box put a tick in the «To all image» checkbox.

To view the changes, put a tick in the «Preview» checkbox.

To perform an automatic histogram adjustment, press «Auto» button.

Press «Show details» button to open a detailed view of the histogram's range between left and right sliders.

Press «Hide details» to close detailed view.

«Statistics» field shows the statistical information about the image:

- Total amount of pixels («Total»);
- Minimum pixel value («Min.»);
- Maximum pixel value («Max.»);
- Mean value («Mean»);
- median value («Median»);
- Standard deviation («Std dev»).

5.3.8.2 Curves tool

For more precise image adjustment use «*Curves*» tool. Choose «*Image*» – «*Correction*» – «*Curves*» or press «*Curves*» button on the «*Image*» tool box to open «*Curves*» dialog window (Fig. 253).

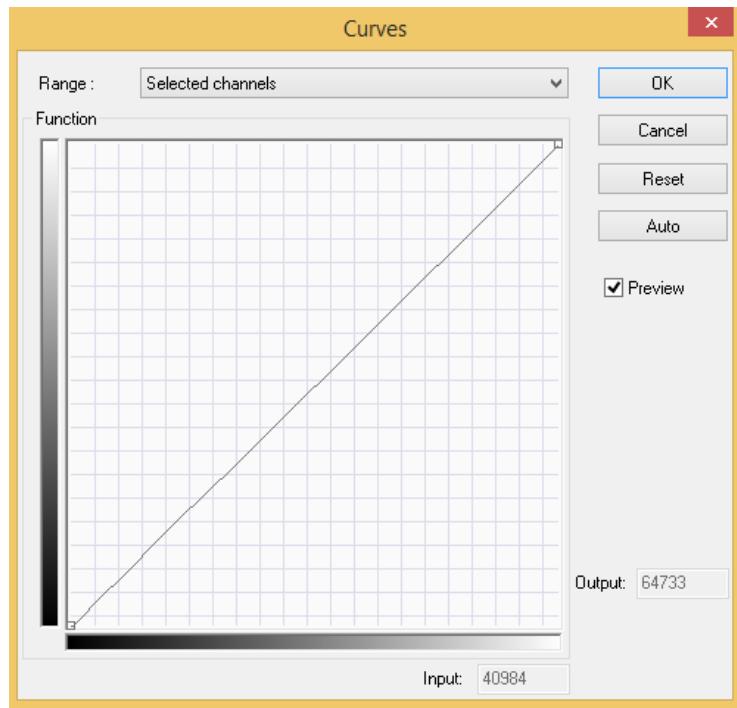


Fig. 253. «*Curves*» dialog window»

Choose the spectral band to edit in «*Range*» drop-down list (Fig. 254).

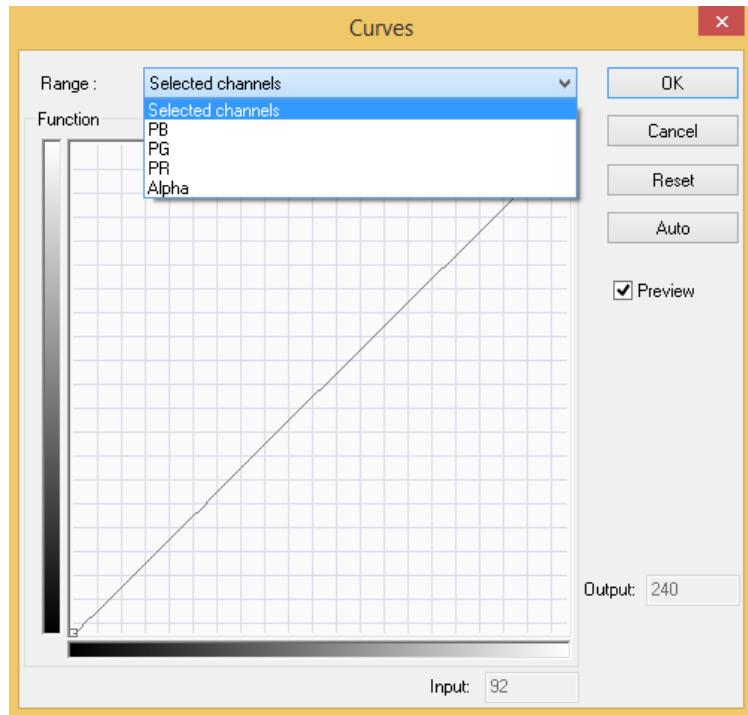


Fig. 254. *List of spectral bands*

In the Curves tool, user adjusts points throughout an image's tonal range. Initially, the image's tonality is represented as a straight diagonal line on a graph. When adjusting an RGB image, the upper-right area of the graph represents the highlights and the lower-left area represents the shadows. The horizontal axis of the graph represents the input levels (original image values) and the vertical axis represents the output levels (new adjusted values). As you add control points to the line and move them, the shape of the curve changes, reflecting your image adjustments. The steeper sections of the curve represent areas of higher contrast while flatter sections represent areas of lower contrast.

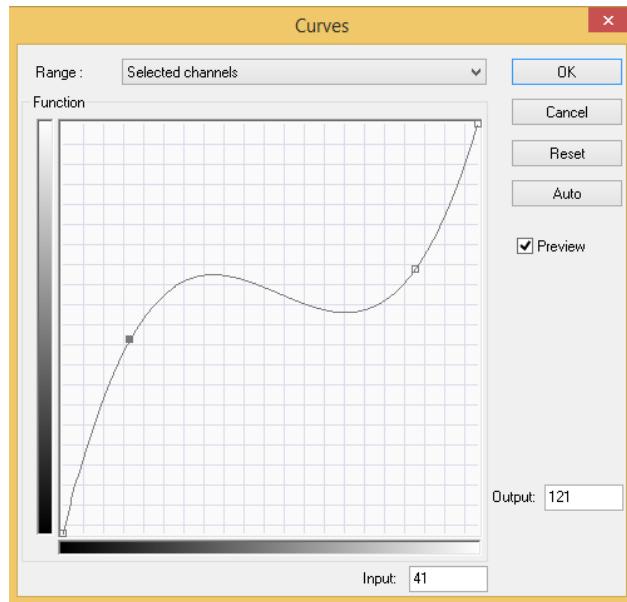


Fig. 255. *Changing brightness distribution graph*

To view the changes, put a tick in the «Preview» checkbox.

To perform an automatic curves adjustment, press «Auto» button.

To undo the changes of the current adjustment settings, press «Auto» button

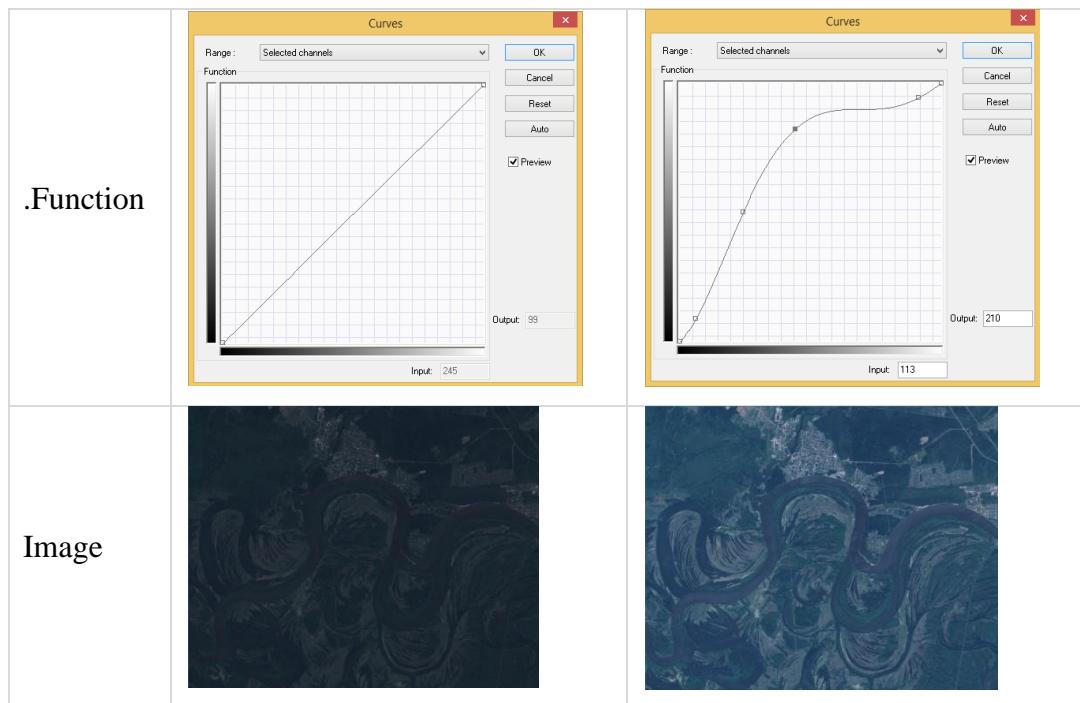


Fig. 256. *Changing brightness distribution graph*

5.3.8.3 Gradient

«Gradient» tool applies color and tonal adjustments to your image without permanently changing pixel values. User can discard your changes and restore the original image at any time

by selecting «*Remove gradient*» item. It is possible to upload a premade gradient to the image. Select «*Image*» - «*Correction*» - «*Gradient*» - «*Load gradient*» (Fig. 257).

Gradients have *.igr file format.

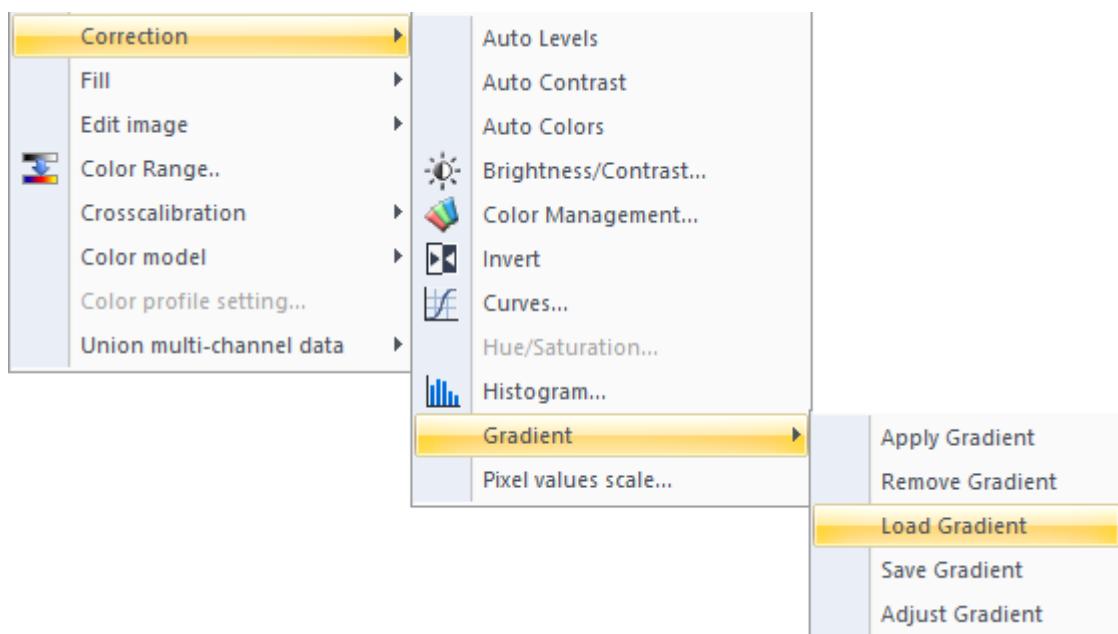


Fig. 257. *Load gradient*

To change actual pixels values, use «*Apply gradient*» option after such functions as «*Auto Levels*», «*Auto Contrast*», «*Auto colors*», «*Brightness / Contrast*», «*Curves*» and «*Histogram*».

5.3.8.4 Color management

«*Color management*» item is designed for color components adjustment (Fig. 258).

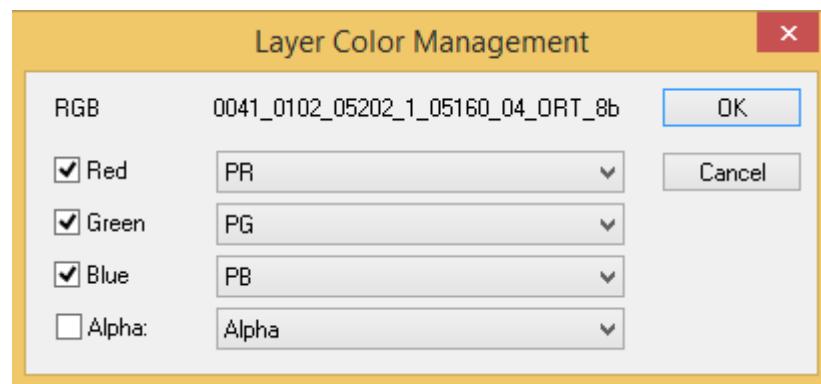


Fig. 258. *Color management*

5.3.8.5 Fill

«*Fill*» item is used to select a fill mode (Fig. 259).



Fig. 259. «Fill»

«Fill» fills the area with selected color.

«Gradient fill» applies gradient fill to the raster layer.

5.3.9. Edit image

«Edit image» section is used to change image size, rotate and crop images (Fig. 260).

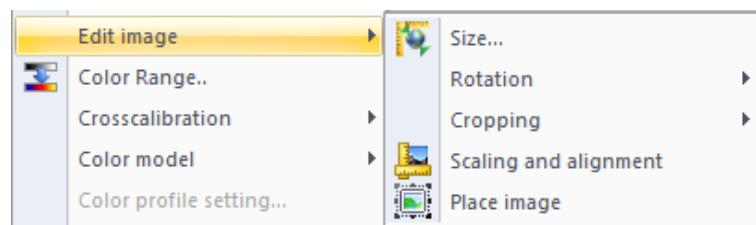


Fig. 260. «Edit image» section

Press «Size...» to open «Image size» dialog box (Fig. 261).

«File size» displays the size of the file in megabytes.

User can set width and height of the image in pixel or percent.

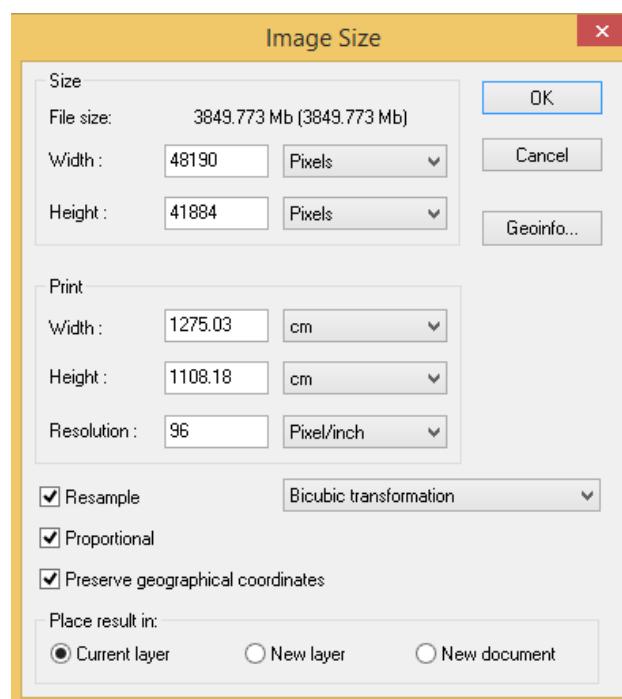


Fig. 261. «Image size» dialog box

In «*Print*» section user can set the print size (width/height) of the image in centimeters, millimeters or inches. Print resolution can be set in pixel per inch or pixel per centimeter.

To resample the image, put a tick in a corresponding checkbox. User can select a resample algorithm in a drop down list. To set a value of pixel projection, press «*Geoinfo...*» button and insert necessary values.

To save proportions of the document put a tick in «*Proportional*» checkbox.

To rotate image, select one of the options from «*Rotation*» section (Fig. 262).

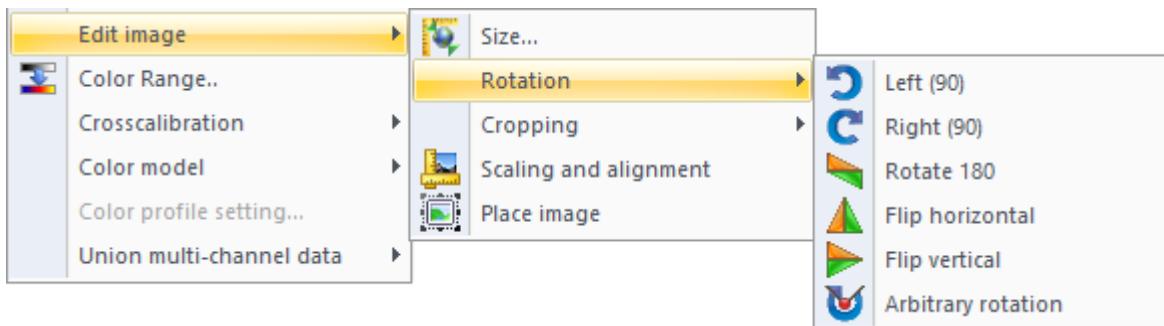


Fig. 262. «*Rotation*» section

To rotate image 90 degrees counterclockwise, select «*Left (90)*» item.

To rotate image 90 degrees clockwise, select «*Right (90)*» item

To rotate image 180 degrees counterclockwise, select «*Rotate (180)*» item.

To flip image vertically or horizontally, select «*Flip vertical*» or «*Flip horizontal*» item.

To rotate image arbitrary, select «*Arbitrary rotation*» item.

5.3.10. Color range

«*Color range*» tool allows user to select and adjust color range. (Fig. 263). It can be applied only to Grayscale images. «*Color range*» tool is designed to change pixels' visualization without changing their actual values.

To open the «*Color range*» dialog box, select «*Image*» – «*Color range*» menu item or press button on «*Image*» tool panel.

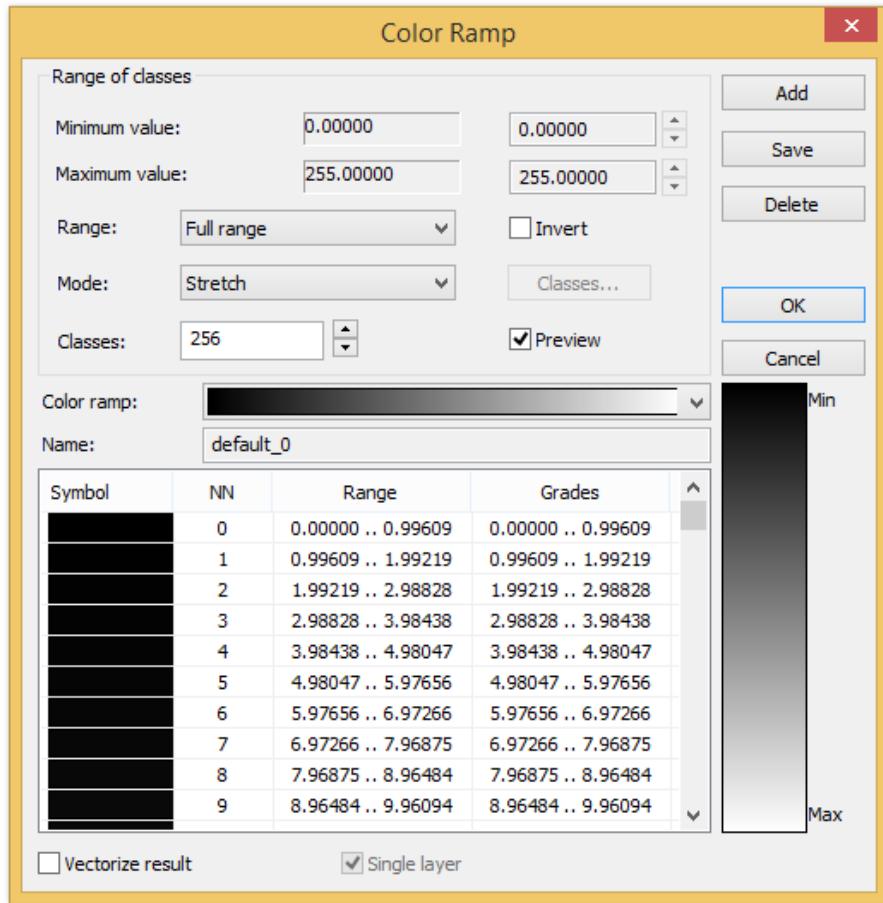


Fig. 263. «Color range» dialog box

«Minimum value» and «Maximum value» displays minimum and maximum pixel values of the image. User can change these values after selecting «Dynamic range» option form «Range» drop down list.

User can switch between two modes of «Color range» tool:

- «Stretch» – color gradations are divided evenly through the pixel values;
- «Classes» – user can change the pixel value range for each class.

User can set the amount of classes in «Classes» field. Parameter value varies in range from 2 to 256.

«Color range» list contains the templates of color ranges. To invert the colors, put a tick in «Invert» checkbox.

To classify different types of objects on the image, select «Classes» option from «Mode» drop-down list. «Classes» button will become active (Fig. 264).

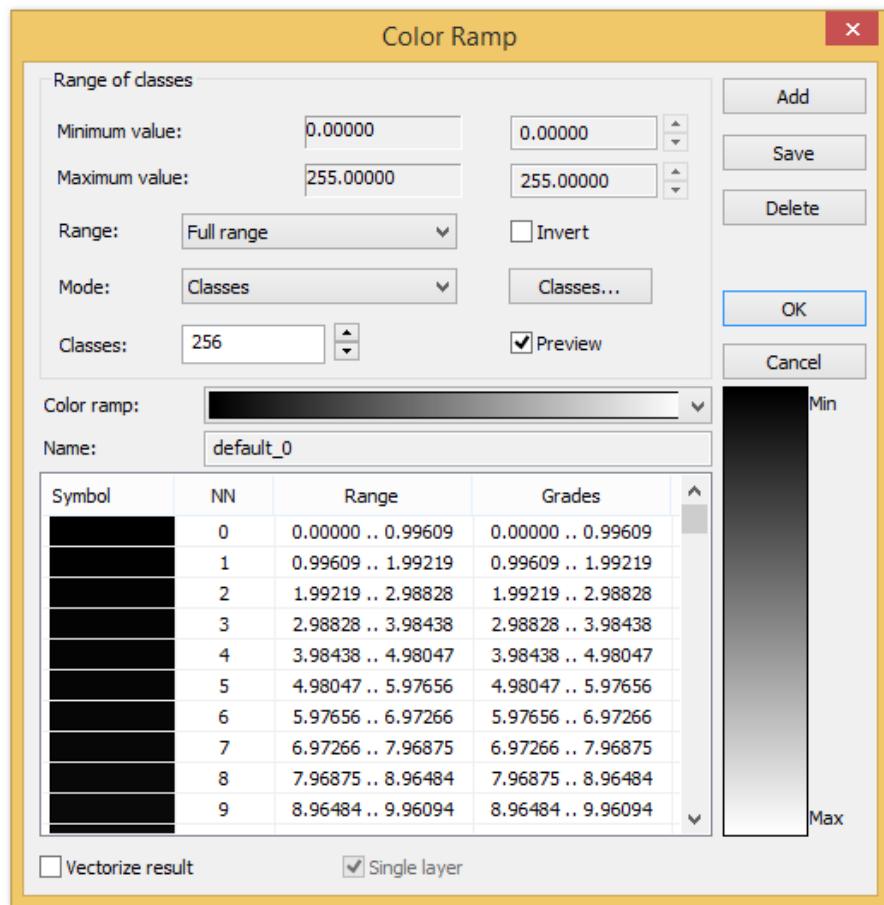


Fig. 264. «Color range» dialog box. «Classes» mode

NDVI color range is shown below, to give an example of objects detection:

- Asphalt/manmade objects (grey);
- water (blue);
- snow (white);
- clouds (blue);
- soil (orange);
- low vegetation density (light green);
- high vegetation density (dark green).

To select the color value for each class, double click on the color icon in «Symbol» column (Fig. 265).

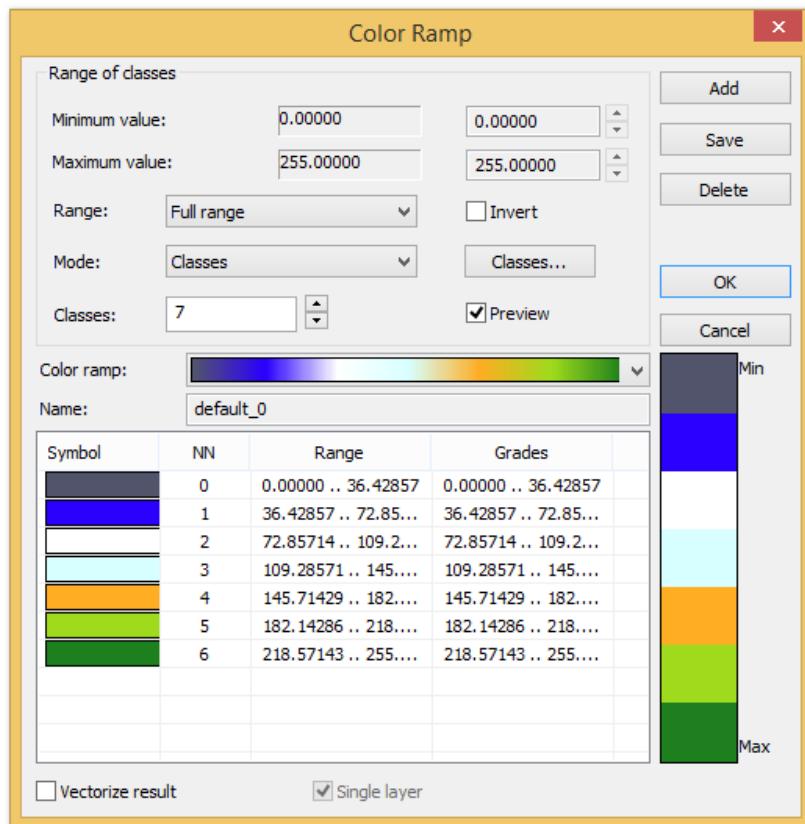


Fig. 265. «Color range» dialog box. *Classes selection*

Press «*Classes*» button to adjust the pixel value ranges for each class. «*Classes*» dialog box will open; move the sliders to adjust the ranges or input necessary values from the keyboard (Fig. 266).

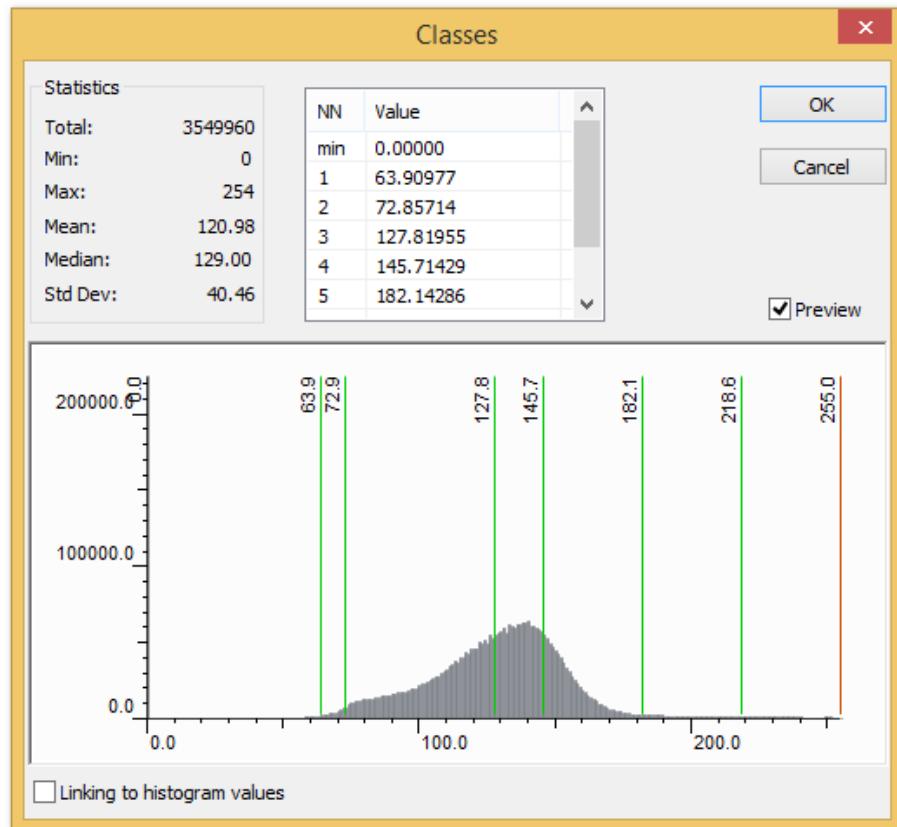


Fig. 266. «*Classes*» dialog box

Fig. 267 shows the result of the classification

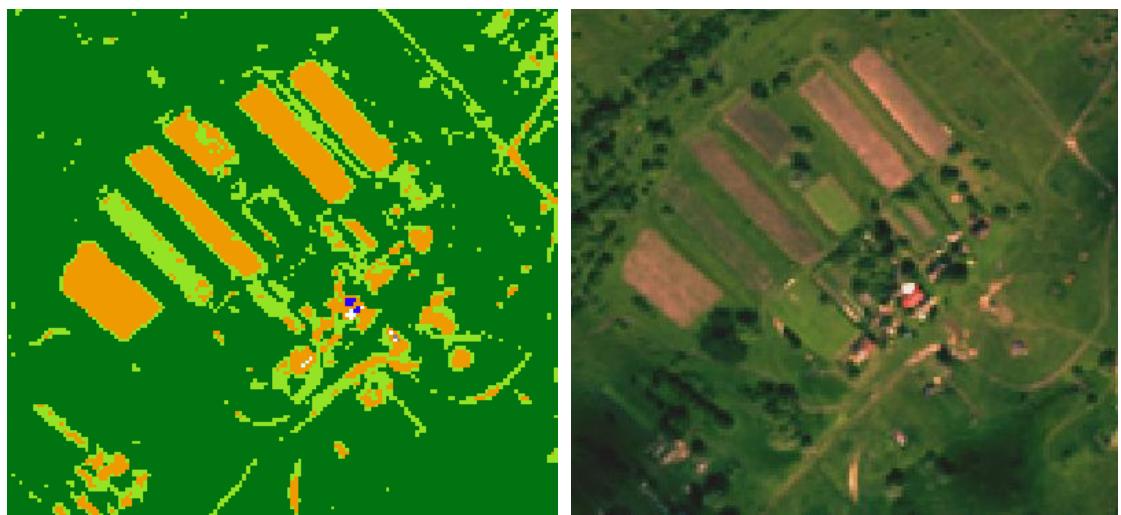


Fig. 267. Classification result (left); original image (right)

To perform a classification of a specific pixel value range, select «*Dynamic range*» option from «*Range*» drop-down list (Fig. 268). User can set the minimum and maximum pixel value manually.

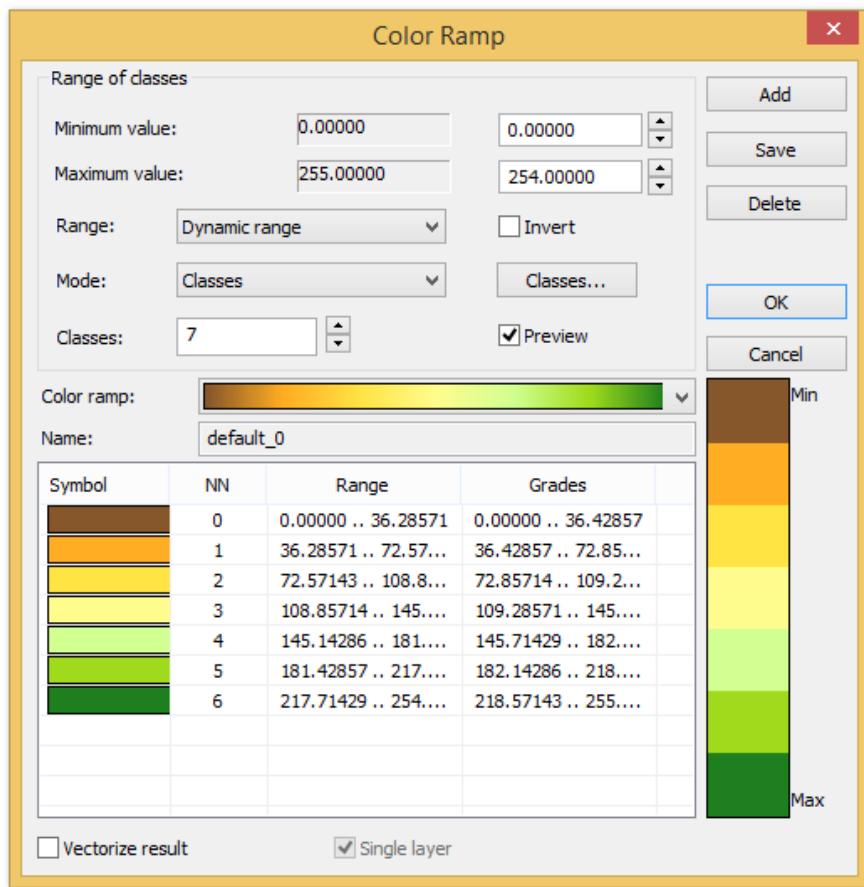


Fig. 268. *Dynamic range*

Fig. 245 shows the original NDVI index image; Fig. 269 shows the same index after «*Dynamic range*» is set.

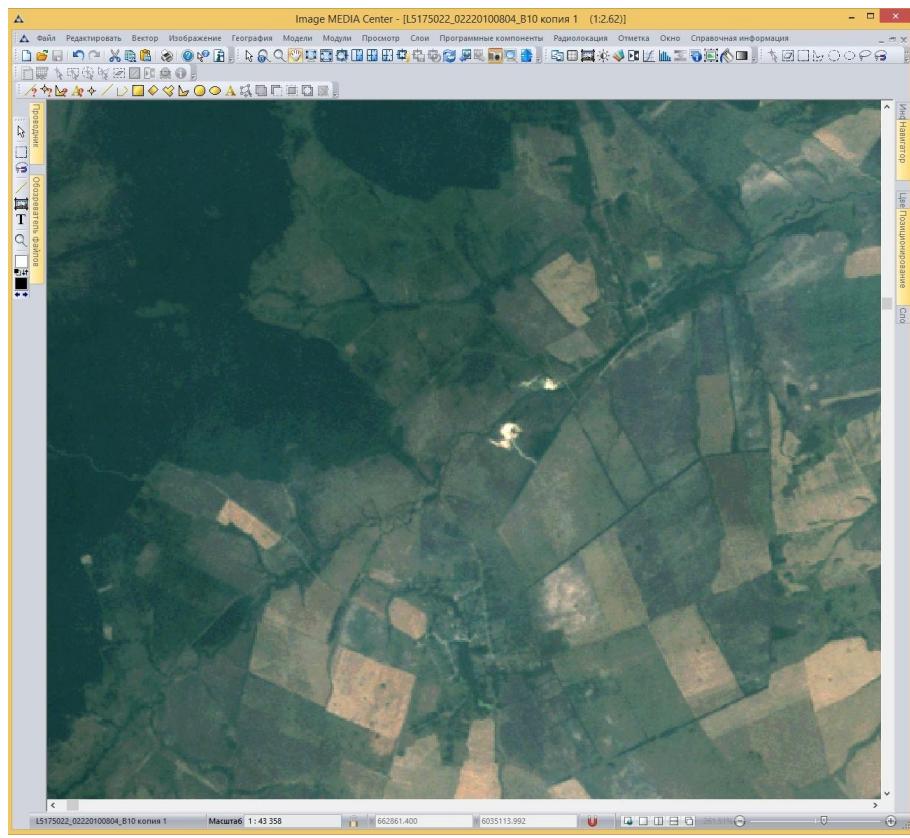


Fig. 269. Original image

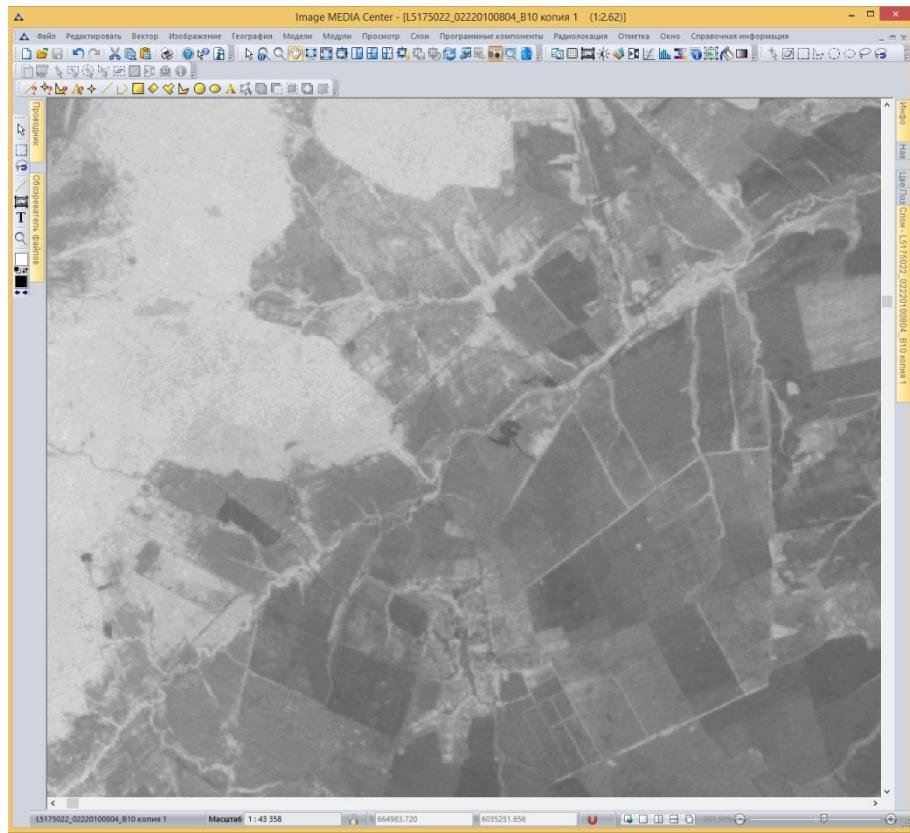


Fig. 270. NDVI index

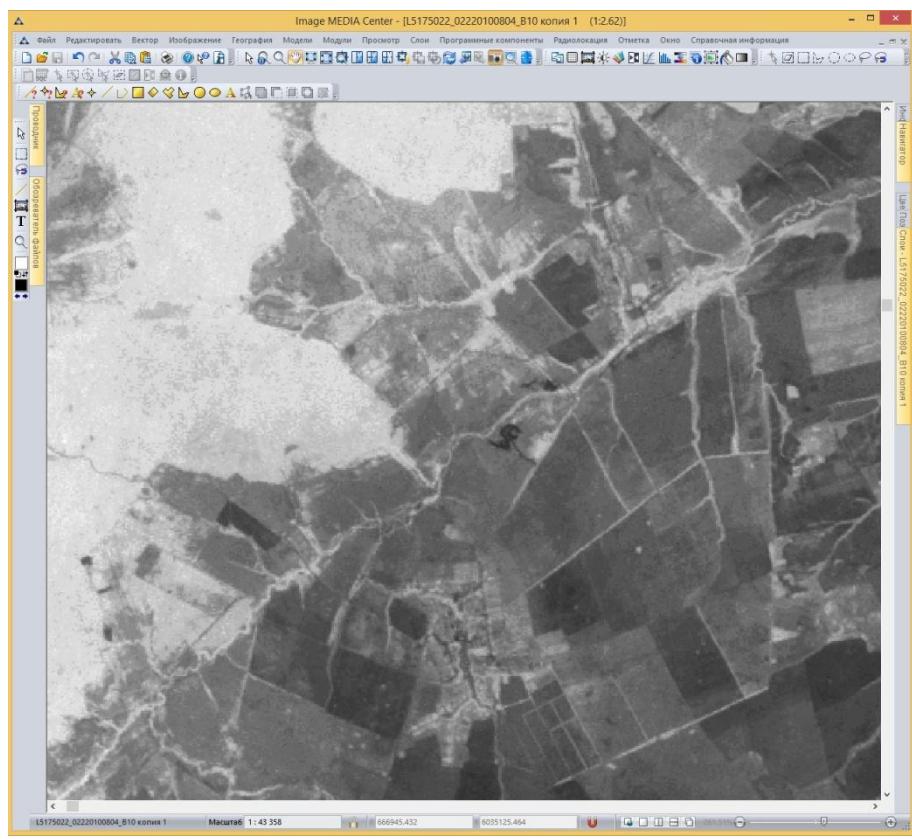


Fig. 271. *NDVI index after dynamic range from 0,5 to 0,8 is applied.*

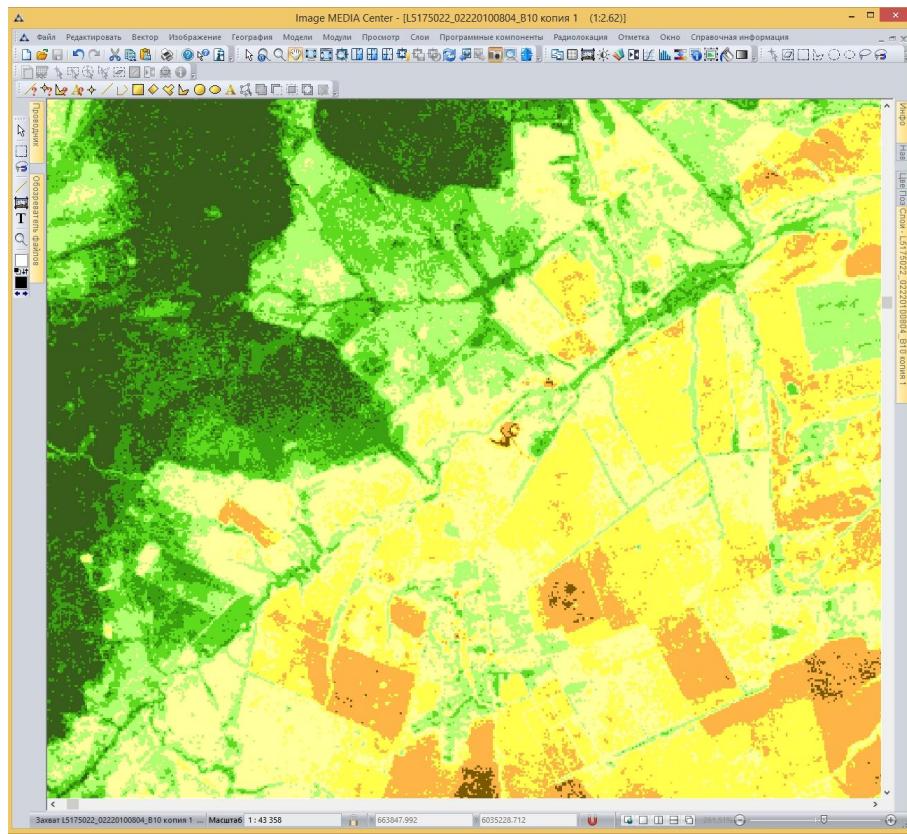


Fig. 272. *NDVI index image after the color range is applied*

5.3.11. Crosscalibration

«Crosscalibration» tool is used to perform image verification based on the reference data. As a result of verification gain and offset of the image can be calculated (Fig. 273).

Select «Image» - «Crosscalibration» - «Crosscalibration by pixels» menu item to open «Crosscalibration» dialog box (Fig. 274).



Fig. 273. *«Image» menu*

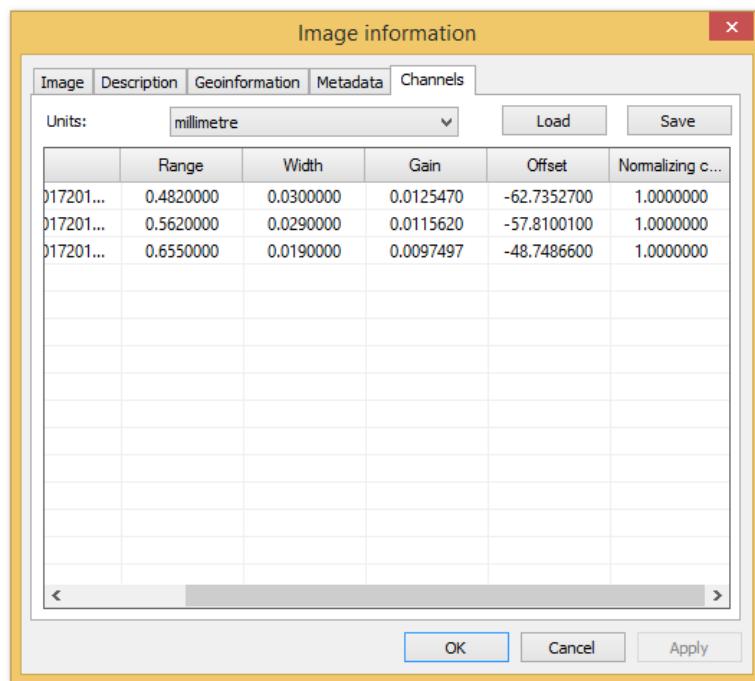


Fig. 274. *Information about the image*

To perform a crosscalibration, reference image and verifiable image should be opened in a single workspace (Fig. 275).

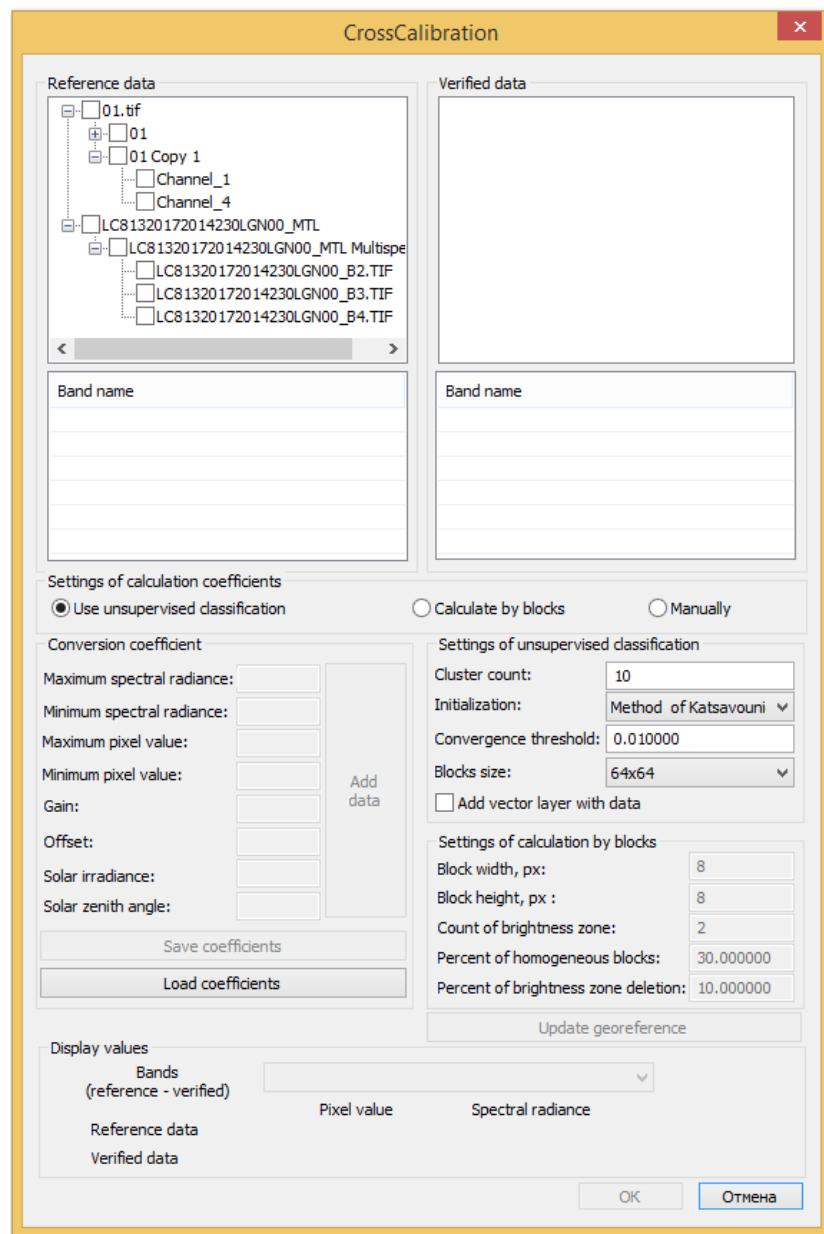


Fig. 275. «Crosscalibration» dialog box

Following methods are used to calculate normalizing coefficients:

- Unsupervised classification.
- Calculation block by block.
- Manual calculation.

To use unsupervised classification (k-means clustering) method, select the area of interest on the image with the «Selection» tool. Insert following parameters in the dialog box:

- Cluster count;
- Initialization;
- Convergence threshold;
- Block size (8x8, 16x16, 32x32, 64x64).

To perform manual calculation, select the area of interest with one of the following methods:

- select the area of interest on the image with the «Selection» tool on the single image;
- select the area of interest on the image with the «Vector» tool on the single image;
- select the area of interest on the image with the «Selection» tool on both images.

If the area is selected on one of the images, it will be automatically selected on another. Both images should be georeferenced.

It is advised to create multiple selections on the different areas of the image. The minimum recommended amount of selections is 50.



Fig. 276. *Example of selections*

Conversion coefficients are used for pixel values to spectral radiance at the upper limit of the atmosphere conversion. To set the coefficients, double click on the necessary color band.

Coefficients can be saved to *.xml file format.

As a result of crosscalibration, following output data is generated:

- Normalizing coefficients A, B ;
- Graph that visualizes spectral radiance at the upper limit of the atmosphere (Y) to verifiable data (X) ratio.

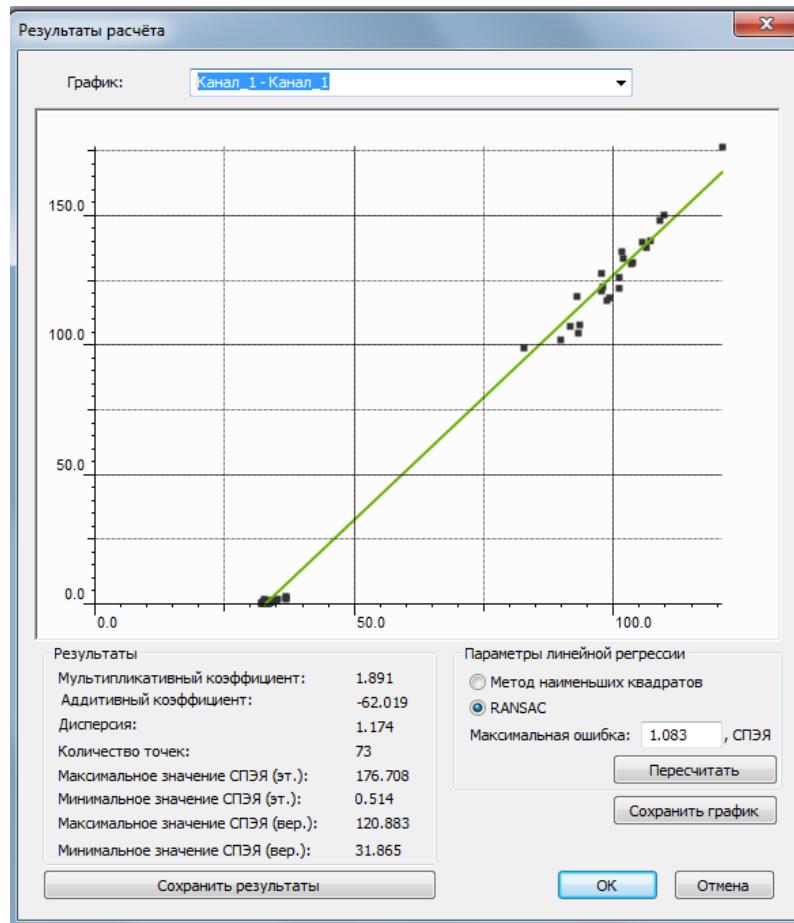


Fig. 277. Output data

Calculated normalizing coefficients are recorded to the information about color bands.

5.3.12. Color spaces

«Color model» item allows user to select one of the following color models of the image: Grayscale, RGB, Lab, HSB, HLS and CMYK (Fig. 278).

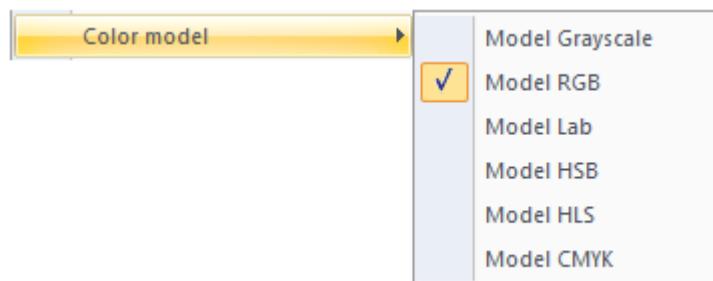


Fig. 278. «Color model» item

5.3.13. Color profile

Select «Color profile settings» item to open «Color profile setting» dialog box (Fig. 279).

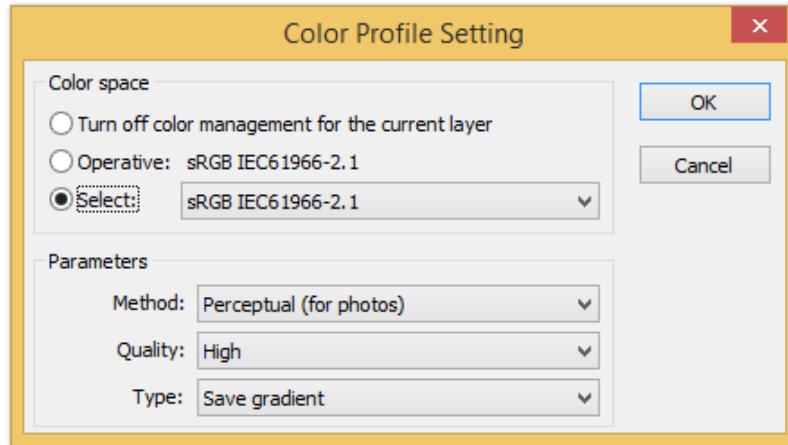


Fig. 279. «Color profile setting» dialog box

Select the necessary color space from «Select» drop-down list.

User can select one of the following options form «Method» drop-down list: Perceptual, Saturation, Relative colorimetric, Absolute colorimetric.

User can select one of the following options form «Quality» drop-down list: Low, Medium or High.

User can select one of the following options form «Type» drop-down list: Save gradient, The closest color, No interpolation, Black point compensation, Use WCS

5.3.14. Merge multichannel data

«Union multi-channel data» function is designed for multichannel (more than 3 color bands) images merging.

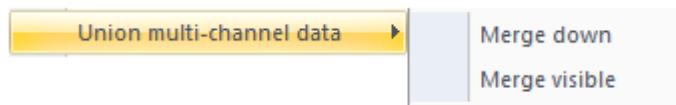


Fig. 280. «Union multi-channel data» section

The result of merging will contain the initial number of color bands, and it can be used for further thematic processing.

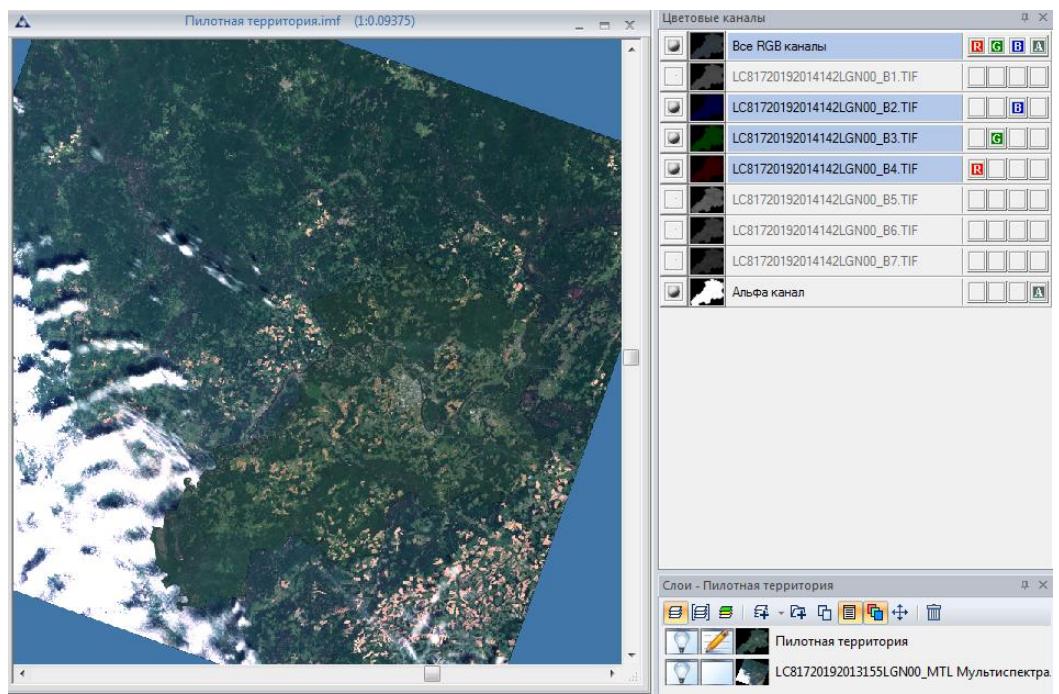


Fig. 281. *Landsat-8 images before merging*

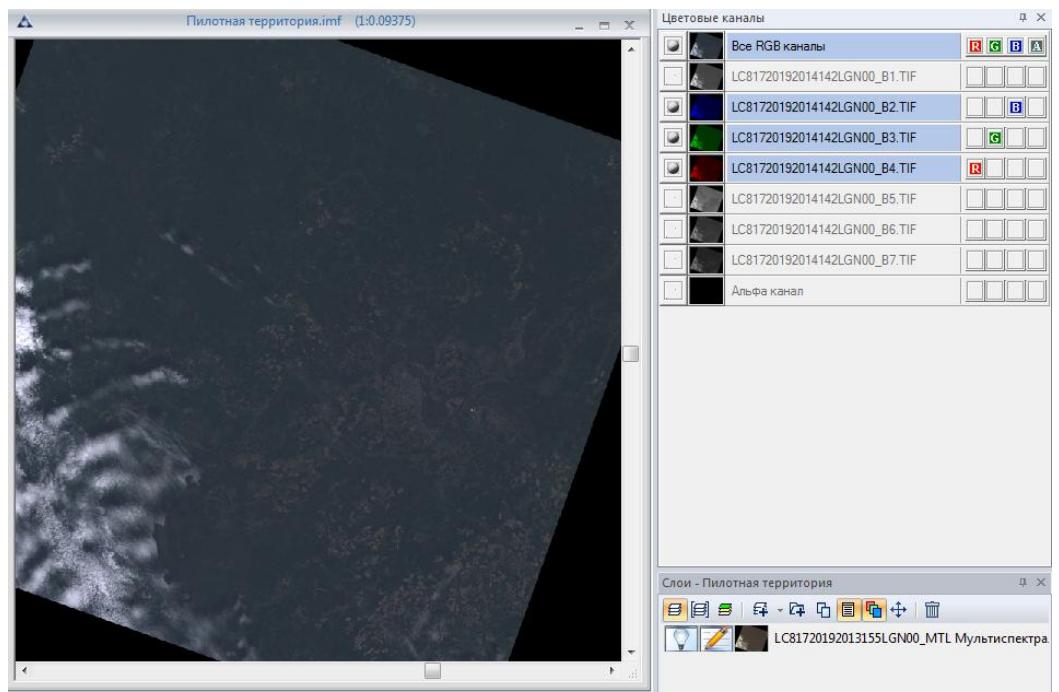


Fig. 282. *Landsat-8 images after merging with «Union multi-channel data» function*

After merging multispectral images through «Layers» panel, the result will contain only three (RGB) color bands.

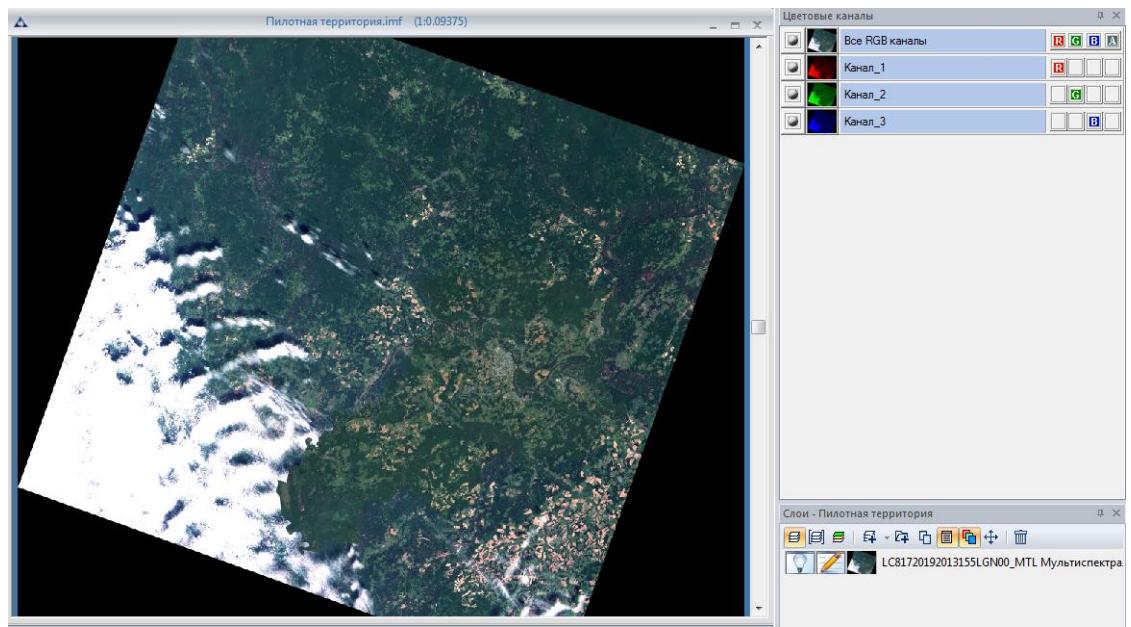


Fig. 283. *Landsat-8 images after merging through «Layers» panel*

5.4. «Preliminary processing» menu

5.4.1. Atmospheric correction

Before performing an atmospheric correction of the image, select «Image» – «Image information» menu item or press button on «Image» tool panel to make sure all the equipment parameters are filled (Fig. 284).



Fig. 284. *«Image» tool panel*

«Channels» tab of «Image information» dialog box contains information about band's range, width, gain, offset and coefficients (Fig. 285).

User can upload the information about color bands from *.xml file or input it manually.

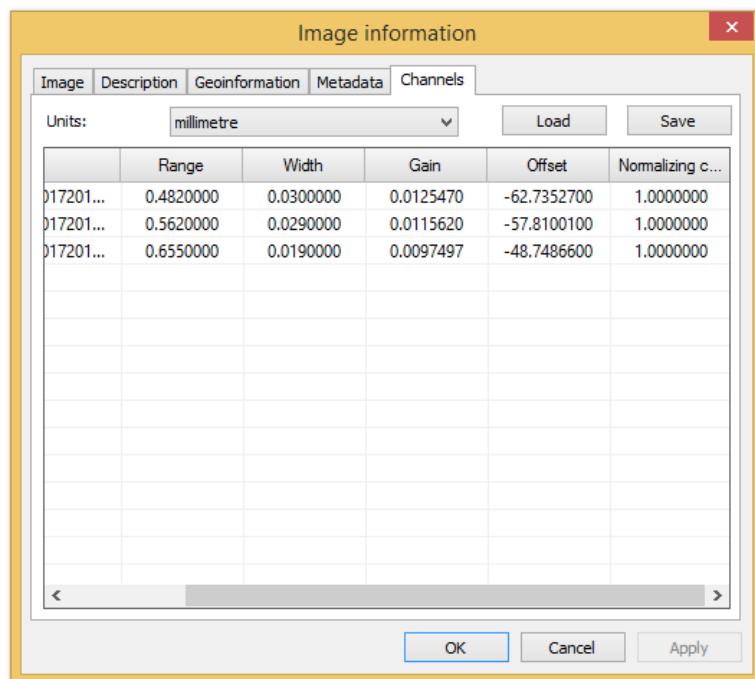


Fig. 285. «*Image information*» dialog box

To perform atmospheric correction using atmospheric transmittance coefficient graph select «*Preliminary processing*» – «*Atmospheric correction*» – «*Atmospheric model*» menu item. Select one of the default graphs or load a new one in «*Atmospheric correction by schedule of transmission coefficients*» dialog box (Fig. 286). Press «*OK*» button to start the atmospheric correction.

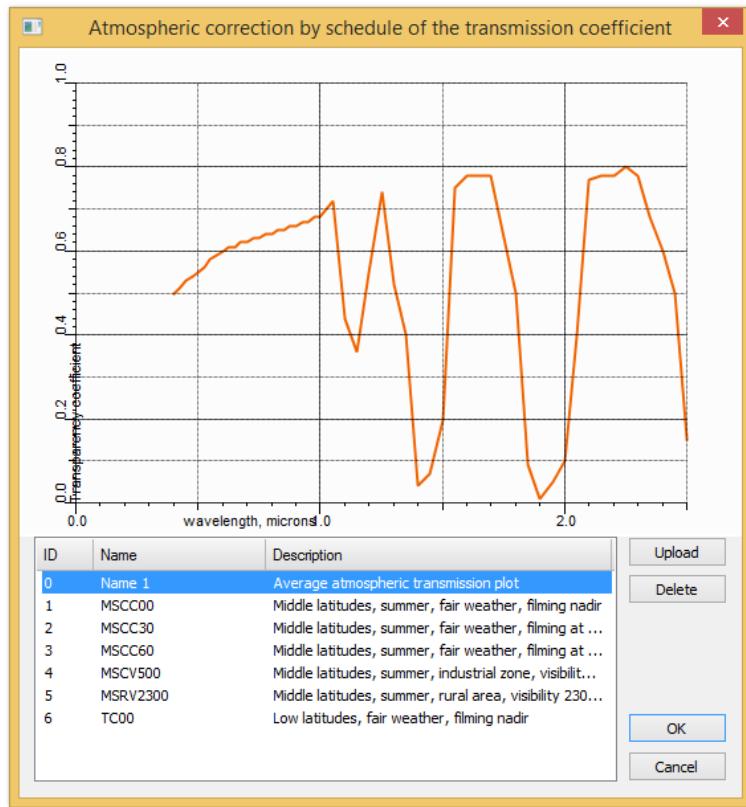


Fig. 286. «Atmospheric correction by average transmittance graph»

If user has required parameters for atmospheric correction, it can be set manually. Select «Preliminary processing» – «Atmospheric correction» – «General» to open «Surface reflection» dialog box. Insert necessary parameters and press «OK» button.

5.4.2. Quicklook creation

To create a georeferenced quicklook, select «Preliminary processing» – «Create quicklook» menu item (Fig. 287).

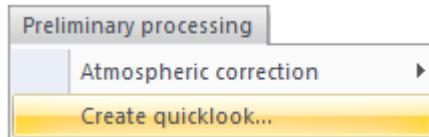


Fig. 287. «Create quicklook» menu item

Select one of the options in «Create quicklook» dialog box (Fig. 288):

- 1) By offering sizes: user can select one of the sizes from drop-down list;
- 2) By maximum image size: user should set the size which must not be exceeded.

The smaller the size of the image, the less detailed it is. The highest level of details is 0.

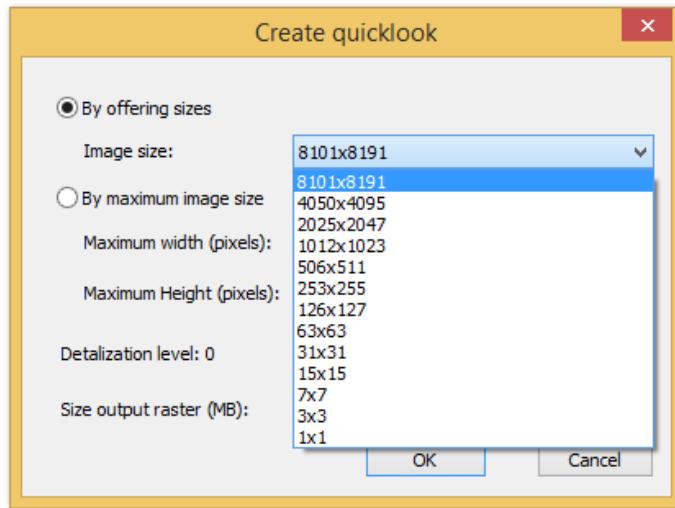


Fig. 288. *Quicklook creation*

After all the parameters are set, press «*OK*» button.

5.4.3. Pansharpening

Before performing pansharpening, user should create a composite image of panchromatic and multispectral bands. Select «*Preliminary processing*» – «*Pansharpening*» menu item and set the parameters in opened «*Pansharpening*» dialog box (Fig. 289).

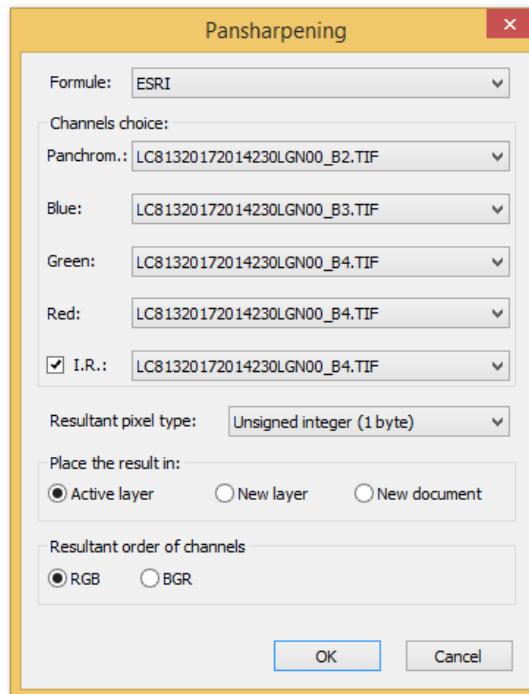


Fig. 289. «*Pansharpening*» dialog box

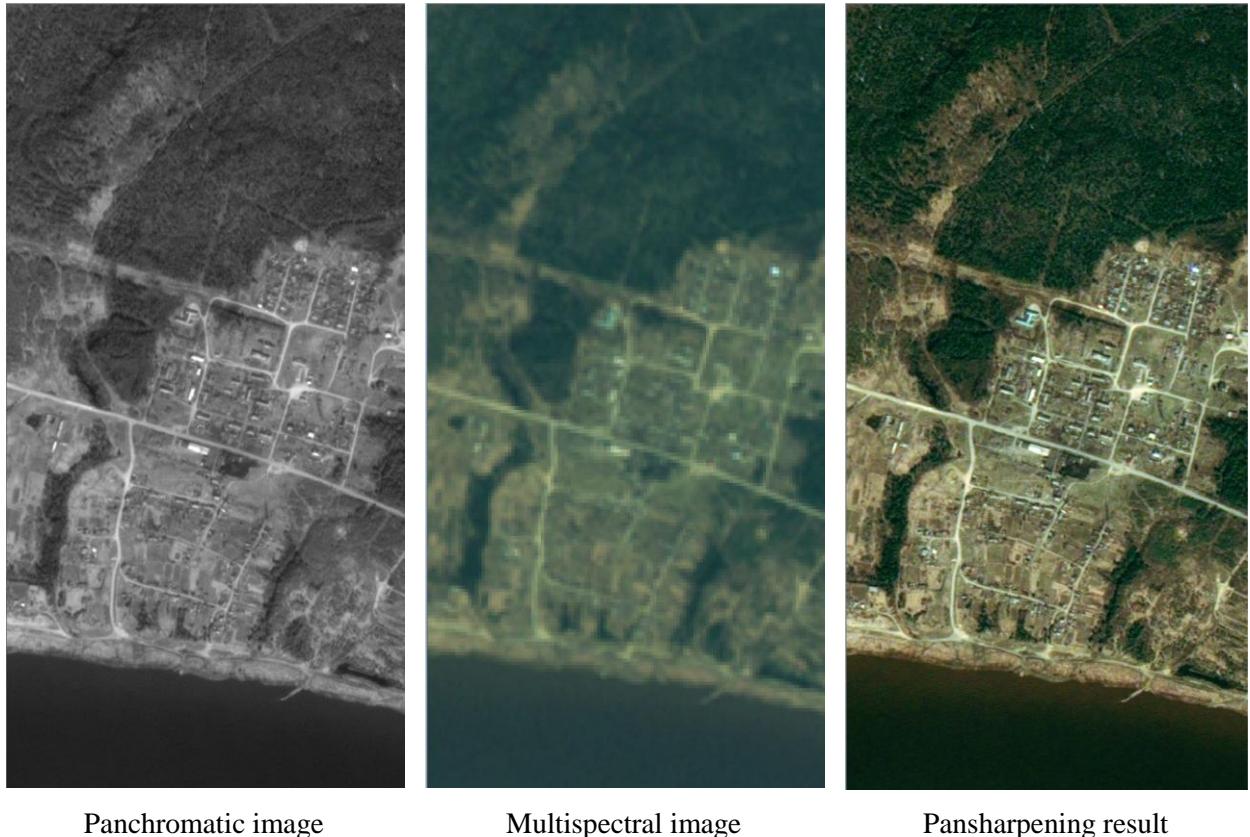
Select the pansharpening method from «*Formule*» drop-down list.

Set the proper color bands in the «*Color choice*» section. Put the tick to «*I.R.*» checkbox to include near infrared spectral band in calculation.

Set the order of color bands of pansharpened image in «*Resultant order of channels*» section:

- RGB – red-green-blue;
- BGR – blue-green-red.

Press «*OK*» button to start the pansharpening.



Panchromatic image

Multispectral image

Pansharpening result

Fig. 290. *Original data and pansharpening result*

5.5. «Geography» menu

«Geography» menu contains a set of tools for working with geographic units of measurements (Fig. 291).

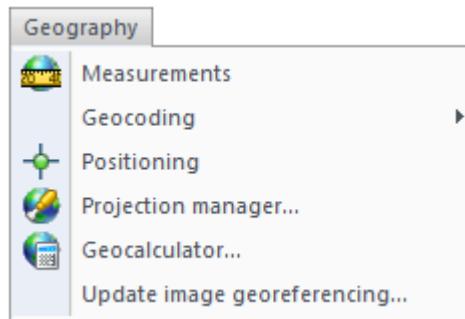


Fig. 291. «*Geography*» menu

5.5.1. Measurements

«Measurements» item is designed to perform measurements on the image

Select «Geography» – «Measurements» to open «Measurements» dialog box (Fig. 292).

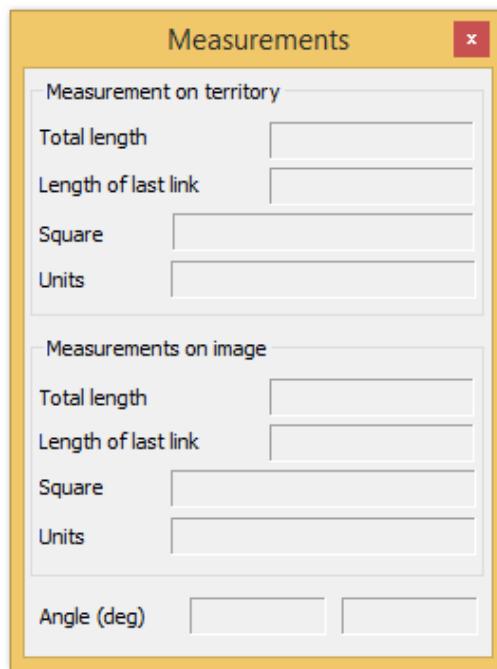


Fig. 292. «*Measurements*» dialog box

«Measurements on the territory» section displays the results of measurements in geographic units. Units of measurements are displayed in «Units» field.

«Measurements on the image» section displays the results of measurements in pixels.

«Simple measurements» item is designed to perform measurements on the image Select this item in «Geography» menu to open «Measurements» dialog box (Fig. 293).

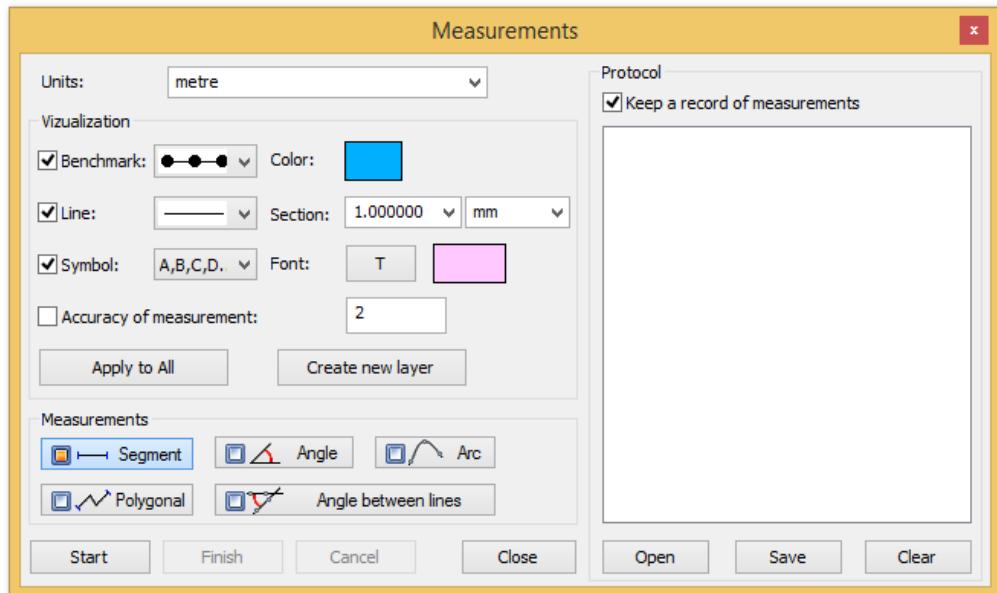


Fig. 293. «Measurements» dialog box

«Measurements» dialog box allows user to set various parameters, such as the shape and color of reference points, the type and width of lines, type, font and color of reference points' labels. User can also choose the numeric precision value of measurements.

Press «Apply to all» button to apply changes to all measurements.

Press «New layer» button to create a new measurements layer.

Select one of the suggested types of measurements: segment, angle, arc, polyline, angle between lines by pressing the corresponding button.

To begin measurements, press «Start» button. Click with left mouse button on the image to put a new reference point. Click on the image with right mouse button to finish current measurement.

Press «Stop» button to end measuring.

Press «Cancel» button to cancel the measurement performed after pressing «Start» button.

To record all the performed measurements, put a tick in the «Keep a record of measurements» checkbox. User can save and load previously saved recorded measurements protocols.

To clear the operations history, press «Clear» button. Confirm the action in the opened dialog box, or press «Cancel» button to cancel.

Perform a right mouse button click on the protocol recording area to open a context menu (Fig. 269).

Select «Up» or «Down» options to move the lines up or down in the list.

User can restore the protocol from active layer or from the document by selecting the corresponding options of context menu.

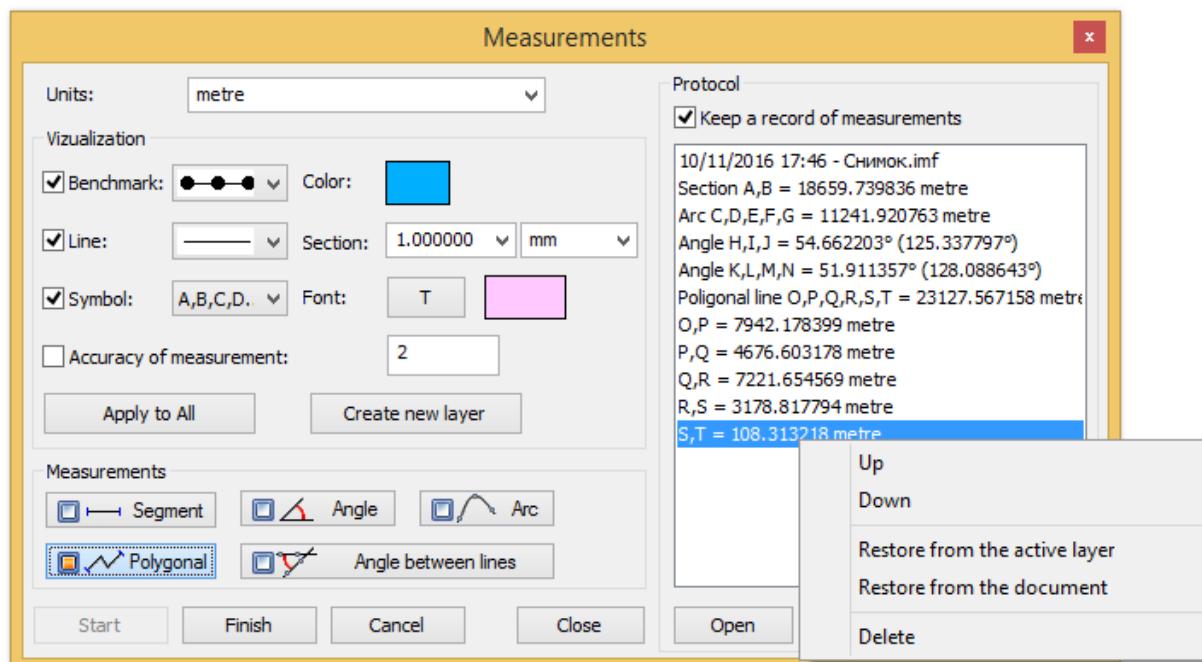


Fig. 294. Context menu

To delete the line from protocol list, select «Delete» option of context menu or press «Delete» key. Confirm the action in the opened dialog box, or press «No» button to cancel.

Fig. 270 shows the example of measurements on the image.

To relocate the reference point, select it with the left mouse button click, hold and drag it to the new position. The changes will be displayed in measurements protocol. To undo the changes, use "Ctrl+Z" key combination.

To delete the measurement, select any of its reference points and press "Delete" key. Confirm the action in the opened dialog box, or press «No» button to cancel the deletion. To undo the changes, use "Ctrl+Z" key combination.

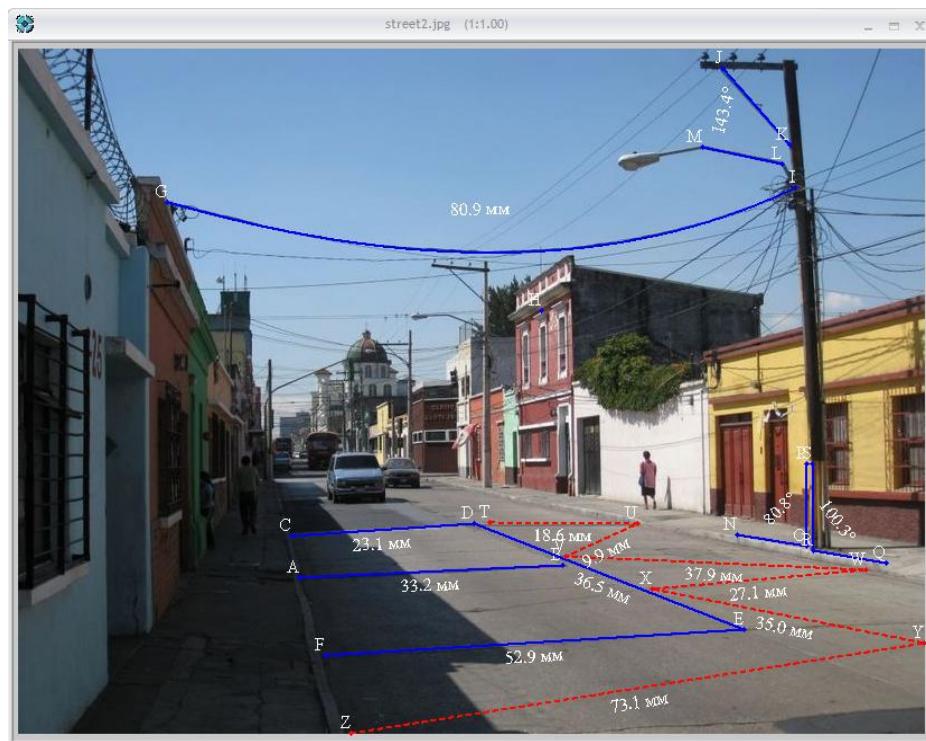


Fig. 295. Measurements

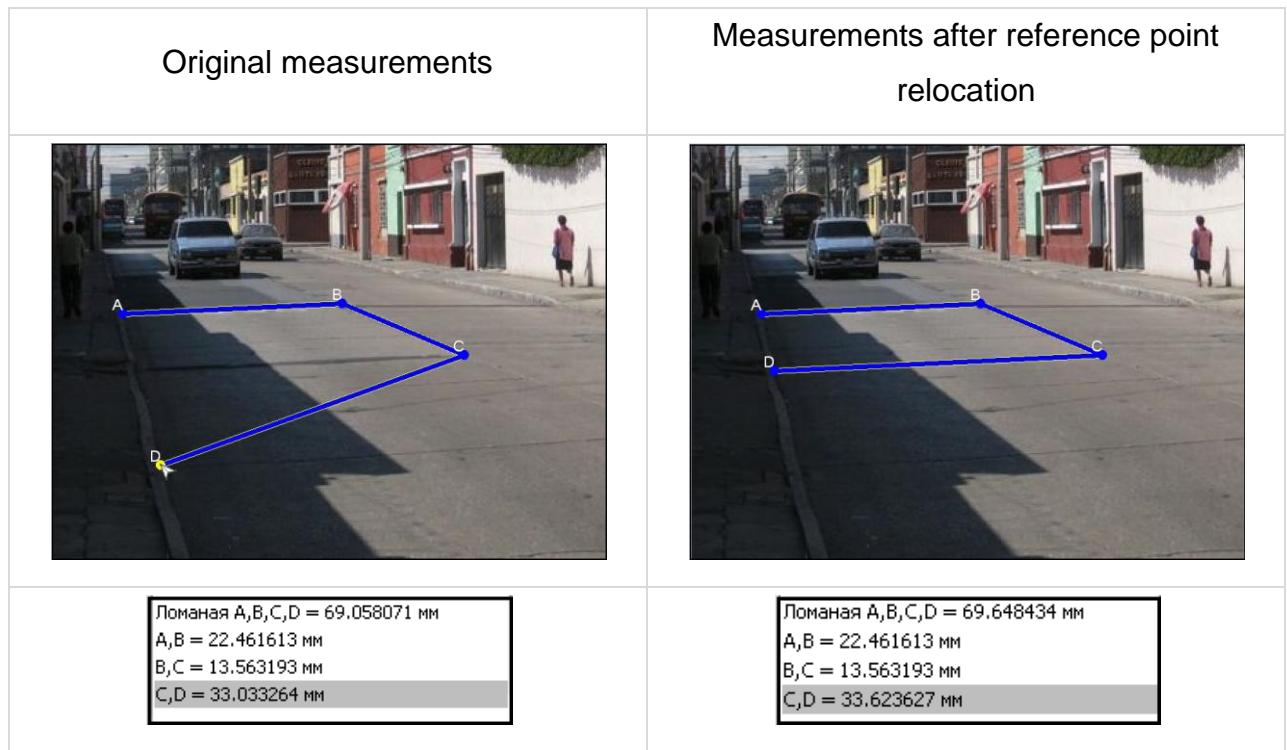


Fig. 296. Reference point relocation

5.5.2. Geocoding

To perform spatial georeferencing user has to open the operating panels. To do this, in menu item «Geocoding» select «Table» and «Parameters» panels (Fig. 297, 298).

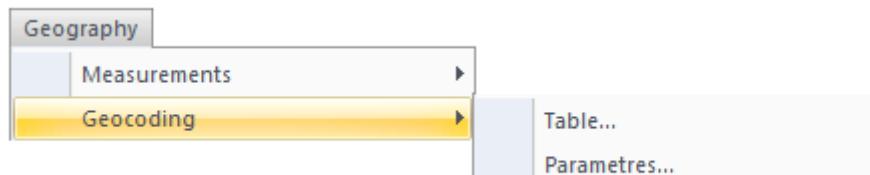


Fig. 297. *Geocoding, «Table» panel*

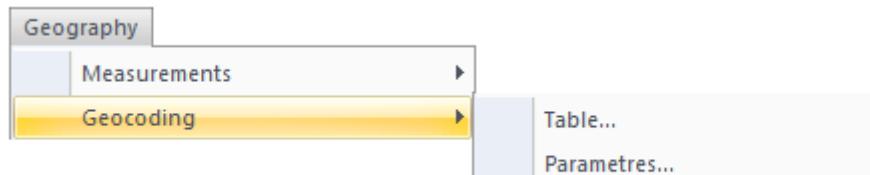


Fig. 298. *Geocoding, «Parameters» panel*

1. Load the working images.

In the workspace open the working images to perform spatial georeferencing (Fig. 299).

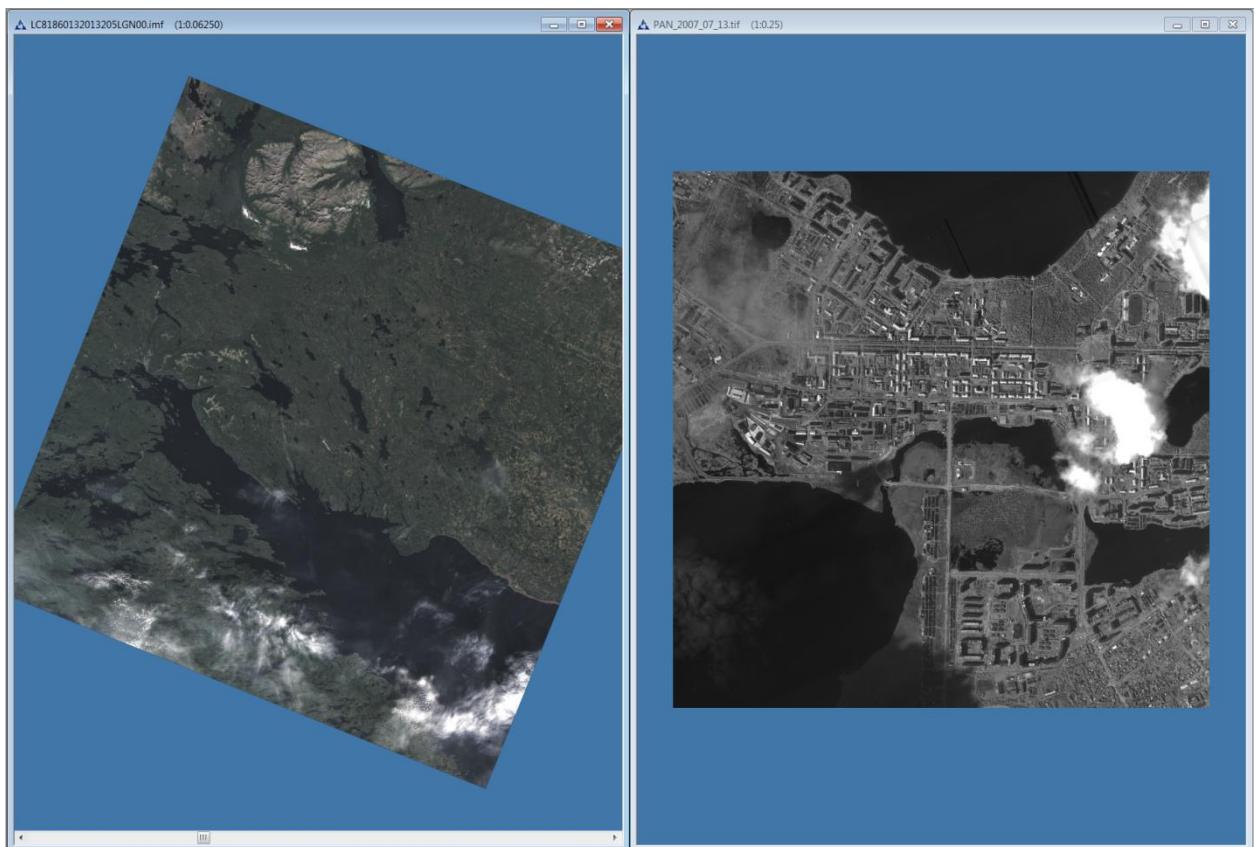


Fig. 299. *Geocoding, the working images*

2. Open the base document

In geocoding panel «Table», in line «Base» choose the document with georeference, with regard to which will be updating perform (Fig. 300).

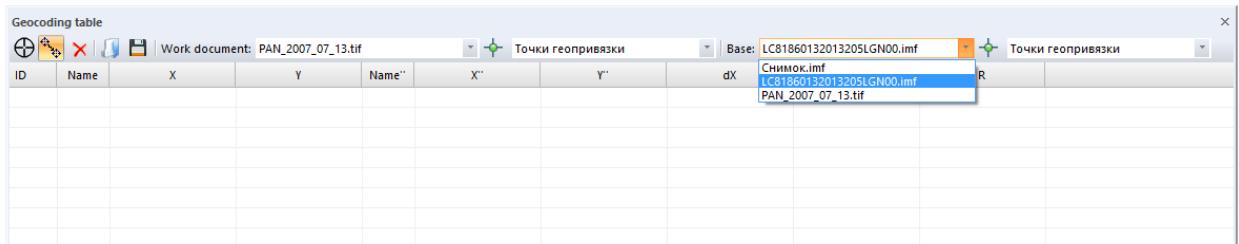


Fig. 300. Selection of the base document

3. Open the work document

In geocoding panel «Table», in line «Work document» choose the work document, for which will be performing the georeference updating (Fig. 301).

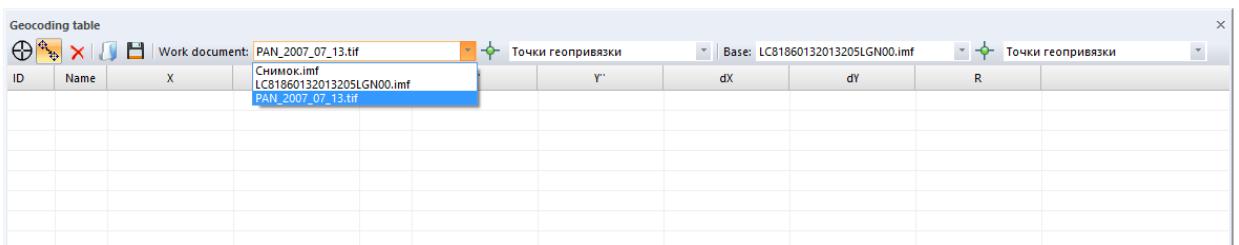


Fig. 301. Selection of the work document

4. Load georeferenced points

In geocoding panel «Table», select «Load points from file», choose the *.txt file with georeferenced points (Fig. 302).

Georeferenced points can be exemplified by the road intersection, the river characteristics, and the corners of objects on the ground that are clearly identified on both images (Fig. 303). To create a reference point, click on the contour on the one image, then on the same contour on the second image. After user sets 3 points, the program will automatically generate estimation of the point position and will put the marker. If the point position is wrong, user has to edit it.

Geocoding table										
ID	Name	X	Y	Name''	X''	Y''	dx	dy	R	
✓ 0 0	495705.5886940	7535044.0448380	0	496113.1783180	7535087.4089240	2.4433300	2.4986036	3.4946933		
✓ 1 1	496089.5886940	7535422.7115040	1	496495.4740570	7535469.7046630	0.2387142	0.2731041	0.3627262		
✓ 2 2	494956.7491880	7536042.7608870	2	495357.4950460	7536096.5041620	2.6419677	0.7118846	2.7361968		
✓ 3 3	496616.0084470	7535597.1312570	3	497023.2255250	7535645.4213240	0.2179995	1.3476973	1.3652150		
✓ 4 4	496333.6874590	7535606.0859900	4	496761.1438760	7535653.8213770	0.6664411	0.0063607	0.6664714		
✓ 5 5	496905.5886940	7534612.0448380	5	497314.9873610	7534653.3439710	1.3347096	1.5853480	2.0723846		
✓ 6 6	495029.4405460	7536605.3287880	6	495428.8954950	7536662.3877220	4.1598808	0.8634419	4.2485457		
✓ 7 7	495447.8109160	7534050.8596520	7	495853.9381690	7534099.8116000	1.7004322	8.8510891	9.0129489		
✓ 8 8	497437.7368420	7534319.5894190	8	497848.1107150	7534355.9198780	1.0246707	0.0013922	1.0246716		
✓ 9 9	497076.9137970	7534027.4193230	9	497485.2284320	7534066.2113890	0.1212332	3.3669729	3.3669749		
✓ 10 10	496921.5886940	7535086.7115040	10	497327.9296640	7535124.7424920	1.8029060	4.7341150	5.0657985		
✓ 11 11	497143.8109160	7534946.2670600	11	497550.9355120	7534984.3682760	1.5544276	3.1309872	3.4956153		
✓ 12 12	497271.0207930	7534952.3905170	12	497681.8518910	7534988.3505230	1.8383455	4.9589743	5.2887560		
✓ 13 13	496096.1072130	7534677.9543030	13	496503.1066970	7534720.5443940	0.9229410	0.1991701	0.9441869		
✓ 14 14	496590.7244960	7536018.2670600	14	496997.4031410	7536068.0373160	0.7301347	0.0110799	0.7302188		
✓ 15 15	495716.3212040	7535207.8637680	15	496116.1650040	7535252.3403320	5.3429048	2.4247437	5.8673685		
✓ 16 16	495607.8109160	7536813.1312570	16	496020.2592150	7536874.9401700	7.3917101	4.1369363	8.4706328		
✓ 17 17	495342.8561840	7536423.6003930	17	495748.0975030	7536471.9865240	0.8703369	7.4809237	7.5313814		
✓ 18 18	494982.0331390	7536834.2670600	18	495384.1519160	7536896.3643400	1.3988756	2.5501752	2.9086503		
✓ 19 19	495157.9672950	7536787.0571830	19	495563.2963400	7536846.6288810	1.3822517	0.8209199	1.6076471		
✓ 20 20	497579.9590640	7535901.3287880	20	497986.4690440	7535947.5606790	3.3244315	0.0183136	3.3244820		
✓ 21 21	494620.9467190	7535241.5757020	21	495024.1331800	7535289.8471670	0.6938228	1.8906841	2.0139703		
✓ 22 22	497252.0578300	7536944.2917510	22	497662.4384360	7537004.3632070	1.2644842	6.1088140	6.2383114		

Fig. 302. Load georeferenced points

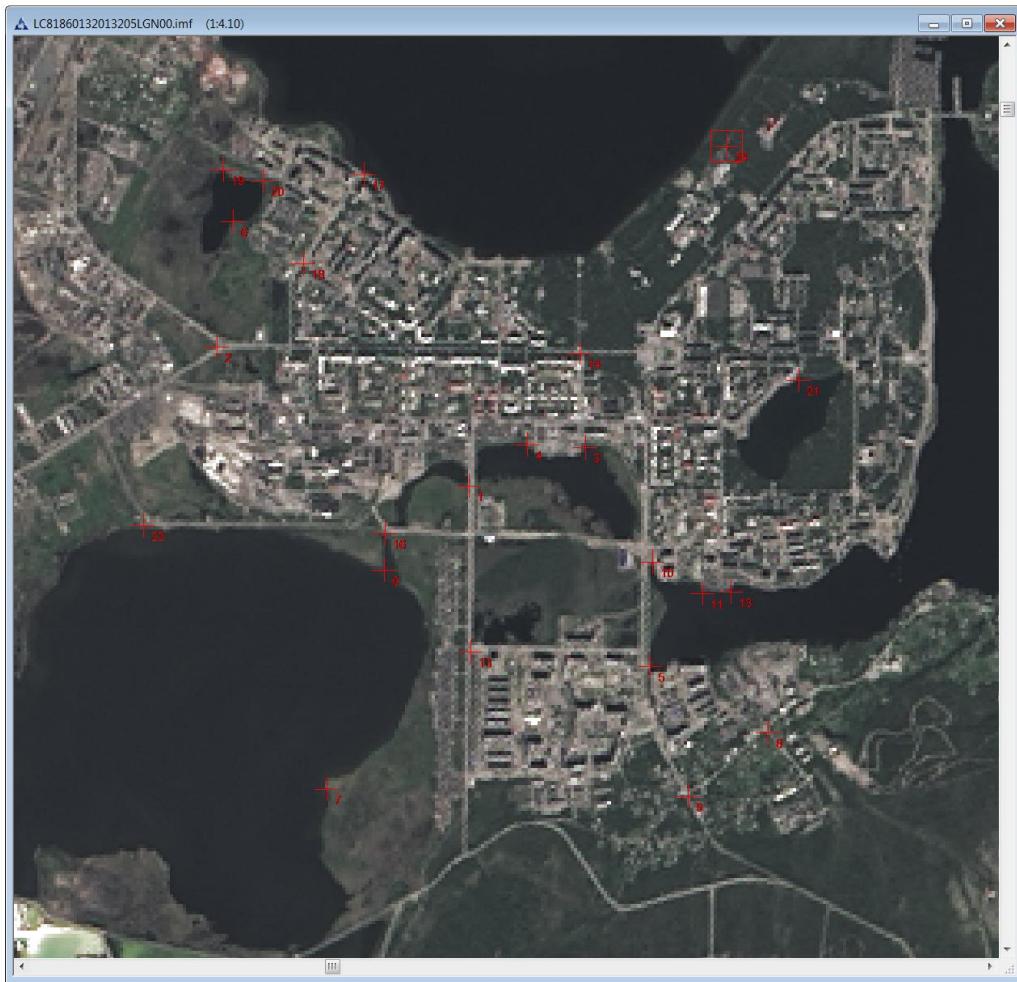


Fig. 303. Georeferenced points

5. Transformation

In geocoding panel «Parameters» select the transformation algorithm and click «Transform» (Fig. 304).

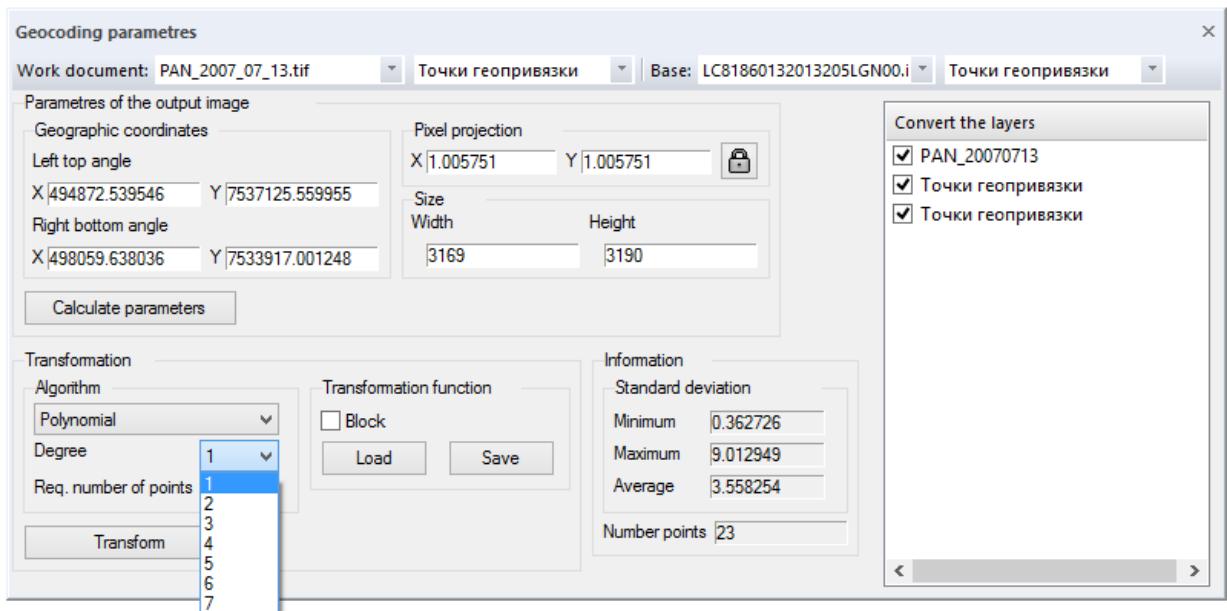


Fig. 304. Selection of transformation parameters

6. Check accuracy of georeferencing (Blind)

To check the quality of georeferencing, user has to add a new georeferenced image as a second layer from the source georeferenced image and use the tool «*Blind*» in the toolbar «*View*» (Fig. 305, 306). Set the direction of view of the images by rotating the frame of the tool.

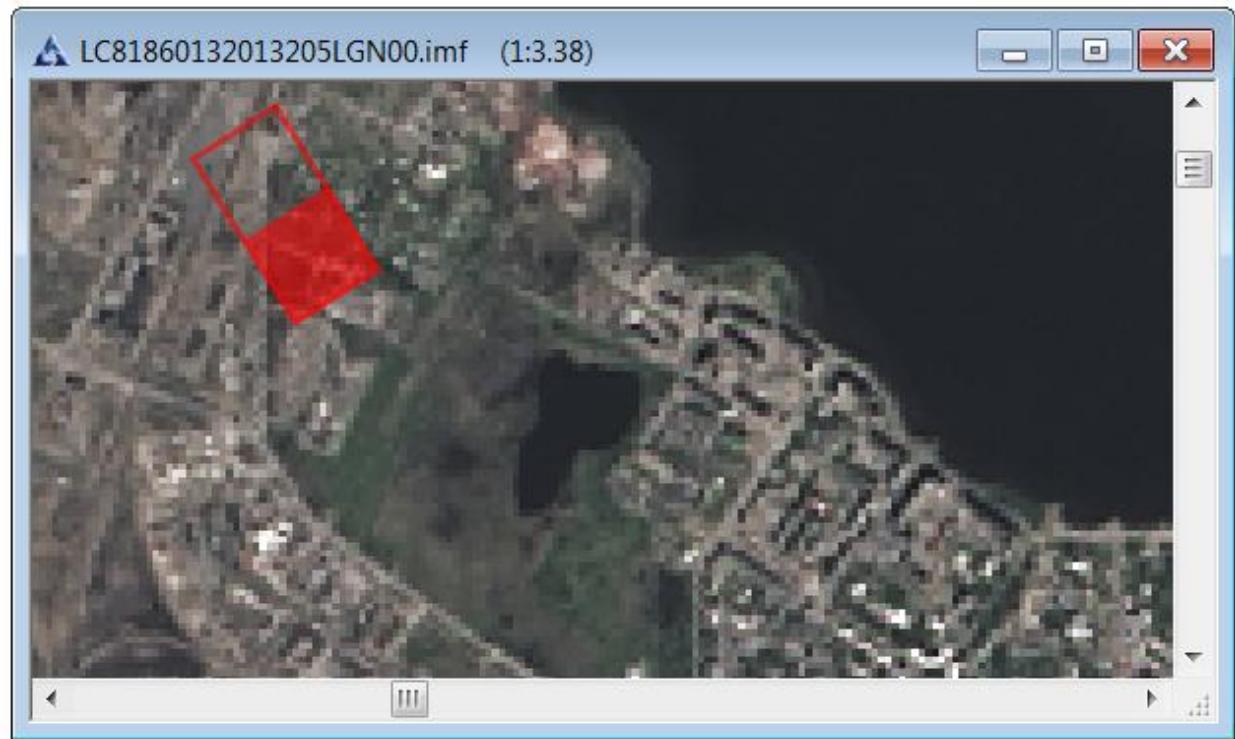


Fig. 305. «*Blind*» tool



Fig. 306. Check accuracy of georeferencing

5.5.3. Creating objects by coordinates (positioning)

To create vector objects (points, lines, polygons) by the coordinates, user has to select «Create object from nodes» in the toolbox «Vectorization» (the Fig. 2307).

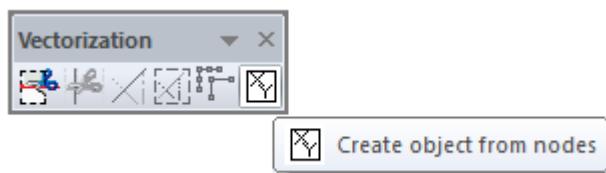


Fig. 307. Call «Create object from nodes» function

Dialog window «Create objects by coordinates» will open (Fig. 308).

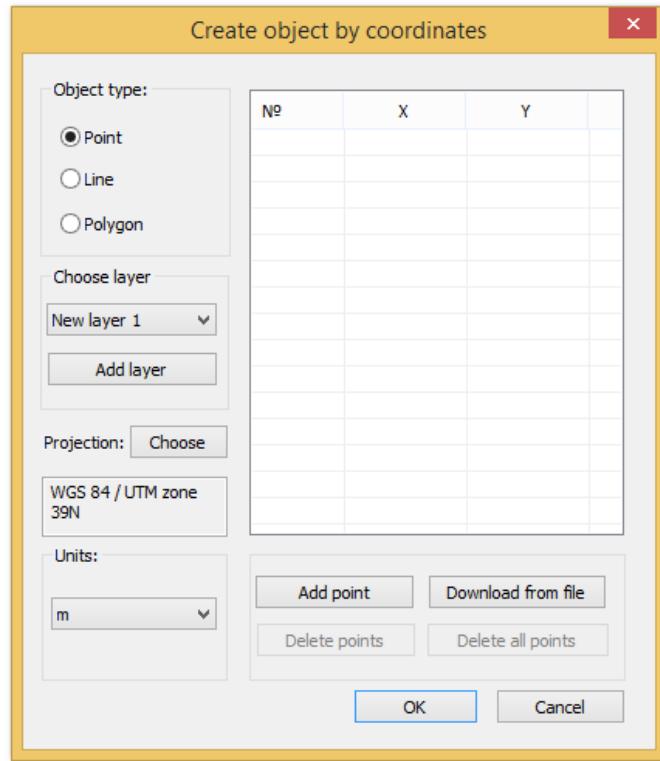


Fig. 308. *Dialog window «Create objects by coordinates»*

To create the object, user has to:

1. Select object type in the group «Object type» («Point» by default).
2. Select layer (first active by default), or add a new one using «Add layer» button.

When user presses on button «Add layer», dialog window will open for entering the name of the layer (Fig. 309).

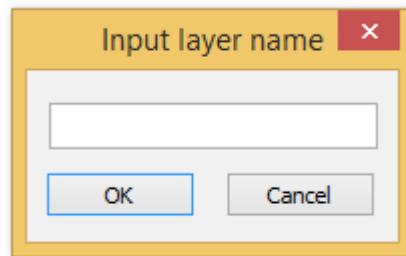


Fig. 309. *Dialog window «Input layer name»*

If user sets the name and clicks on the «OK» button, new vector layer will be created.

If user doesn't set the name and then clicks on the «OK» button, name will be created automatically.

If user clicks on the «Cancel» button, layer won't be created.

3. Select the projection in which points will be added (by default – the projection of the active document).

Dialog window with projection will open by clicking on «Choose projection» button (Fig. 310).

If needed, the projection of the coordinates can be changed. At the same time coordinates will be automatically converted to the projection of the document.

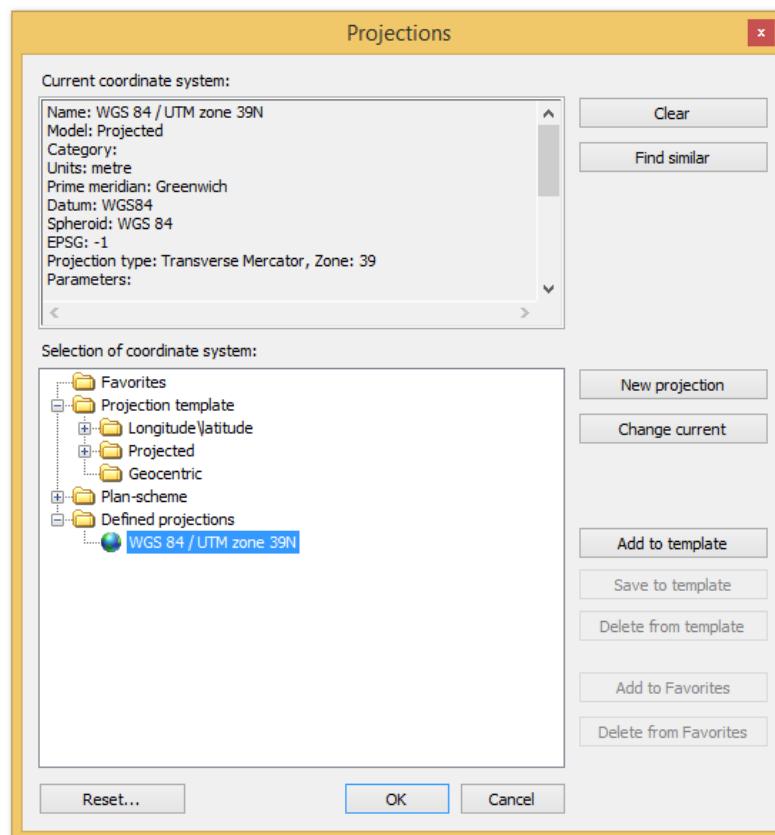


Fig. 310. Dialog window «Projection»

4. Select units (by default – units of the document).

5. Add points (enter data manually or load from file).

When user clicks on the «Add point» button, a coordinate with default value (0, 0) will be added to the list.

When user clicks on the «Download from file», the dialog window will open (Fig. 311).

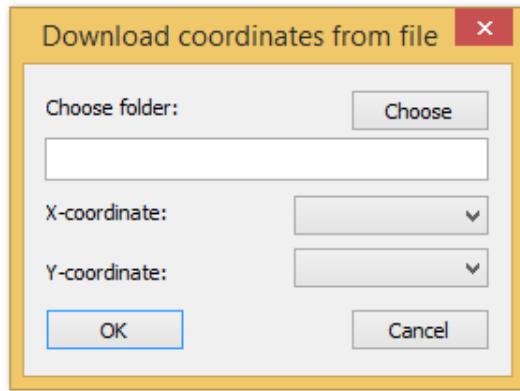


Fig. 311. *Dialog window «Download coordinates from file»*

To load coordinates from file, select file by pressing on the «*Choose folder*» button. There are two types of the supporting files:

- Text file with column separated by tabulation. The first line – name of the column, others lines – values of these columns.
- CSV files.

After selecting file, choose columns which will correspond with X and Y coordinates of object in selected projection (p. 3).

After pressing «*OK*» button, all selected values will be added to the points list on the main dialog window in module.

To edit values, clicks the left mouse button twice on required item in the table. After this, the item become editable and user will be able to change the value.

Items in the table can be deleted by choosing the required item(s) and clocking «*Delete points*» button, or pressing on the keyboard «*Delete*» button.

Also, the tool allows user to move the points. To replace point from one place to another, click the left mouse button on the required item and drag it to another place. Click on the «*OK*» button.

5.5.4. Projection manager

Menu item «*Projection manager*» is used to manage existing projections, add, edit and remove projections.

When this menu item is selected, dialog window «*Projections*» will open (Fig. 312).

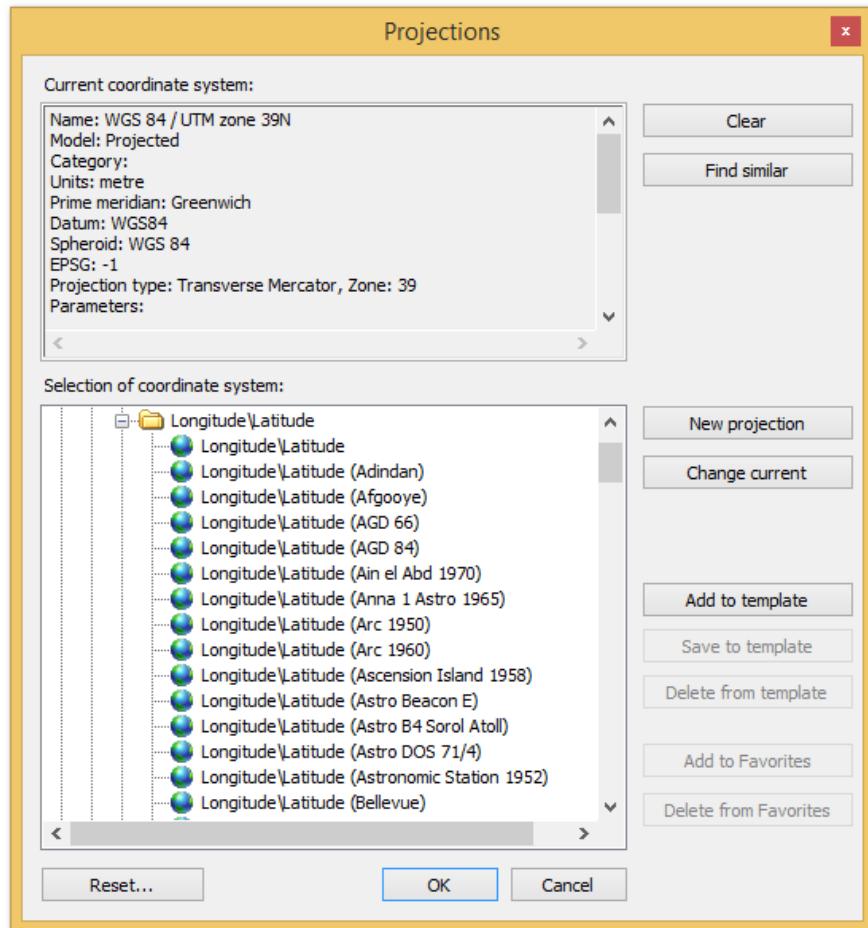


Fig. 312. *Dialog window «Projections»*

The information about current coordinate system displayed in «Current coordinate system» section.

To clear this section, press the «Clear» button.

To find similar projections, press the «Find similar» button.

The list of the existing geographic projection displayed in «Selection of coordinate system» section.

To create new projection, press the «New projection» button.

To change current projection, press the «Change current» button. After this, dialog windows will open to change the parameters of the system.

To change the current document projection, select menu «Edit» - «Document properties» or choose on the toolbox «File» button  «Document properties» (Fig. 313, 314).

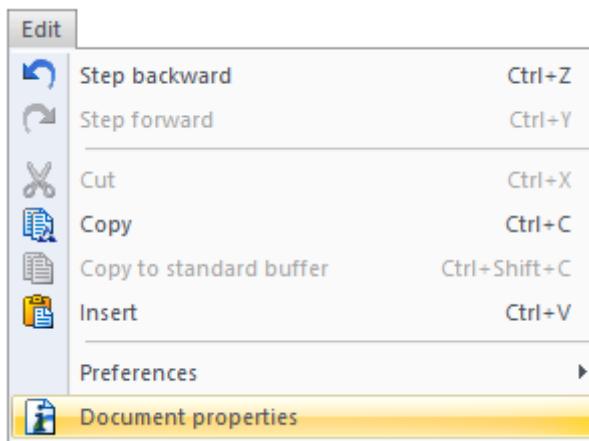


Fig. 313. *Menu item «Edit»*



Fig. 314. *Toolbox «File»*

After this, dialog window «Document properties» will open. Select the tab «Geoinformation», and then click on «Select» button (Fig. 315).

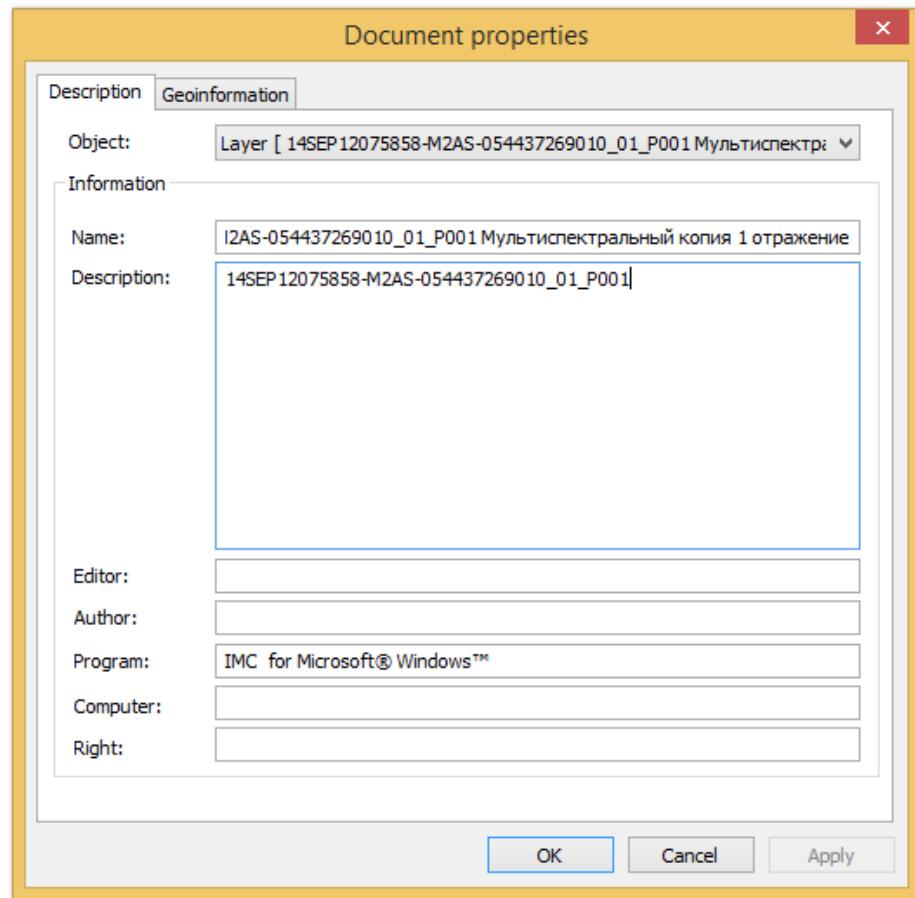


Fig. 315. *Dialog window «Document properties»*

In opened dialog window «Projections» choose the required projection (Fig. 316).

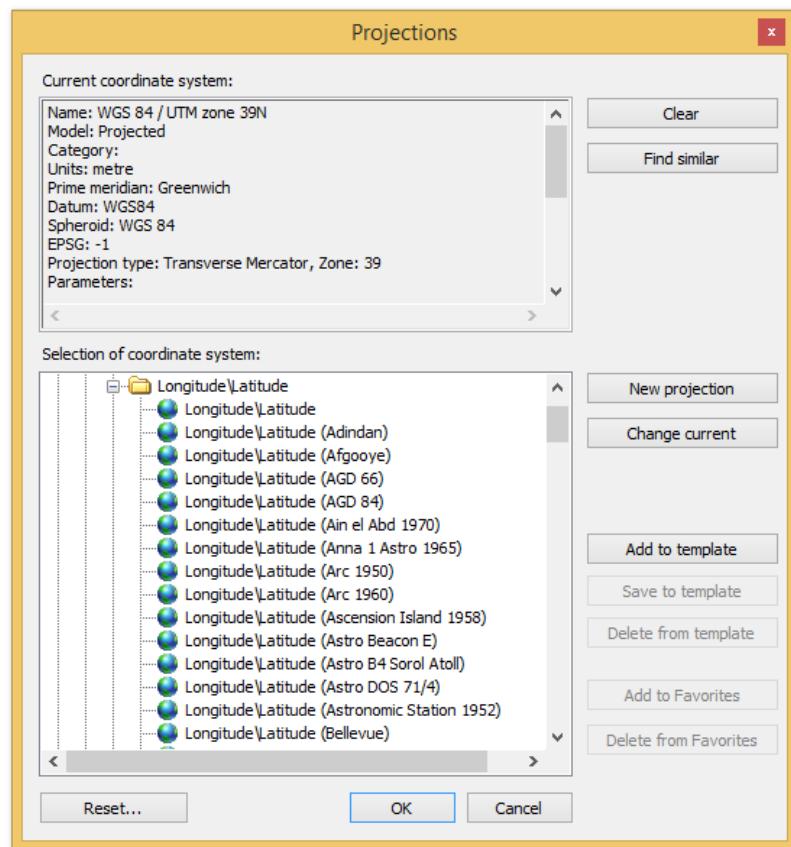


Fig. 316. *Dialog window «Projections»*

5.5.5. Geocalculator

Menu item «Geocalculator» provides coordinate conversation from one geographic system to another.

When user selects this menu item, dialog window «Geocalculator» will open (Fig. 317), in which user sets the input and output geographic projection.

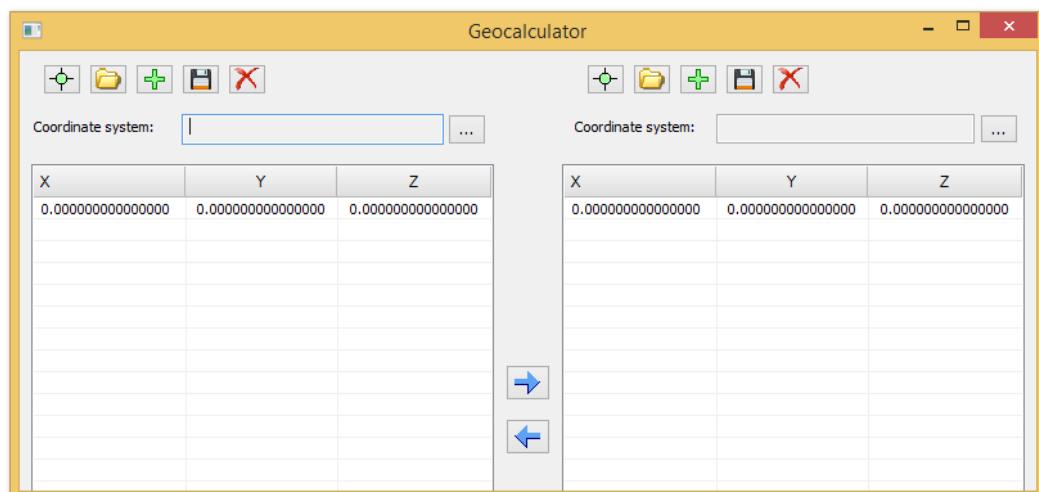


Fig. 317. *Dialog window «Geocalculator»*

5.6. «Thematic processing menu»

5.6.1. Unsupervised classification

Image classification refers to the task of extracting information classes from a multiband raster image. The resulting raster from image classification can be used to create thematic maps. Depending on the interaction between the analyst and the computer during classification, there are two types of classification: supervised and unsupervised. Unsupervised classification finds spectral classes (or clusters) in a multiband image without the analyst's intervention.

5.6.2. Supervised classification

Supervised classification uses the spectral signatures obtained from training samples to classify an image.

Select «*Thematic processing*» – «*Image classification*» – «*Supervised classification...*» menu item to open «*Supervised classification*» panel (Fig. 318). Panel contains a table with following columns:

- ID – class ID;
- Name – class name, user can change it manually;
- Dimension – number of spectral bands of the image;
- Color – the color of class, user can change it manually;
- Elements number – the number of pixels of the selected area;
- X – coordinate of the center of the selection on the horizontal axis in accordance with the image's projection;
- Y – coordinate of the center of the selection on the vertical axis in accordance with the image's projection;
- Source – the name of the satellite
- Scanner – the name of the equipment;
- Sensing date – the date of the surveying
- Description – class description, user can set it manually.

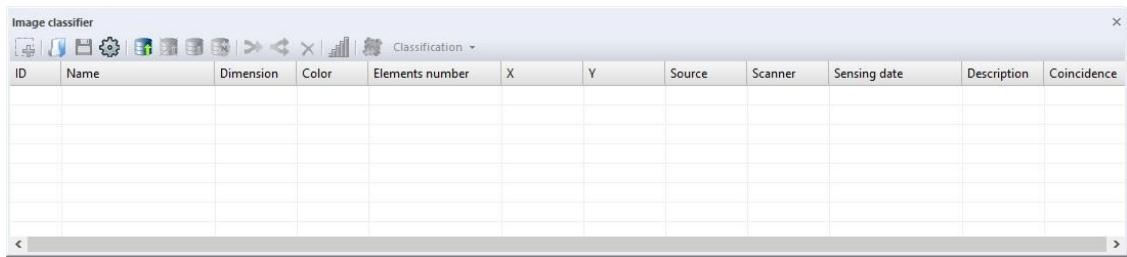


Fig. 318. *Supervised classification panel*

Training samples creation

Supervised classification uses the spectral signatures obtained from training samples to classify an image.

To create a training sample, select the object on the image with «*Selection*» tool (Fig. 319).

Selected area should contain only pixels of one class. For example, if user is creating a training sample for water, only water pixels should be inside the selection.

Selection polygons should be as big as they can be to cover more variations within the single class.



Fig. 319. *Selecting the area on the image*

After the area is selected, press «*Get the selection form the active mark*» button on the panel. A new class will be added to the table (Fig. 320).

ID	Name	Dimension	Color	Elements number	X	Y	Source	Scanner	Sensing date	Description	Coincident
5	Areas with a high proba...	7		6833	47.838371	58.756925	LC8172019...	Landsat 8	04/06/2013 07:53:13		
6	Water	7		49	49.605269	58.513346	LC8172019...	Landsat 8	04/06/2013 07:53:13		
7	Agricultural grounds	7		971	49.376661	58.760546	LC8172019...	Landsat 8	04/06/2013 07:53:13		
8	Artificial objects	7		223	49.594037	58.579996	LC8172019...	Landsat 8	04/06/2013 07:53:13		
9	Trees and shrubs	7		127	49.776178	58.518833	LC8172019...	Landsat 8	04/06/2013 07:53:13		
1	Wetlands	7		5	49.230459	58.716053	LC8172019...	Landsat 8	04/06/2013 07:53:13		
1	Areas with a high proba...	7		6833	47.838371	58.756925	LC8172019...	Landsat 8	04/06/2013 07:53:13		

Fig. 320. Adding new class to the table

Edit classes

Depending on the result of evaluation of training samples user may need to combine overlapping classes into one class. Press «Merge» button on the panel to combine classes (Fig. 321). Also, user can change the name of the existing class and its color, divide classes , delete classes , save and load the training samples, add the information about the satellite and class's description.

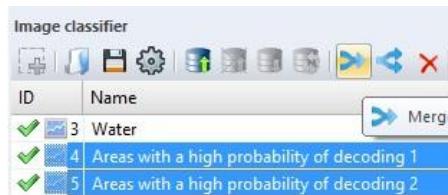


Fig. 321. Merging classes

Training samples can be saves in XML file format.

Training samples database

To work with database of spectral characteristics and training samples, press «Connect to database» button on the panel (Fig. 322).

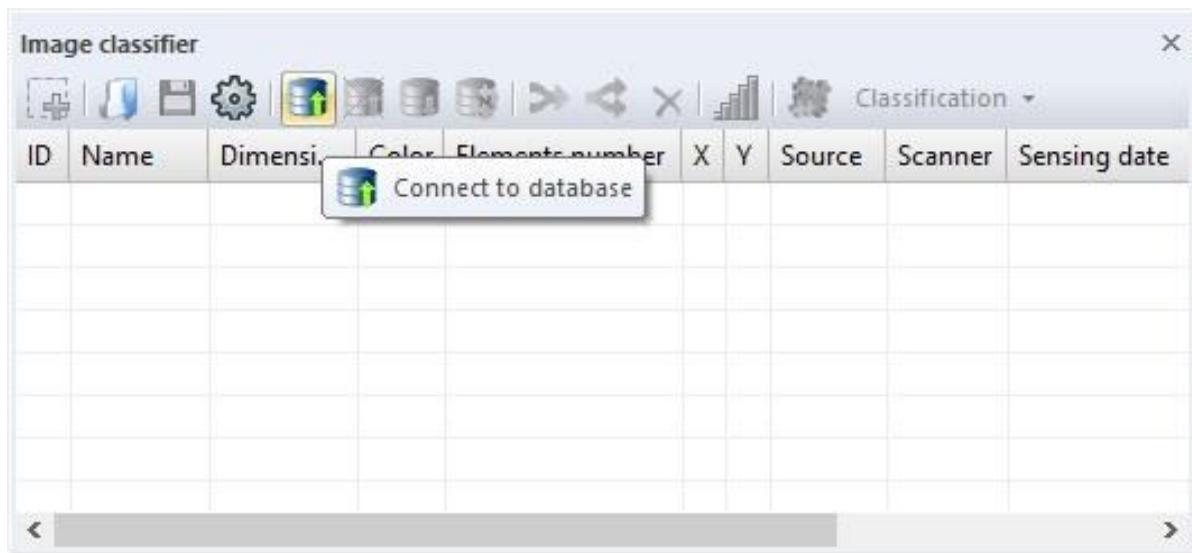


Fig. 322. «*Connect to database*» button

«*Connecting to database*» dialog box will open. User should set the parameters of connection and press «*OK*» button (Fig. 323).

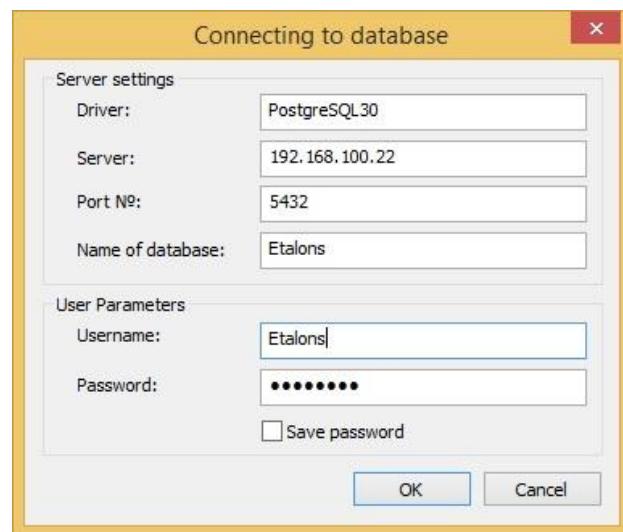


Fig. 323. Database connection

If some parameters were not entered correctly the error message will appear (Fig. 324).

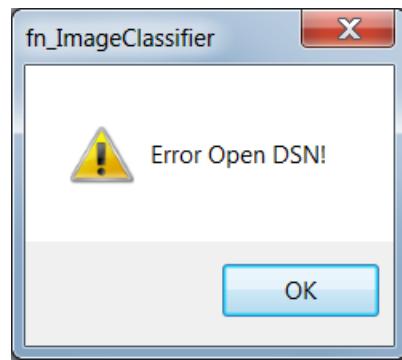


Fig. 324. *Error message*

Press «OK» button and re-enter parameters of connection.

To download the necessary classifiers from database, press «*Load from database*» button on the panel (Fig. 325).

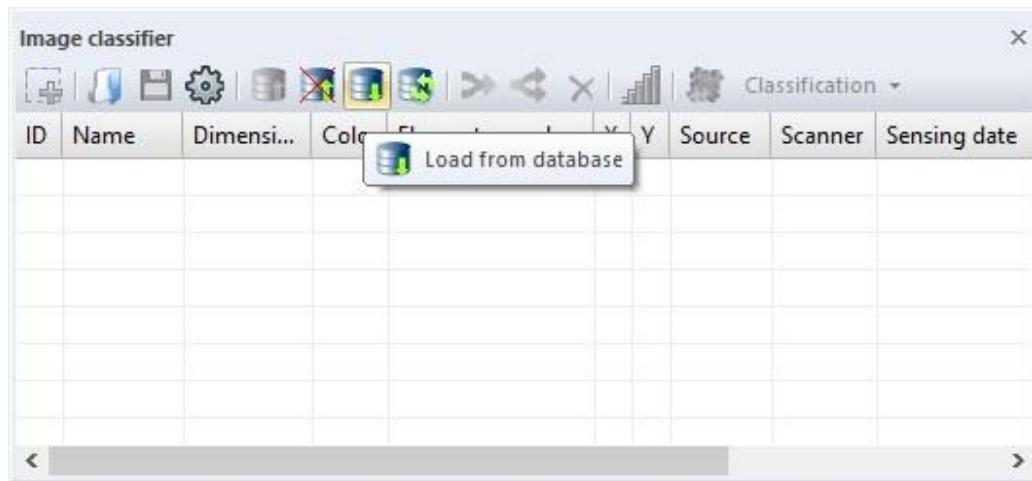


Fig. 325. «*Load from database*» button

«*Load from database*» dialog box will open (Fig. 326).

Set all the necessary parameters in the opened dialog box, such as landscape type, sub-zone, dimension, scanner type, etc.

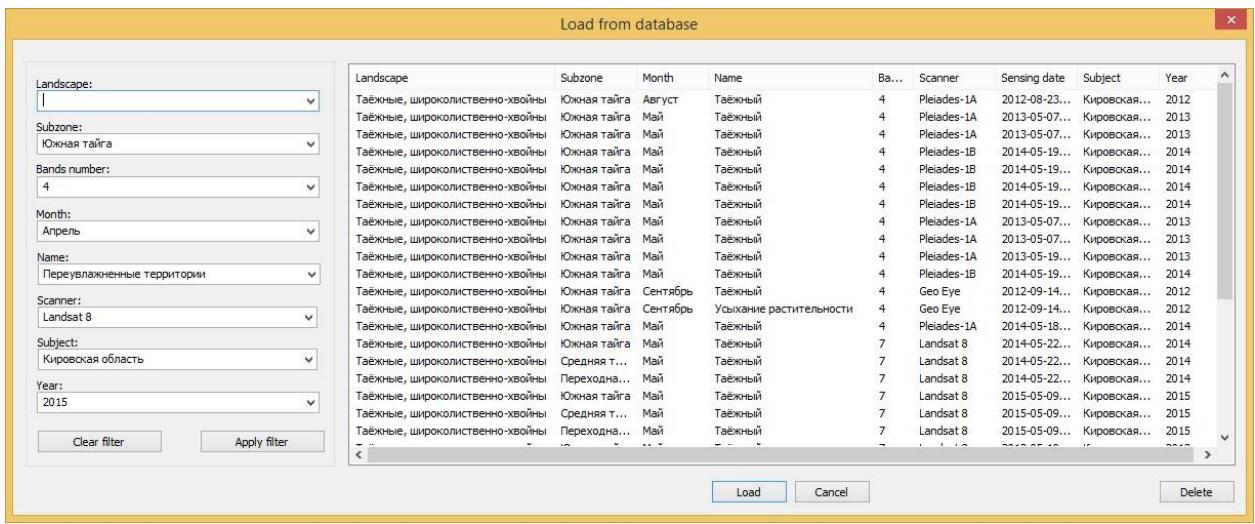


Fig. 326. *Load from database*

The list of the selected objects' classifiers will be displayed in the «*Supervised classification*» panel (Fig. 327).

Image classifier											
ID	Name	Dimensi...	Color	Elements number	X	Y	Source	Scanner	Sensing date	Description	Coincidence
✓ Песок	4		Yellow	388	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Грунт	4		Brown	4114	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Искусс...	4		Grey	1362	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Травян...	4		Light Green	298	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Листве...	4		Green	548	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Хвойн...	4		Dark Green	1191	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Переув...	4		Purple	18	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Зоны с...	4		Light Grey	3578	4	5.	DIM_...	Pleiad...	19/05/2014 08:01:47		

Fig. 327. *Classifiers*

To upload the necessary classifiers to database, press «*Update database*»  button on the panel (Fig. 328).

Image classifier

ID	Name	Dimensi...	Color	El	Source	Scanner	Sensing date	Description	Coincidence
✓ Песок	4		Yellow	3	DIM_...	Pleiad...	19/05/2014 08:01:47		
✓ Грунт	4		Brown	4114	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Искусс...	4		Grey	1362	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Травян...	4		Light Green	298	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Листве...	4		Dark Green	548	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Хвойн...	4		Dark Green	1191	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Переу...	4		Purple	18	4	DIM_...	Pleiad...	19/05/2014 08:01:47	
✓ Зоны с...	4		Light Grey	3578	4	DIM_...	Pleiad...	19/05/2014 08:01:47	

Fig. 328. *Updating database*

Set the parameters of the classifiers to upload them to database (Fig. 329).

Save to database

Landscape:	Tайга
Subzone:	Южная тайга
Bands number:	4
Month:	Май
Name:	Таёжный
Scanner:	Pleiades-1B
Date and time:	19.05.2014 8:01:47
Subject:	Кировская область
Year:	2014
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

Fig. 329. *Saving the parameters of objects' classifiers*

To overwrite an existing database classifier it is necessary to fill in all the parameters the same way. To save a new classifier to the database, user should change at least one of the parameters.

Classification method

Once all the classes are specified, select the classification method (Fig. 330):

- Minimum distance;
- Maximum likelihood;
- Mahalanobis distance.

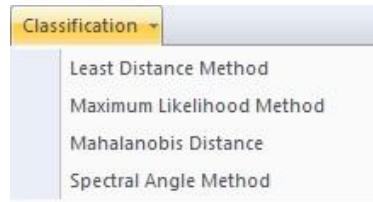


Fig. 330. *Selecting the method of classification*

As a result of classification a raster and vector layers of classes will be created. User can turn off vectorization option in «Settings» dialog box of «Supervised classification» panel.

5.6.3. Texture analysis

Select «Texture analysis» option in «Thematic processing» menu to open texture analysis tool.

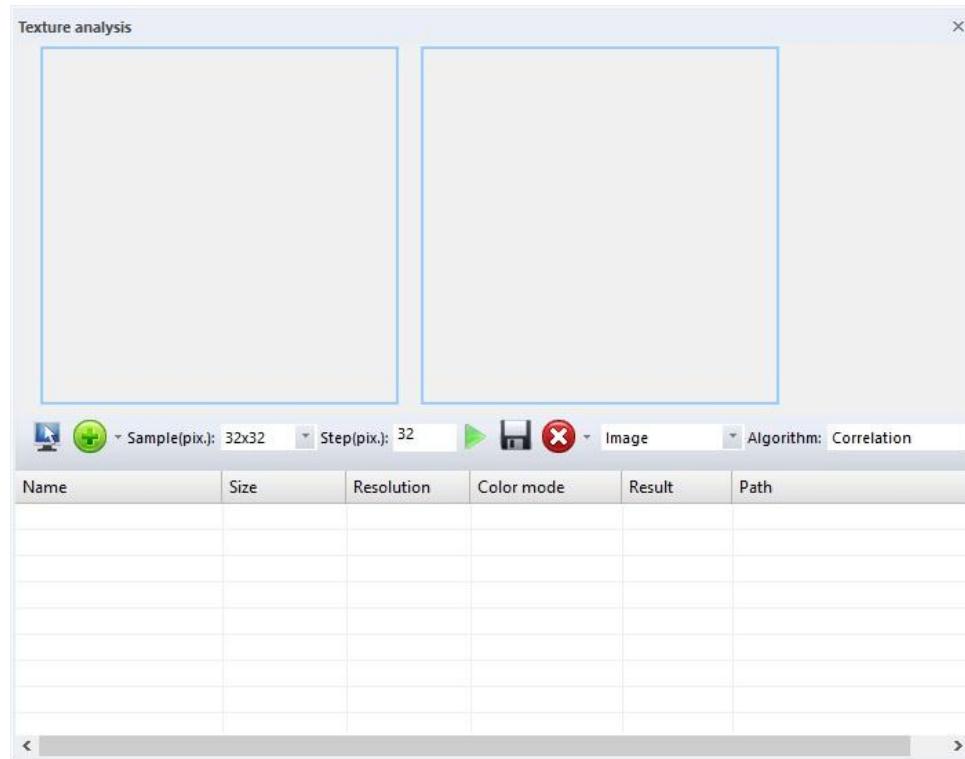


Fig. 331. *Texture analysis tool*

«Select area on the image» button  opens a frame to capture the necessary texture fragment on the image.

«Add from image» button  allows user to save the selected reference fragment to the table. User can also add reference fragments from file or from directory.

User can select the size of the reference fragment from the drop-down list.

«Step (pix.)» field specifies the step size of step-by-step comparison of reference fragment to the image.

«Run» button  starts the texture analysis process.

«Save» button  allows user to save the selected reference fragment to *.ift file format.

«Delete» button  allows user to remove the selected reference fragment from the table.

Select one of the texture analysis modes from drop-down list. «Image» mode performs a step-by-step comparison of reference fragment to the image. «Table» mode performs a comparison between the selected reference fragment and the rest of the fragments in the table. «Result» column will be filed with the relevance percent.

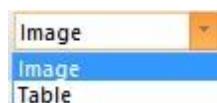


Fig. 332. *Texture analysis modes*

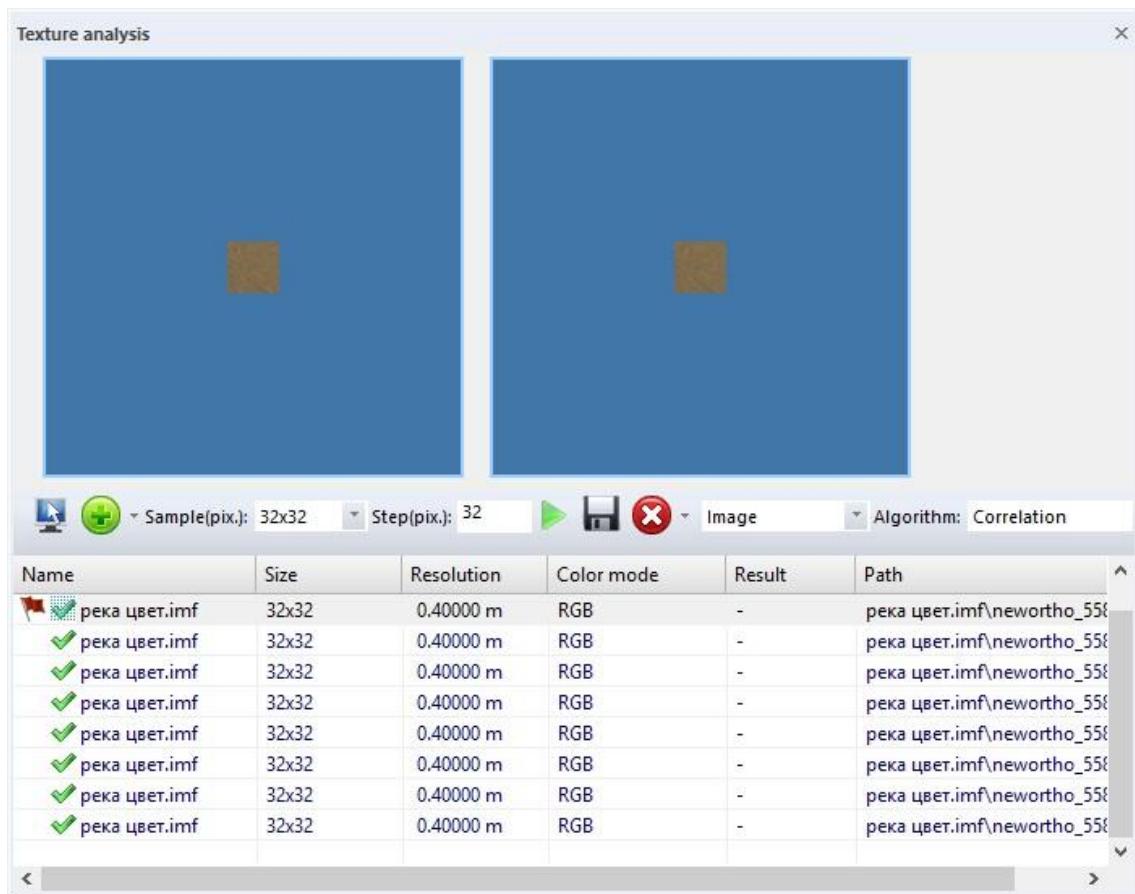


Fig. 333. Reference fragments table

User can select one of the following algorithms for image's texture analysis: «Correlation», «Correlation Pearson» or «Analysis of histograms».

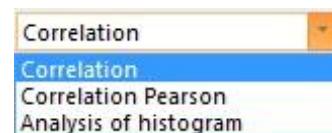


Fig. 334. Texture analysis algorithms

User should specify the size of the fragment and choose the texture, which will serve as a reference for comparison with the image. Press «Select area on the image» button. Then, press «Add from image» button, and selected reference fragment will be saved to the table. Put a flag in the left column of the table next to the necessary reference fragment. Select the algorithm of texture analysis. After all the parameters are set, press «Run» button.

After the analysis is over, a grayscale image will be generated. Light color shows the areas on the image, similar to reference fragment.



Fig. 335. *The result of texture analysis*

5.6.4. Spectral analysis

Spectral analysis tool allows user to perform following actions:

- open, visualize, edit and save hyperspectral data;
- select areas on the hyperspectral image to spectral profiles and reflectance plots;
- save and load spectral plots for hyperspectral data analysis;
- create spectrograms along the row, column or arbitrary polyline on the image;
- select spectral bands for RGB image generation;
- calculate spectral indices;
- automated comparison of spectral graphs with a certain confidence interval;
- create spectral plots.

Select «*Thematic processing*» - «*Spectral analysis*» - «*Graph*» and «*Table*» items to open «*Spectral graph*» and «*Spectral table*» panels (Fig. 336, 337).

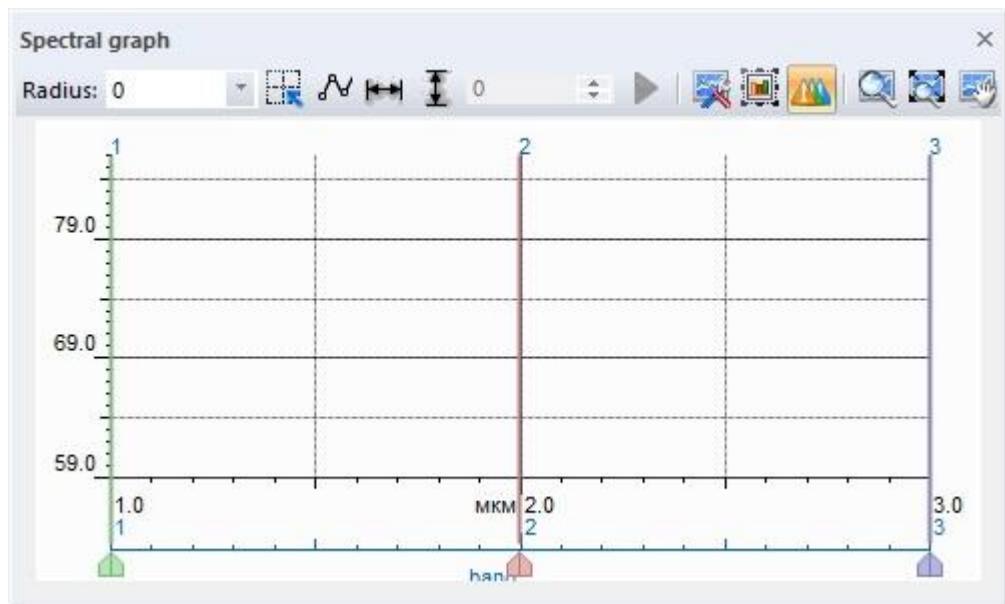


Fig. 336. «Spectral graph» panel

Nº	Radius	X (pixel)	Y (pixel)	X (geo.)	Y (geo.)	Dimension	Scanner	Description	Image	Date
<										>

Fig. 337. «Spectral table» panel

User can select the radius of the sample area for spectrogram creation. Select the necessary value from «Radius» drop-down list (Fig. 338).

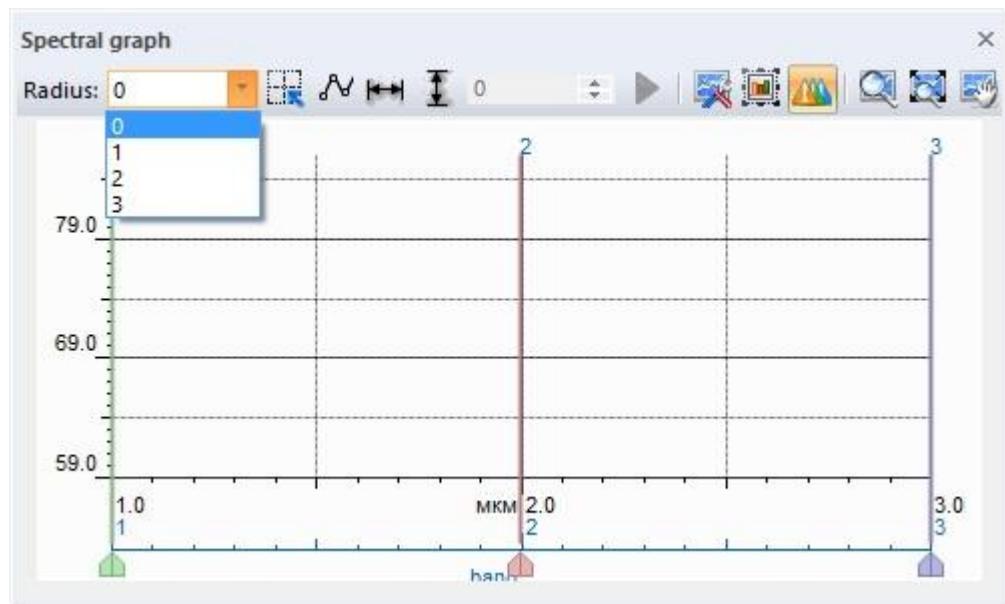


Fig. 338. Selecting the radius of the sample area

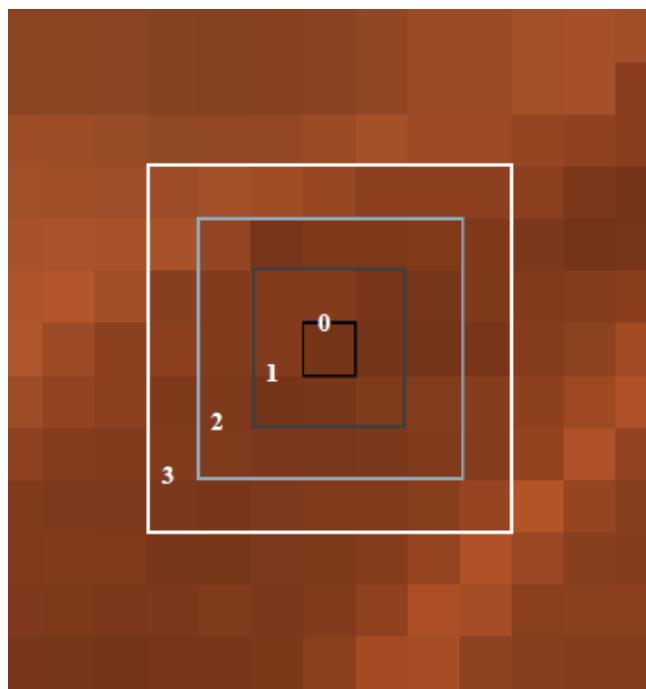


Fig. 339. The example of sample area sizes

Press «Specify center» button on the «Spectral graph» panel to select the area on the image (Fig. 340).

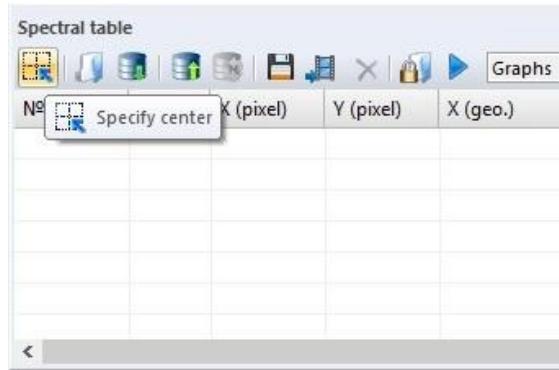


Fig. 340. «Specify center» button

Make sure all the spectral bands of the image are properly ordered. Select «Image» - «Image information». In the opened dialog box, select «Channels» tab (Fig. 341).

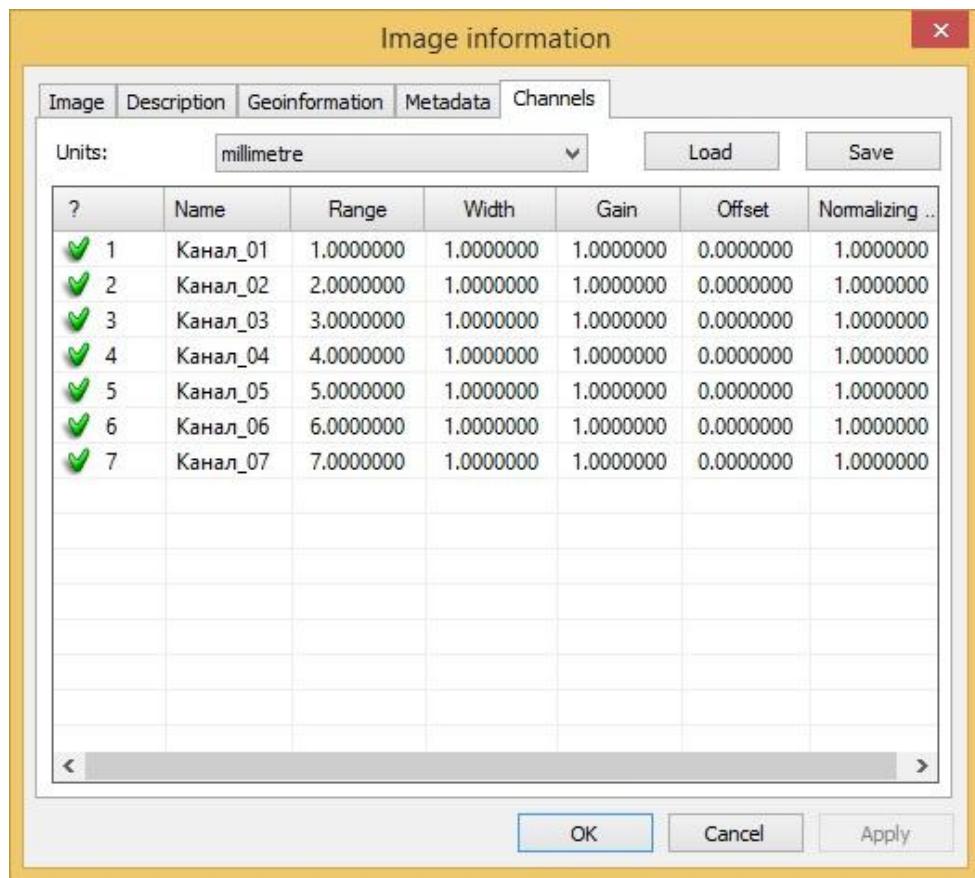


Fig. 341. «Image information» dialog box, «Channels» tab

To order spectral bands, press on «Range» column name. Spectral bands will be sorted in ascending order of their range.

Place the cursor on the necessary area of the image and click on it. Spectrogram of that area will appear in «Spectral graph» panel (Fig. 343), and the information about this spectral plot will be displayed in the «Spectral table» panel (Fig. 344).

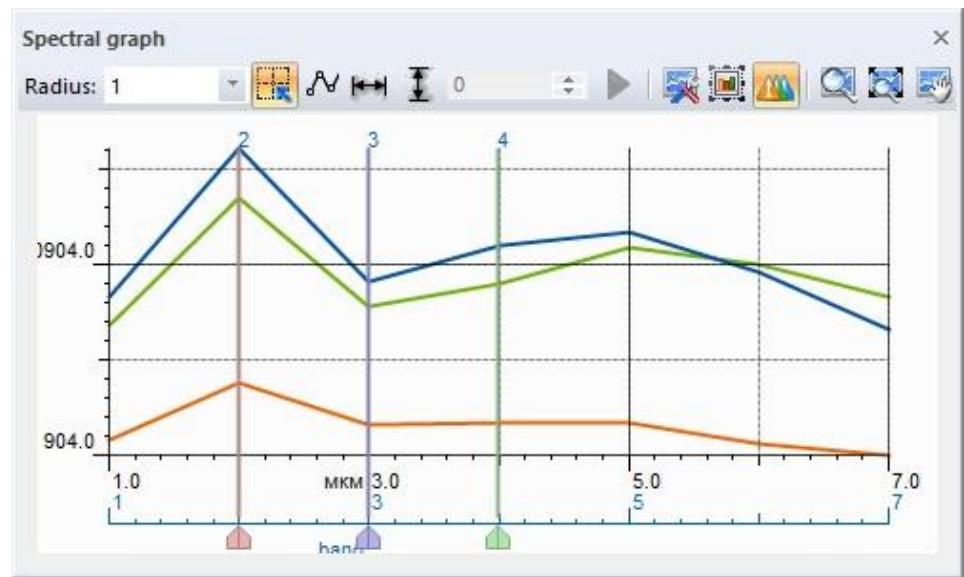


Fig. 342. Spectral plot

#	Radius	X (pixel)	Y (pixel)	X (geo.)	Y (geo.)	Dimension	Scanner	Description	Image	Date	Coincidence
0	0	2022	2193	1905.61697	3449.23177	7/7			MOD02HKM.A201...	10.11.2016	-
1	0	870	2321	1313.02290	3416.01581	7/7			MOD02HKM.A201...	10.11.2016	-
2	0	3446	2193	2638.12909	3449.23177	7/7			MOD02HKM.A201...	10.11.2016	-

Fig. 343. Information about the spectral plot in table

User can fill the additional information in table manually.

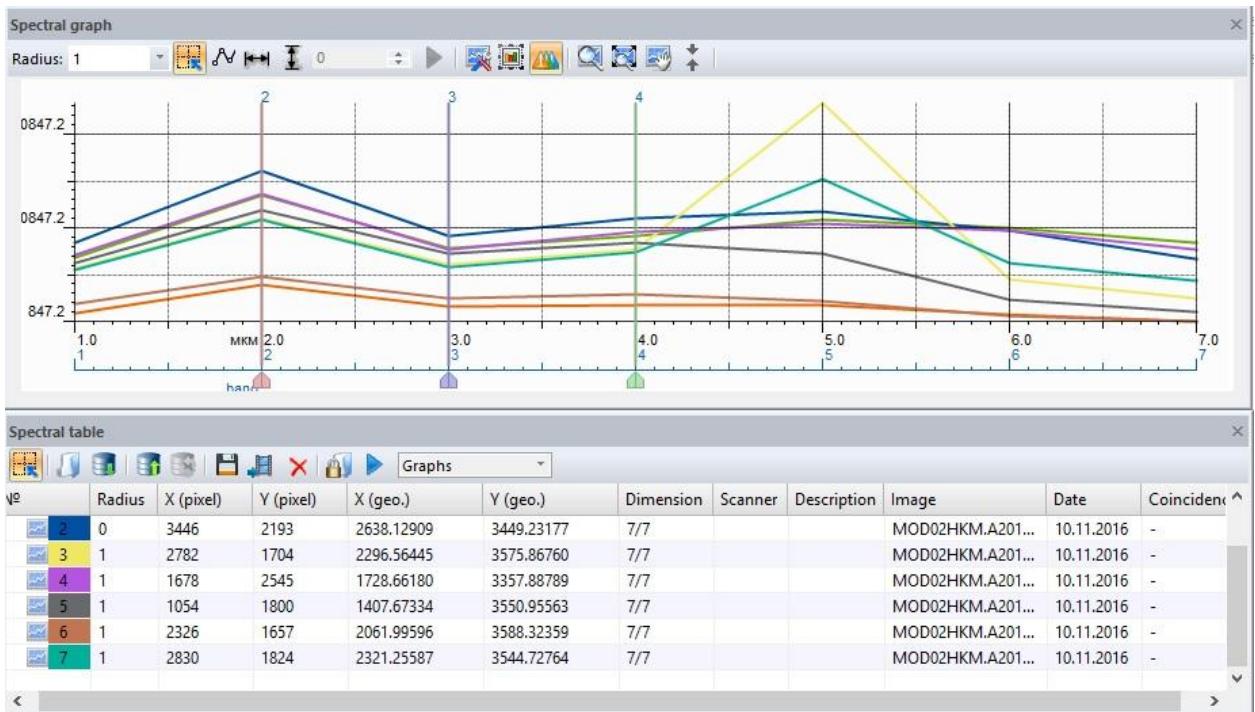


Fig. 344. *Spectral plots of different objects*

«*Spectral graph*» panel contains following tools:

- «*Graph settings*» - change the design of the graph (Fig. 345– 350);
- «*Graph position*» - change the position and the display area of the graph;
- «*Channel management*» – change the color components;
- «*Detail view*» - area of interest enlargement;
- «*Fit into window*» - fit the graph into the panel;
- «*Moving*» - move the graph inside the panel;

«*Spectral table*» panel contains following tools:

- «*Delete*» - delete the selected graph.

Click on the graph in the table to select it. User can select multiple graphs using «*Shift*» and «*Ctrl*» keys.

Press «*Select all records*» button in the context menu to select all graphs.

User can invert selection and deselect all by using corresponding options of the context menu.

Click in the icon to hide the graph. Icon of hidden graph will change to .

To scale the graph according to normalizing coefficient value, press «*Scale*» button.

Image information

Channels					
Units:	millimetre		Load	Save	
	Range	Width	Gain	Offset	Normalizing c...
037201...	0.4430000	0.0080000	0.0122260	-61.1291400	1.0000000
037201...	0.4820000	0.0300000	0.0125190	-62.5969800	1.0000000
037201...	0.5620000	0.0290000	0.0115370	-57.6825900	1.0000000
037201...	0.6550000	0.0190000	0.0097282	-48.6412100	1.0000000
037201...	0.8650000	0.0140000	0.0059532	-29.7659900	1.0000000
037201...	1.6100000	0.0440000	0.0014805	-7.4025300	1.0000000
037201...	2.2000000	0.0940000	0.0004990	-2.4950500	1.0000000
037201...	1.3750000	0.0120000	0.0023266	-11.6332200	1.0000000
037201...	10.9000000	0.3000000	0.0003342	0.1000000	1.0000000
037201...	12.0000000	0.5000000	0.0003342	0.1000000	1.0000000

OK Cancel Apply

Fig. 345. Normalizing coefficient values

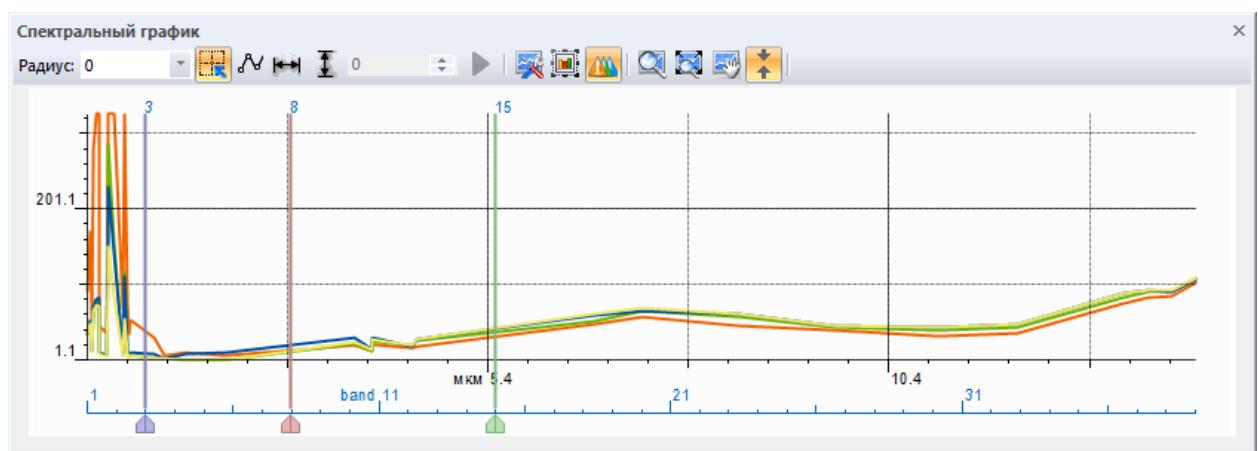


Fig. 346. Scaled plot

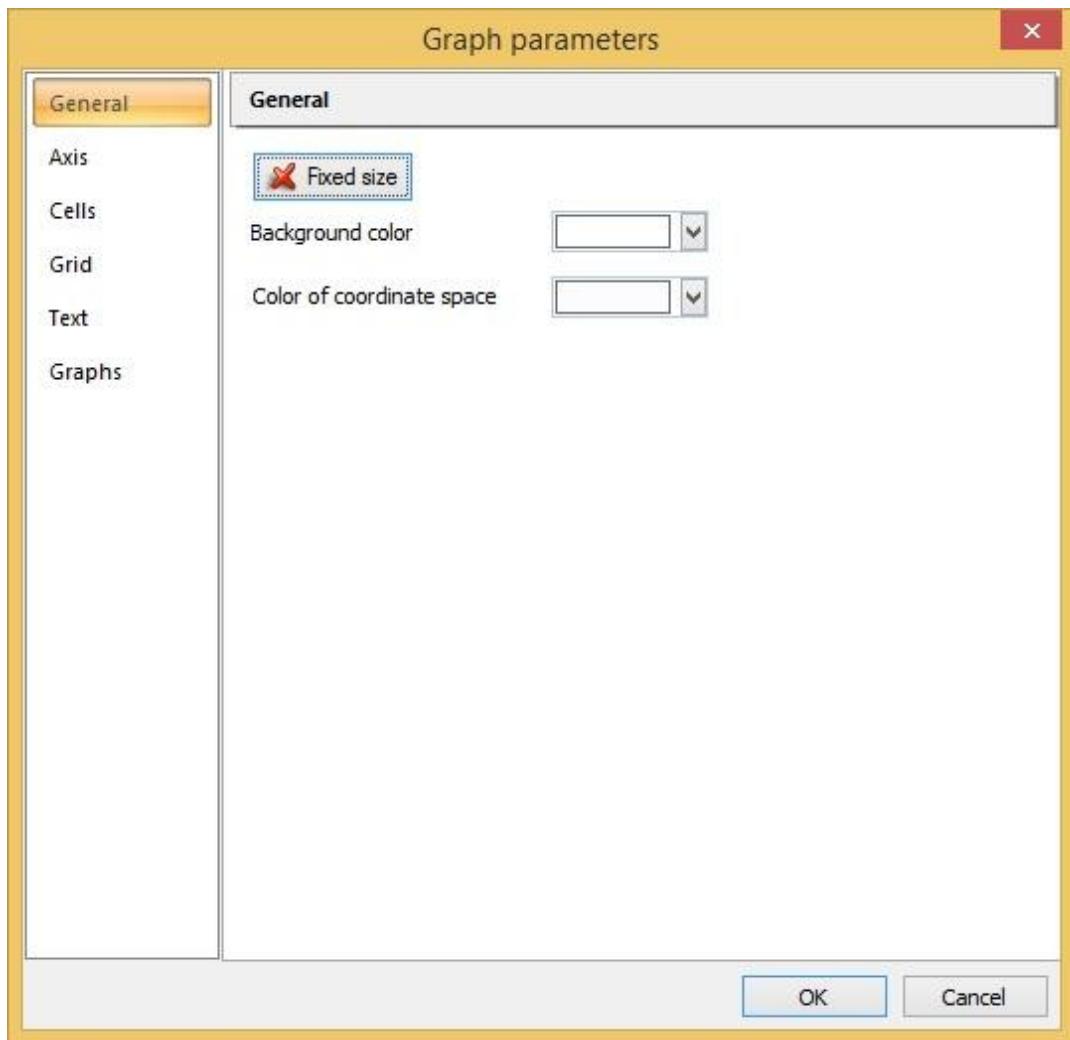


Fig. 347. «General» graph settings

«*Fixed size*» parameter allows user to set the fixed size of the plot area.

«*Background color*» parameter defines the background color of the plot.

«*Color of coordinate space*» parameter defines the color of coordinate space and coordinate scale.

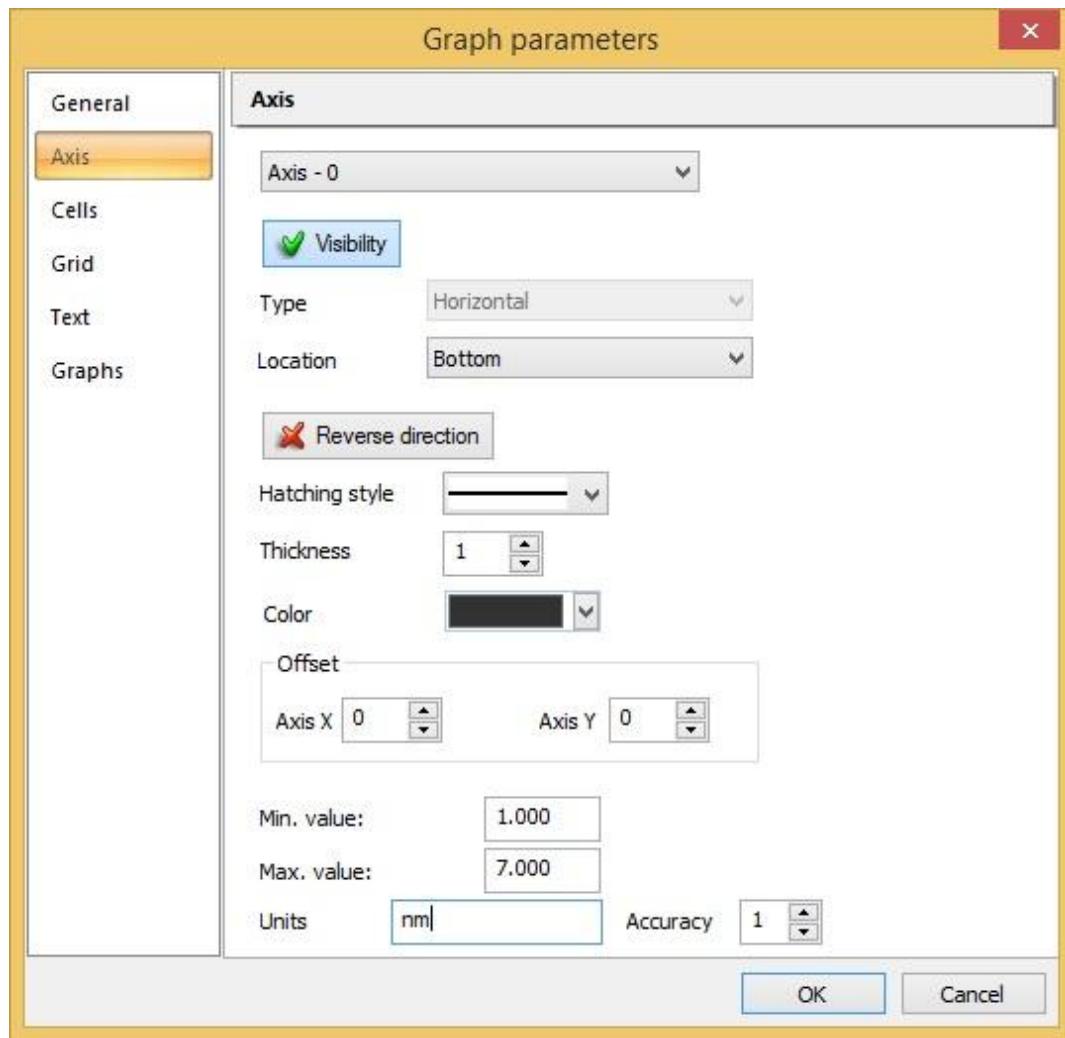


Fig. 348. «Axis» graph settings

Select the axis to set the design of axis.

«Visibility» parameter defines the visibility of the axis.

«Type» parameter defines horizontal or vertical placement of the axis.

«Location» defines the location of the axis: «Bottom» – under the plot, «Top» - above the plot.

«Reverse direction» parameter changes the direction of the axis from right to left.

«Hatching style» parameter defines the axis line type.

«Thickness» parameter defines the thickness of the axis line.

«Color» parameter defines the color of the axis line.

«Offset» parameter allows user to set the offset for vertical and horizontal axis.

«Min. value» and «Max. value» fields are designed to set the minimum and maximum values of the axis.

«Units» parameter defines the units of measurements for the axis.

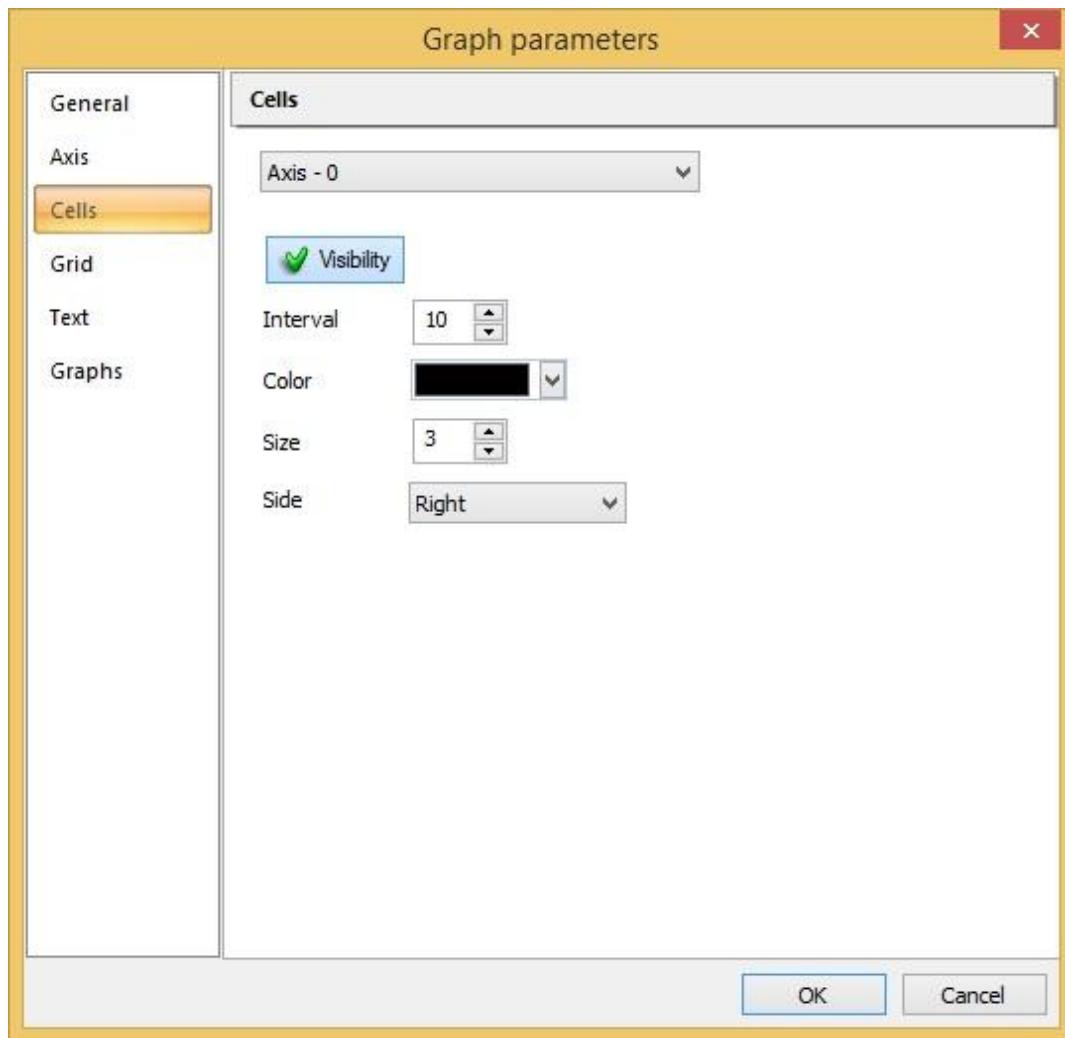


Fig. 349. «Cells» graph settings

Select the axis to set the design of the division marks.

«Visibility» parameter defines the visibility of the division marks.

«Interval» parameter defines the interval between the cells.

«Color» parameter defines the color of the division marks.

«Size» parameter defines the size of the division marks.

«Side» parameter defines the placement of the division marks.

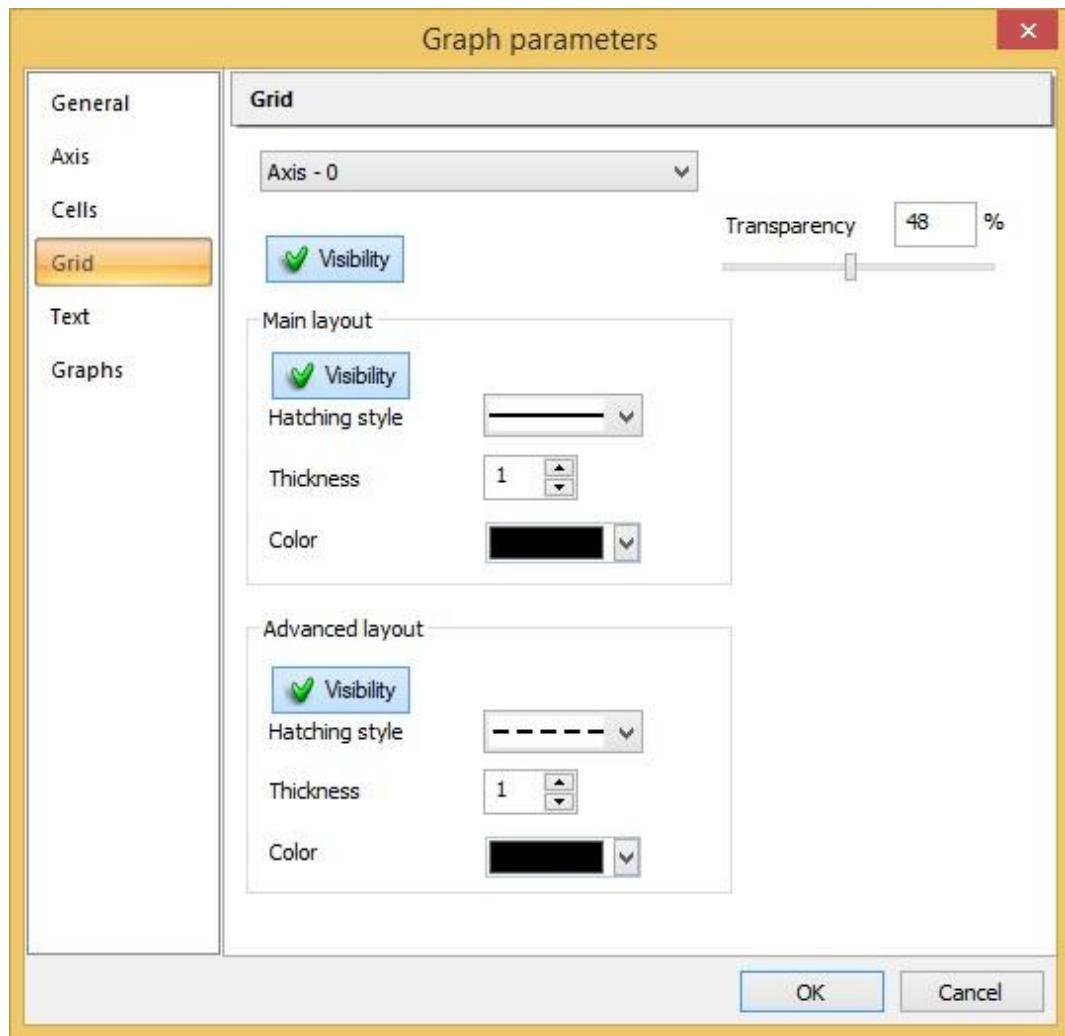


Fig. 350. «Grid» graph settings

Select the axis to set the design of the grid.

«Visibility» parameter defines the visibility of the grid.

«Main layout» section defines the style of the main layout.

«Hatching style» parameter defines the style of the grid.

«Thickness» parameter defines the thickness of the grid.

«Color» parameter defines the color of the grid.

«Advanced layout» section defines the style of the additional layout.

«Hatching style» parameter defines the style of the grid.

«Thickness» parameter defines the thickness of the grid.

«Color» parameter defines the color of the grid.

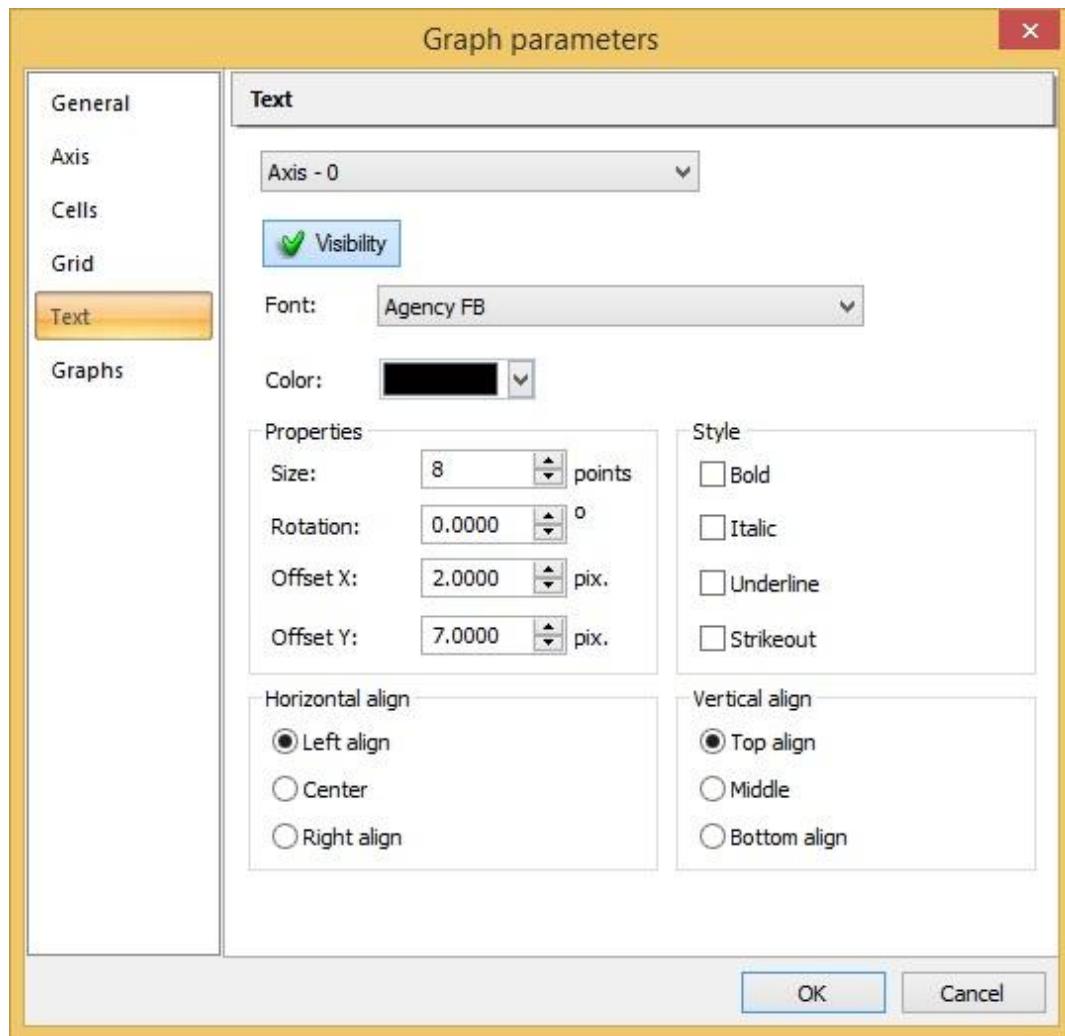


Fig. 351. «Text» graph settings

Select the axis to set the design of the text.

«Visibility» parameter defines the visibility of the text.

«Font» parameter defines the font of the text.

«Color» parameter defines the color of the text.

In «Properties» section user can set such parameters of the text as size, rotation and offset.

In «Style» section user can set the style of the font.

In «Horizontal align» section user can set the aligning style: left, right or center.

In «Vertical align» section user can set the aligning style: top, middle or bottom.

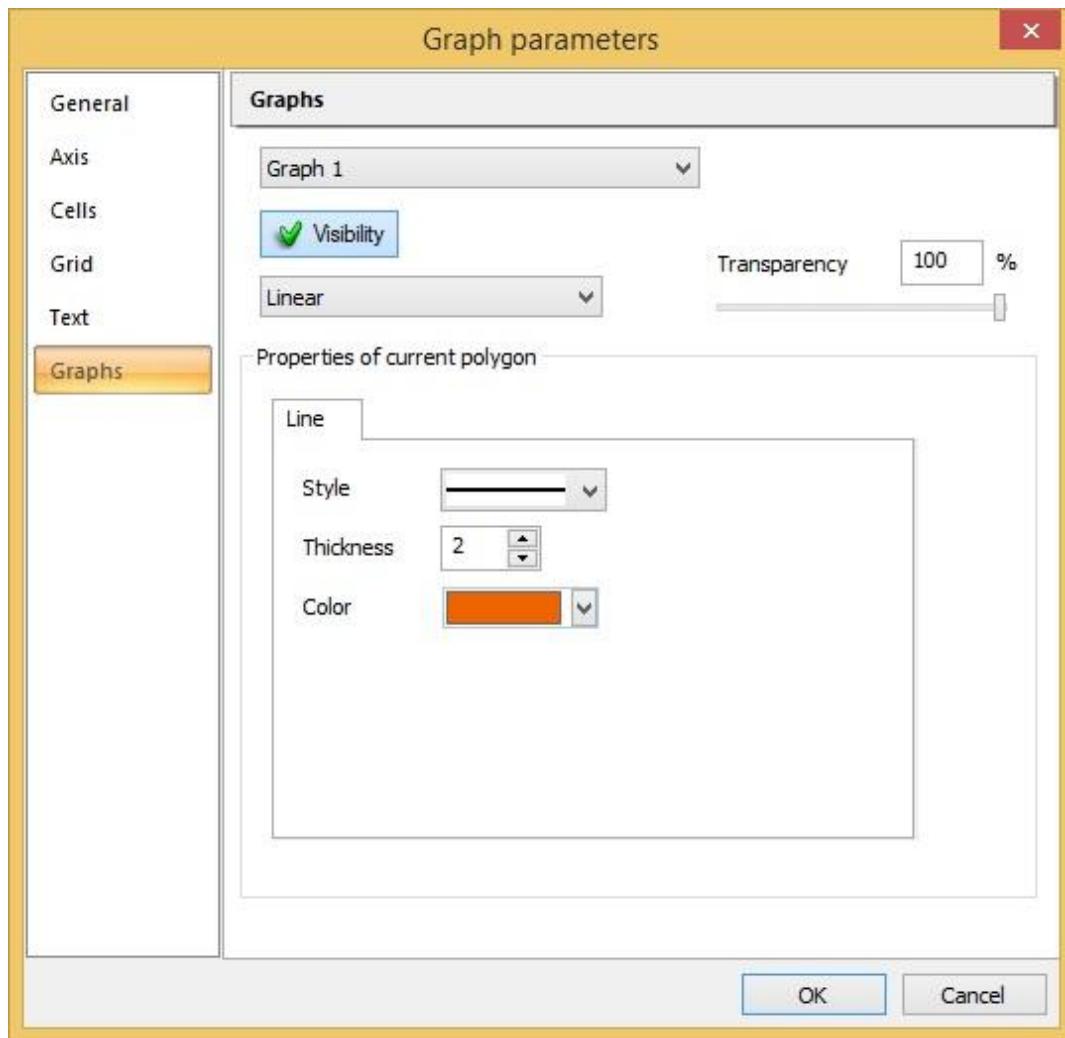


Fig. 352. «Graph» graph settings

Select the axis to set the design of the plot.

«Visibility» parameter defines the visibility of the plot.

Select the type of the graph from the drop-down list.

«Transparency» parameter defines the transparency of the plot.

In «Properties of the current polygon» section user can change the parameters of selected plot type.

Save and load spectral plots

User can save the spectral plots in *.iss file format.

Spectral plots comparison

To perform the comparison, user should perform following operations:

1. Put the flag in the left column to select the reference plot
2. Select the objects of comparison Графики

3. Press «Run»  button to start the comparison.

The results of the comparison will appear in the «Coincidence» column of «Spectral table» panel.

Spectral table											
#	Radius	X (pixel)	Y (pixel)	X (geo.)	Y (geo.)	Dimension	Scanner	Description	Image	Date	Coinciden...
2	0	3446	2193	2638.12909	3449.23177	7/7			MOD02HKM.A201...	10.11.2016	-
3	1	2782	1704	2296.56445	3575.86760	7/7			MOD02HKM.A201...	10.11.2016	-
4	1	1678	2545	1728.66180	3357.88789	7/7			MOD02HKM.A201...	10.11.2016	-
5	1	1054	1800	1407.67334	3550.95563	7/7			MOD02HKM.A201...	10.11.2016	-
6	1	2326	1657	2061.99596	3588.32359	7/7			MOD02HKM.A201...	10.11.2016	-
7	1	2830	1824	2321.25587	3544.72764	7/7			MOD02HKM.A201...	10.11.2016	-

Fig. 353. «Spectral table» panel

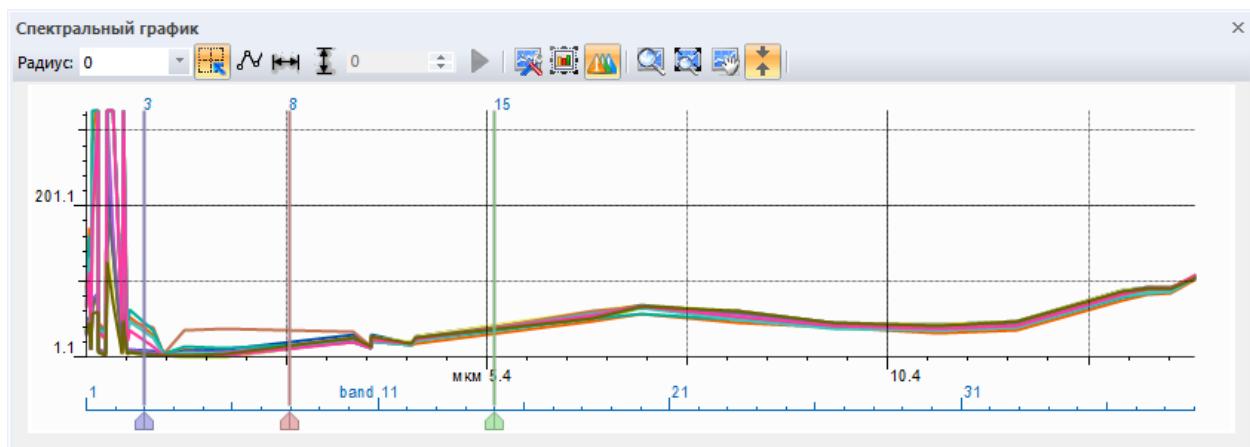


Fig. 354. «Spectral graph» panel

Спектральная таблица											
#	Радиус	X (пиксел)	Y (пиксел)	X (гео.)	Y (гео.)	Размерн...	Сканер	Описание	Изображение	Дата	Совп...
0	0	4353	1097	65.67490	67.75017	39			MODIS_SWATH_T...	22.08.2013	1.000
1	0	3977	1209	61.38028	66.47092	39			MODIS_SWATH_T...	22.08.2013	0.957
2	0	4297	841	65.03527	70.67416	39			MODIS_SWATH_T...	22.08.2013	0.940
3	0	3057	961	50.87219	69.30354	39			MODIS_SWATH_T...	22.08.2013	0.879
4	0	2097	977	39.90721	69.12079	39			MODIS_SWATH_T...	22.08.2013	0.878
5	0	3737	753	58.63904	71.67928	39			MODIS_SWATH_T...	22.08.2013	0.681
6	0	2233	785	41.46058	71.31378	39			MODIS_SWATH_T...	22.08.2013	0.667
7	0	3225	1009	52.79106	68.75529	39			MODIS_SWATH_T...	22.08.2013	0.636
8	0	2785	873	47.76544	70.30866	39			MODIS_SWATH_T...	22.08.2013	0.634
9	0	2137	609	40.36409	73.32403	39			MODIS_SWATH_T...	22.08.2013	0.588
10	0	2241	1081	41.55196	67.93291	39			MODIS_SWATH_T...	22.08.2013	0.581

Fig. 355. The results of the comparison in the «Coincidence» column

Detection of the objects on the image.

To perform an automated search of the objects on the image by their spectral plots, perform following operations:

1. Put the flag in the left column to select the reference plot **11**.
2. Select the objects of comparison **Изображение**
3. Press «Run» button to start the search

№	Радиус	X (пиксел)	Y (пиксел)	X (geo.)	Y (geo.)	Размерн...	Сканер	Описание	Изображе
2	0	4297	841	65.03527	70.67416	39			MODIS_SW
3	0	3057	961	50.87219	69.30354	39			MODIS_SW
4	0	2097	977	39.90721	69.12079	39			MODIS_SW
5	0	3737	753	58.63904	71.67928	39			MODIS_SW
6	0	2233	785	41.46058	71.31378	39			MODIS_SW
7	0	3225	1009	52.79106	68.75529	39			MODIS_SW
8	0	2785	873	47.76544	70.30866	39			MODIS_SW
9	0	2137	609	40.36409	73.32403	39			MODIS_SW
10	0	2241	1081	41.55196	67.93291	39			MODIS_SW
11	0	3961	1745	61.19753	60.34881	39			MODIS_SW

Fig. 356. «Spectral table» panel

«Image analysis» dialog box will open (Fig. 357).

«Radius» parameter allows user to set the radius of a spectral profile on the image.

«Smoothing mask» parameter allows user to smoothen the edges of the result.

«Interval» parameter allows user to adjust the confidence interval.

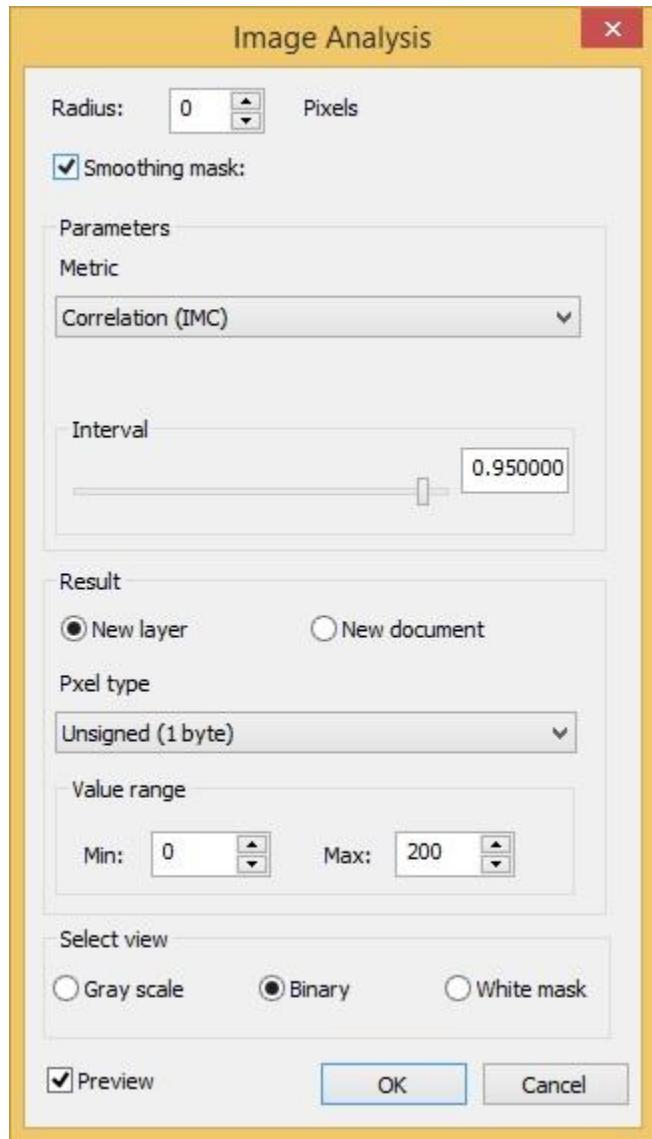


Fig. 357. «Image analysis» dialog box

«Metric» parameter determines the spectral analysis algorithm:::

- correlation (IMC);
- correlation;
- binary coding;
- spectral-angular mapping;
- orthogonal projection of subspace.

If the «Grayscale» parameter is active, a grayscale image will be generated, where objects with the greater confidence interval will be colored in the lighter shades than objects with the smaller confidence interval. (Fig. 359). The original image is shown on the Fig. 358.

If the «Binary» parameter is active, the objects that fit in the confidence interval will be displayed as white and all the rest will be colored in black (Fig. 360).

If the «*White mask*» parameter is active, the objects that fit in the confidence interval will be colored in white, and the rest of the image will remain in its initial state.

«*Value range*» section allows user to set the minimum and maximum pixel values.

«*Preview*» option allows user to view the approximate result of the processing.

Press «*OK*» button to start the processing.



Fig. 358. *Original image*

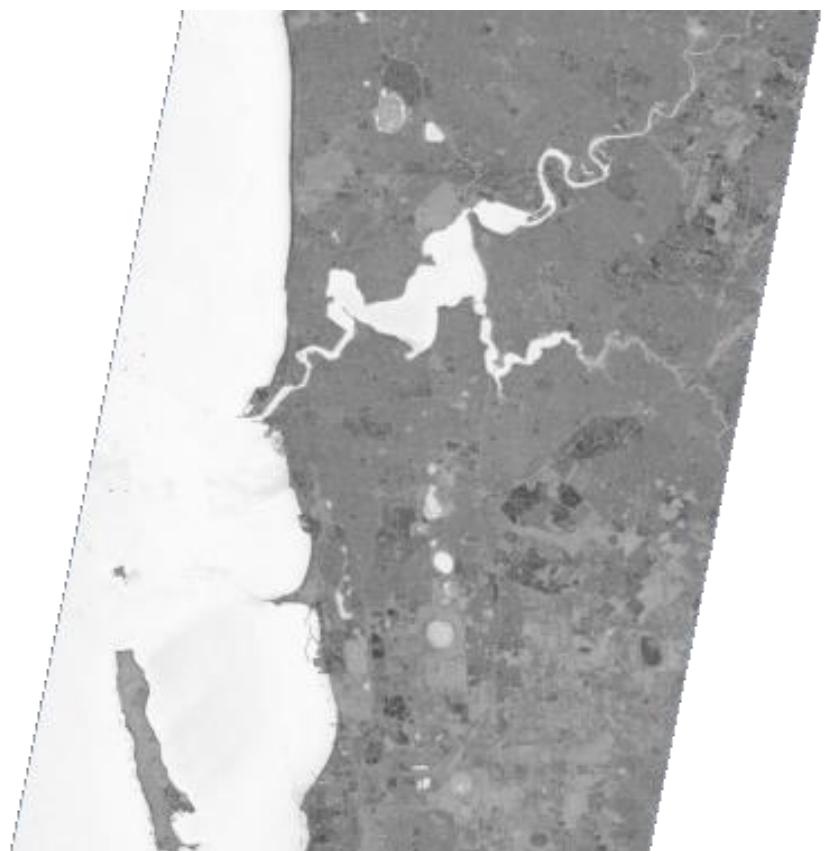


Fig. 359. «Greyscale» parameter



Fig. 360. «Binary» parameter

5.7. «Vector» menu

«Vector» menu allows user to create and edit vector objects, their styles and attribute information (Fig. 361).

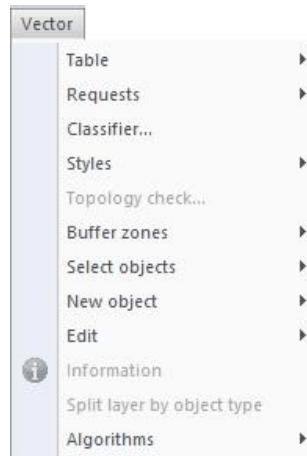


Fig. 361. «Vector» menu

5.7.1. Attribute table

5.7.1.1 Attribute table panel

User can edit the attributes of vector objects, create and fill attribute table in «*The attributes of vector objects*» panel.

Press «*The attributes of vector objects*» button on the «Vector requests» toolbar (Fig. 362) or select «Vector» - «Table – Attributes» menu item to open the panel (Fig. 361).

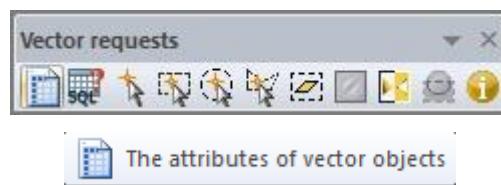


Fig. 362. «Vector requests» toolbar

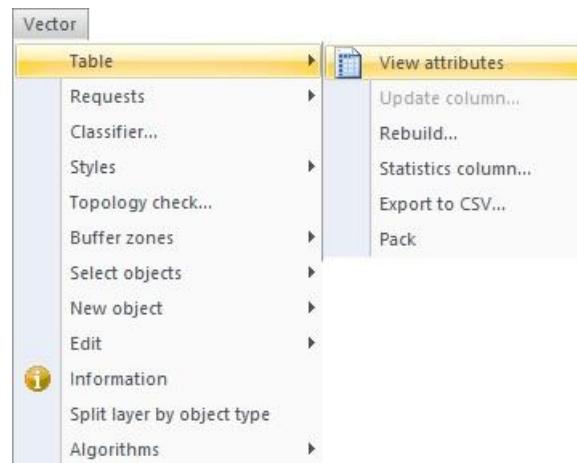


Fig. 363. «Vector» menu

The attributes of vector objects				
		Объекты_в зоне пожара	Выгоревшая растительность	Очаги пожаров
ID	Тип	Площадь_М2	Площадь_КМ	
0	Очаги пожаров	80100.000000		0.080000
1	Очаги пожаров	72000.000000		0.070000
2	Очаги пожаров	39600.000000		0.040000
3	Очаги пожаров	35100.000000		0.040000
4	Очаги пожаров	13500.000000		0.010000
5	Очаги пожаров	18000.000000		0.020000
6	Очаги пожаров	11700.000000		0.010000
7	Очаги пожаров	14400.000000		0.010000
8	Очаги пожаров	2700.000000		0.000000
9	Очаги пожаров	1800.000000		0.000000

Fig. 364. «The attributes of vector objects» panel

If the vector object is deleted, the record about it will remain in the attribute table, but it will be grayed out (Fig. 365).

Атрибуты векторных объектов				
Кодировка CP1251				
ID	Название	Тип	Категория	
0	Beer Master	Паб	Еда	
1		Паб	Еда	
2	Failthe Food House	Паб	Еда	
3	Чешский сладек	Паб	Еда	
4		Паб	Еда	
5	Веселый Роджер	Паб	Еда	
6	Praha Nova	Паб	Еда	
7		Паб	Еда	
8		Паб	Еда	
9	Частная пивоварня	Паб	Еда	
10		Паб	Еда	
11	Живое пиво	Паб	Еда	

Fig. 365. Deleted vector objects in the attribute table

To change the order of the selected rows, press  «Up selected rows» button on the panel. Select multiple rows while holding *Shift* or *Ctrl* keys, or select the necessary objects on the image.

To delete the selected objects, press  «Delete selected rows» button on the panel.

User can select the encoding of the text information from one of the options in drop-down list.

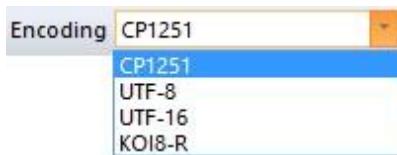


Fig. 366. *Changing the encoding*

Right click on the header of the table to open a context menu

«*Autofit column width*» option is used to resize the width of the selected column according to the longest entry.

«*Autofit all column width*» – option is used to resize the width of all columns according to the longest entry.

To hide or view the information about the deleted objects in the table, press the button  «*Show deleted rows*»,  or «*Don't show deleted rows*».

To remove the records of deleted vector objects from the table, press  «*Pack table*» button.

5.7.1.2 Changing structure of attributes table

To set the columns of attribute table, select «*Vector*» – «*Table*» – «*Rebuild*» menu item (Fig. 367).

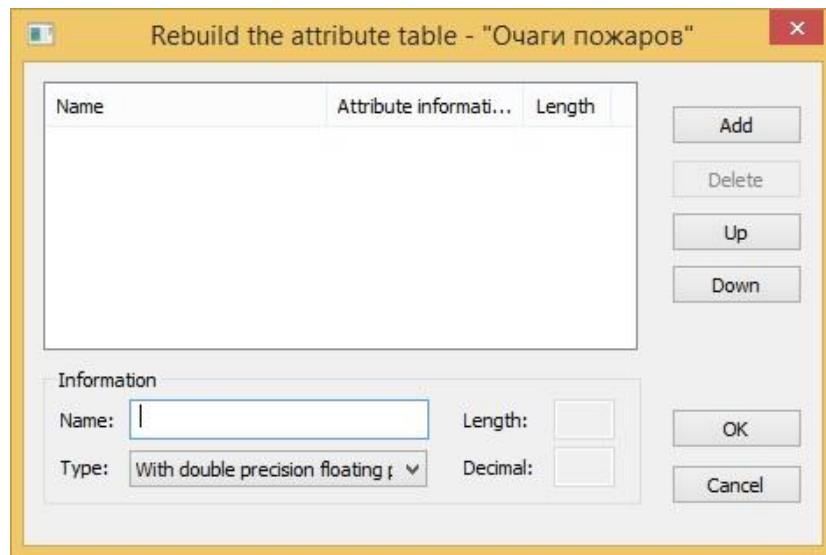


Fig. 367. «Rebuild the attribute table» dialog box

To create, delete, or rearrange the information, use «Add», «Delete», «Up» or «Down» buttons.

Set the name, type, length and decimal precision in «Information» section.

To save the changes made to the structure of the table, press «OK» button. To exit the window without applying any changes, press «Cancel» button.

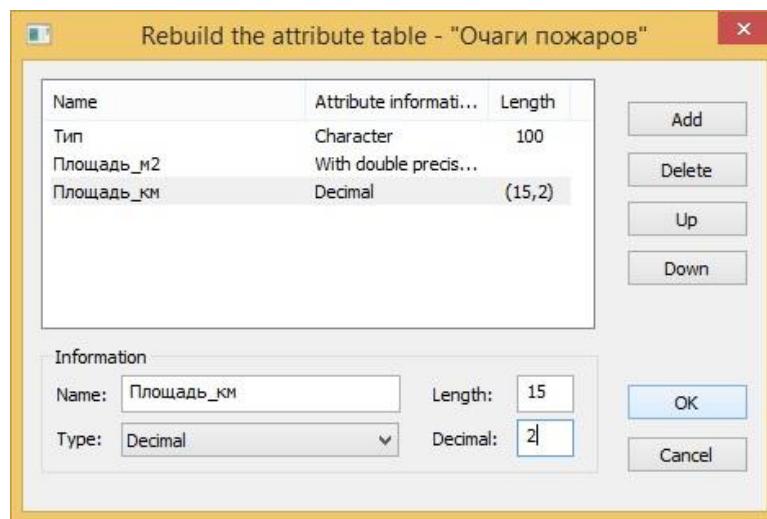


Fig. 368. «Rebuild the attribute table» dialog box

5.7.1.3 Updating the information in the attribute table

To perform an automated update of the columns of the attribute table, select «Vector» – «Table» – «Update column» or press the «Update column» button on the «Attributes of vector objects» panel. Select the necessary layer and column in the opened dialog box (Fig. 369).

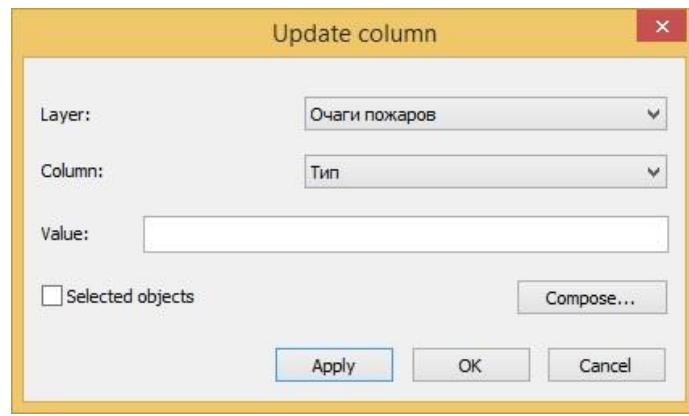


Fig. 369. «Update column» dialog box

Select the necessary column in the dialog box, then press «Compose» button.

Select the proper function from the drop-down list of the «Value» dialog box, or make an own calculation (Fig. 370).

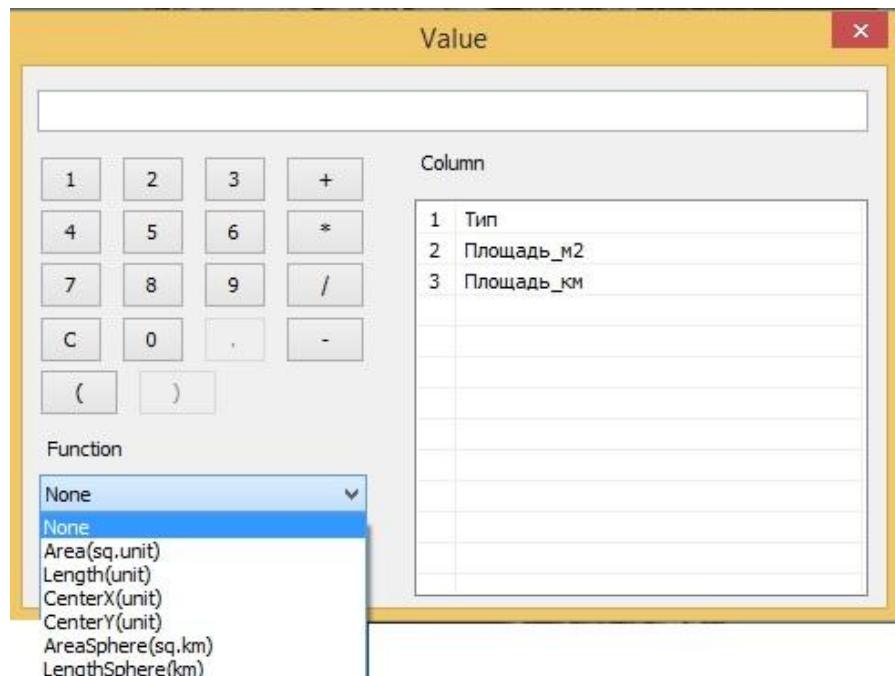


Fig. 370. «Value» dialog box

Press «OK» button to apply changes.

5.7.1.4 Statistical information

To view the statistical information about vector objects, select «Vector – «Table» – «Statistics column» menu item or press «Statistics column» on the «Attributes of vector objects» panel. «Calculate column statistics» dialog box will open (Fig. 371). Select the

necessary vector layer and column from drop-down list, and the statistical information such as the number of the objects, minimum, maximum and average values, range, sum, standard deviation and dispersion will be displayed..

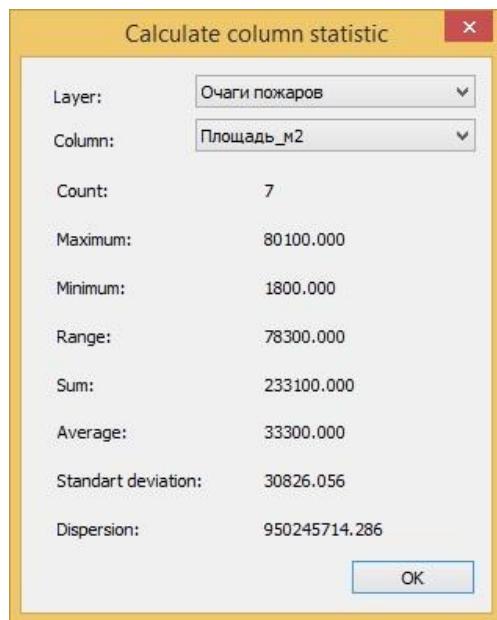


Fig. 371. «Calculate column statistics» dialog box

Note: «Statistics column» tool works with the numeric information only.

5.7.1.5 CSV export

User can save attribute information in *.csv file format. Select «Vector» – «Table» – «Export to CSV» menu item or press «Export to CSV» button on the «Attributes of vector objects» panel. Set the path to the destination folder and the name of the file in the opened dialog box (Fig. 372)

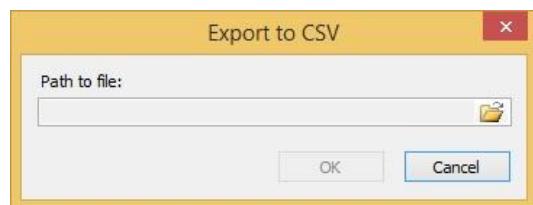


Fig. 372. «Export to CSV» dialog box

5.7.2. SQL-query

To select objects by their attribute values, select «Vector» – «Requests» – «Select by attributes value» menu item or press  «Search in the table using sql query» button on the «Attributes of vector objects» panel.

In the «Selection by attributes value» dialog box (Fig. 373) select the necessary vector layer. Perform a double click on the desired parameter in «Attributes» field. Insert the search criteria in «WHERE» field.

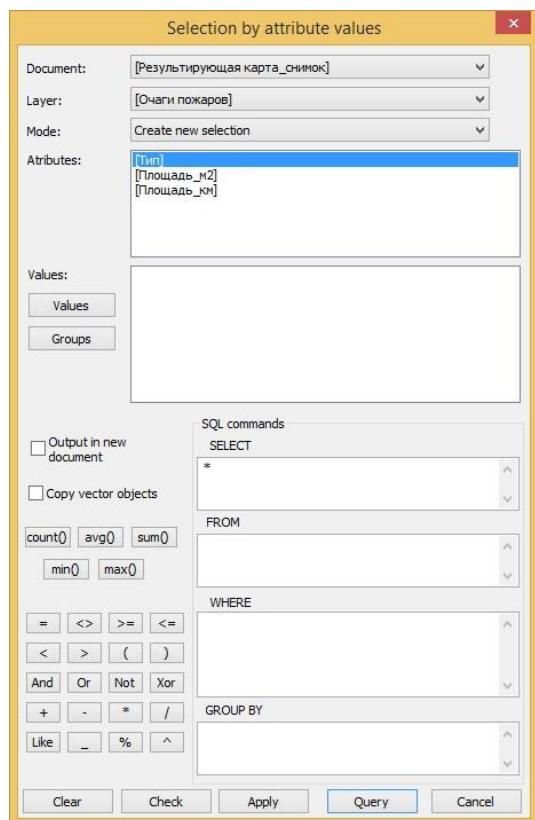


Fig. 373. «Selection by attributes value» dialog box

Press «Check» button to make sure the query is entered correctly.



Fig. 374. The result of query check

To select vector objects, press «*Apply*» or «*Query*» button. The notification with the amount of matching objects will appear (Fig. 375).

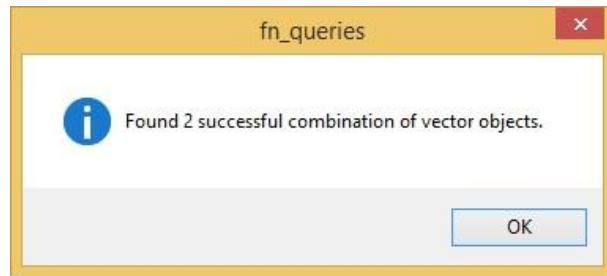


Fig. 375. *Query result notification*

The rows of the selected objects will be colored in grey in the attribute table (Fig. 376).

ID	Тип	Площадь_м2	Площадь_км
0	Очаги пожаров	80100.000000	0.080000
1	Очаги пожаров	72000.000000	0.070000
2	Очаги пожаров	39600.000000	0.040000
3	Очаги пожаров	35100.000000	0.040000
8	Очаги пожаров	2700.000000	0.000000
9	Очаги пожаров	1800.000000	0.000000
10	Очаги пожаров	1800.000000	0.000000

Fig. 376. *Attribute table*

All available functions are used to create more complex queries (Fig. 377).

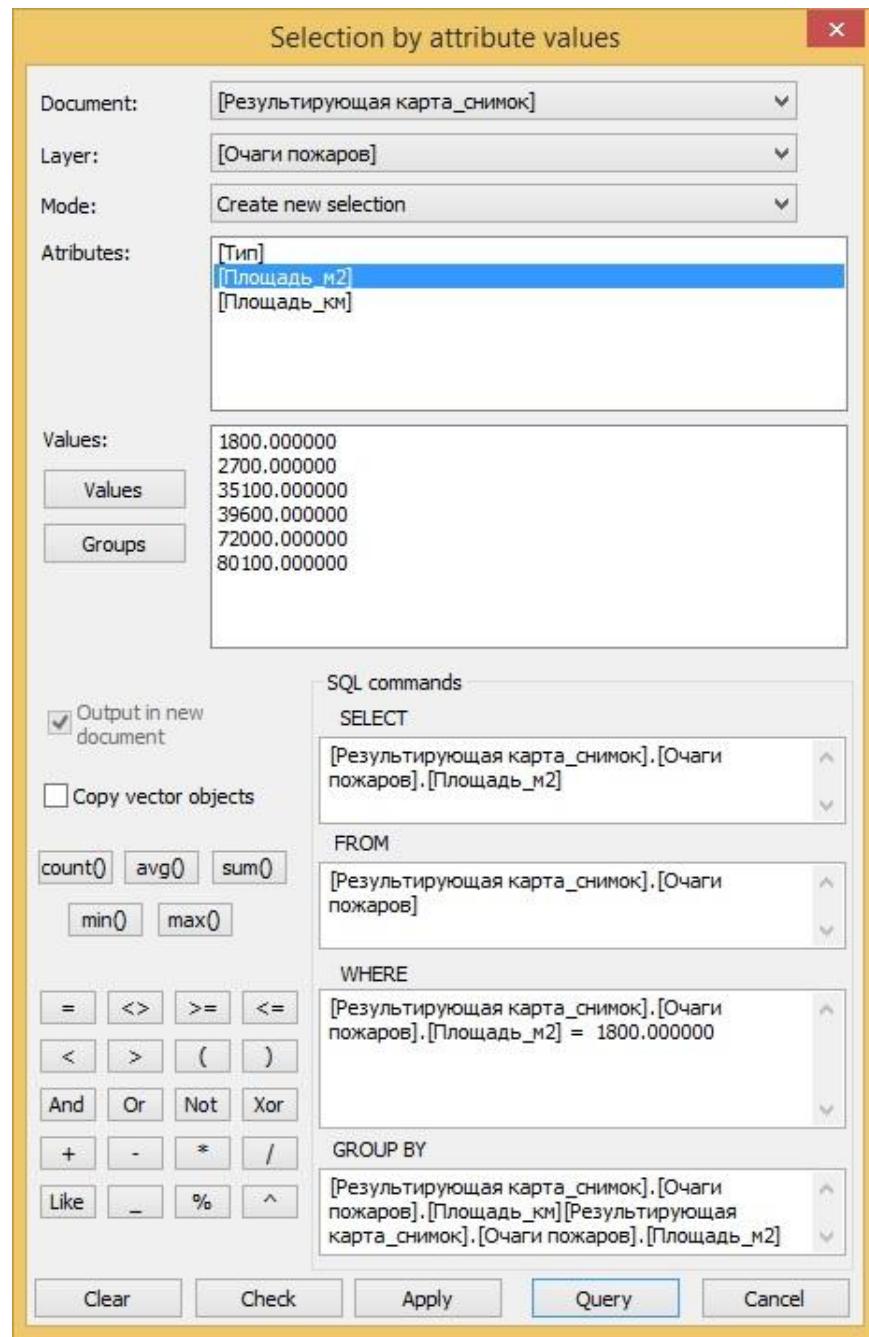


Fig. 377. Example of SQL request

5.7.3. Classifier

To create a vector objects classifier, select «Vector – Classifier» menu item; «Classifier» panel will open.

Press «Create section» button to create a new section (Fig. 378).

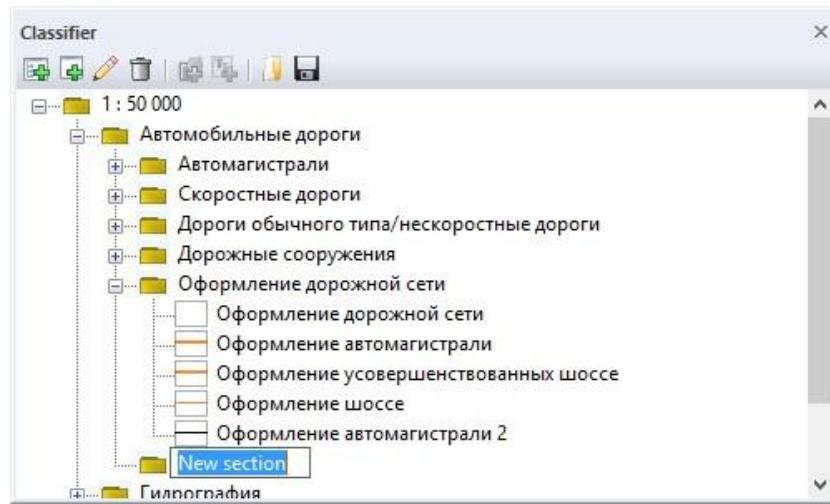


Fig. 378. «Classifier» panel, creating a new section

To edit the section, press «Edit» button (Fig. 379).

In the opened dialog box user can create the attribute table columns, which will be inherited by all the nested structures.

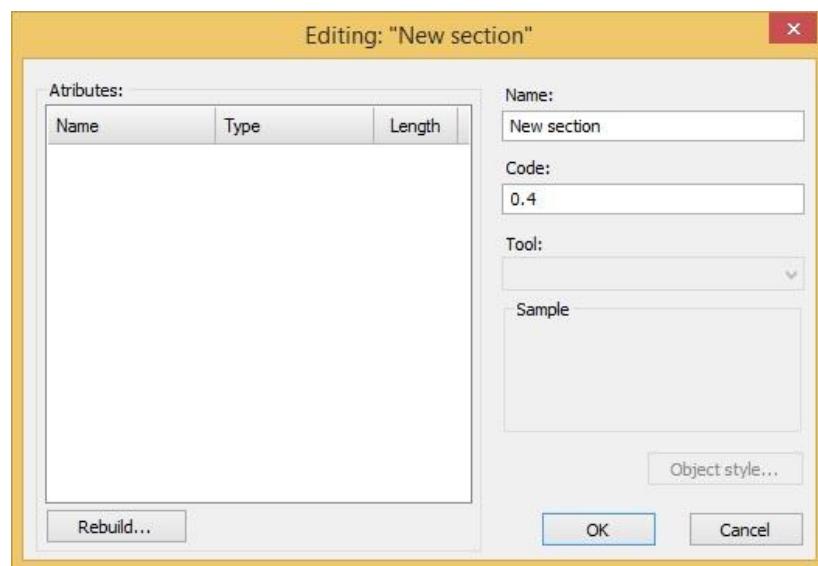


Fig. 379. «Editing» dialog box

Press «Create object» button to create a new object (Fig. 380).

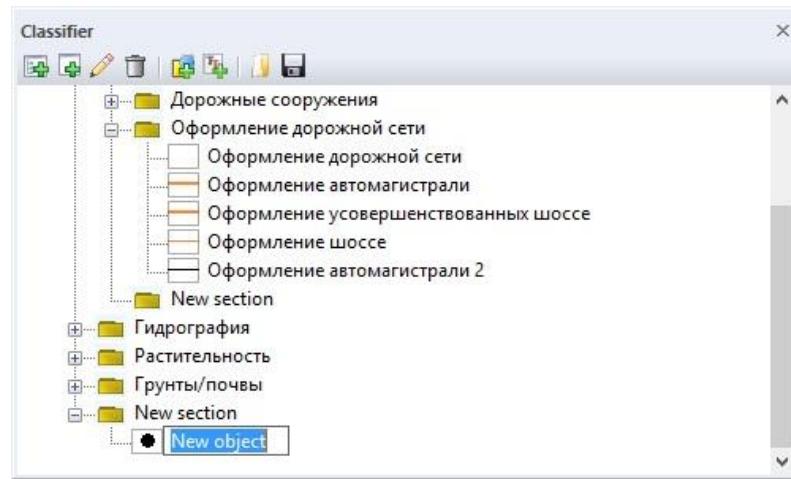


Fig. 380. «Classifier» panel, creating a new object

To edit the object, press «Edit» button or double click on the object (Fig. 381).

In the opened dialog box all the features of the parent object will be colored in grey.

User can change the name, code, vector style and the vector tool of the object in corresponding fields.

Press «OK» button to apply the changes.

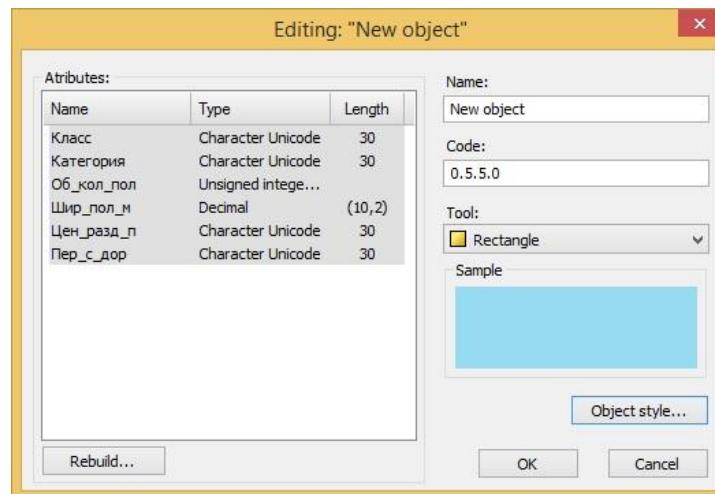


Fig. 381. «Editing» dialog box

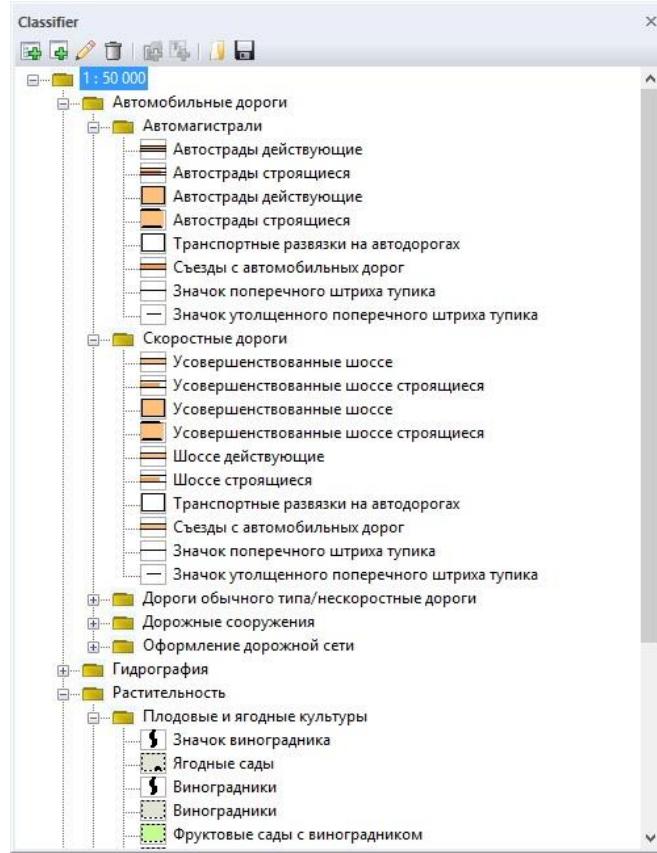


Fig. 382. «Classifier» panel

5.7.4. Edit vector objects

To edit vector objects, select «Vector» – «Edit» menu item (Fig. 383).

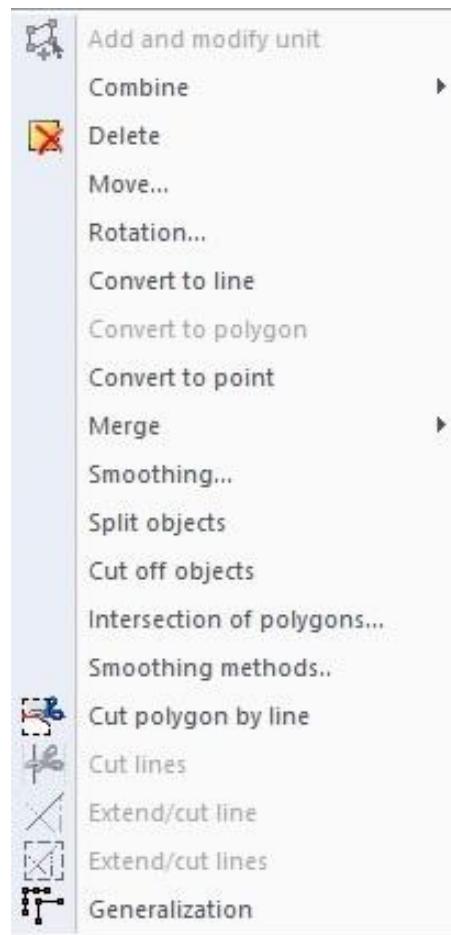


Fig. 383. «Edit» menu item

5.7.4.1 Add and modify the nodes

Select «Add and modify units» item to edit the nodes of the vector object (Fig. 384).

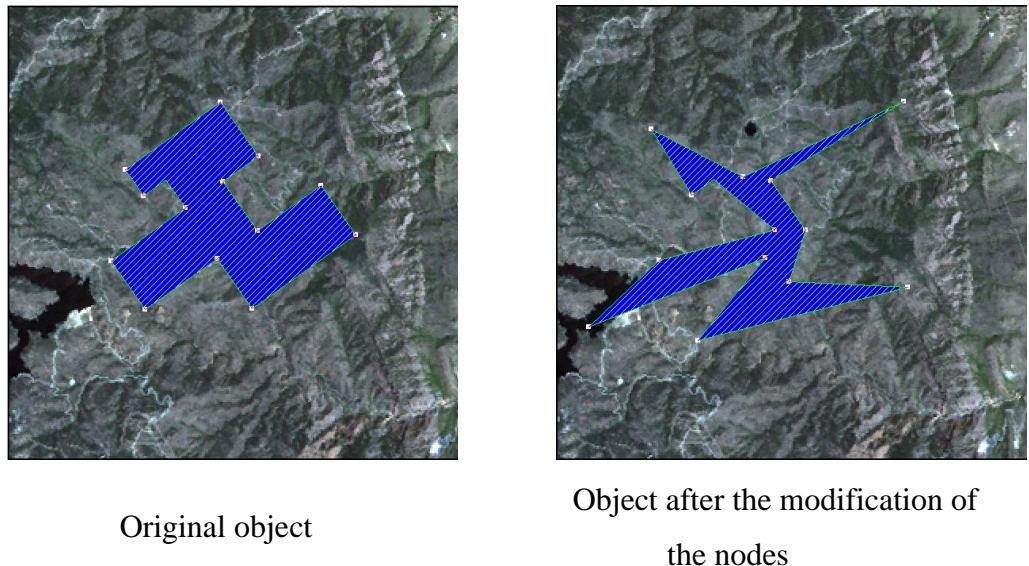


Fig. 384. Editing the nodes of the vector object

5.7.4.2 Combine

«Combine» menu item contains the set of tools to perform the logical operations between vector objects, such as addition, subtraction, intersection and exclusion (Fig. 385).

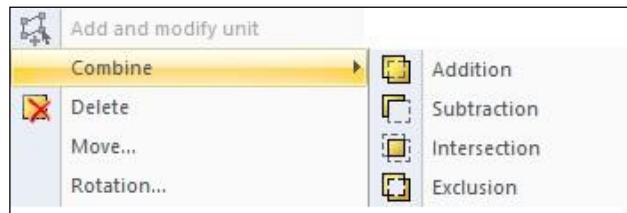
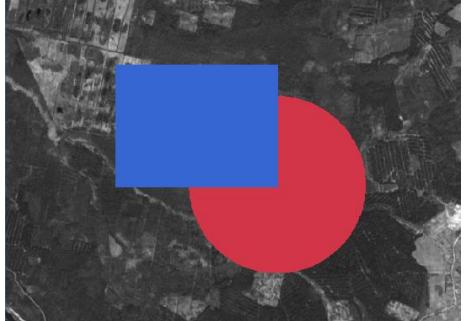


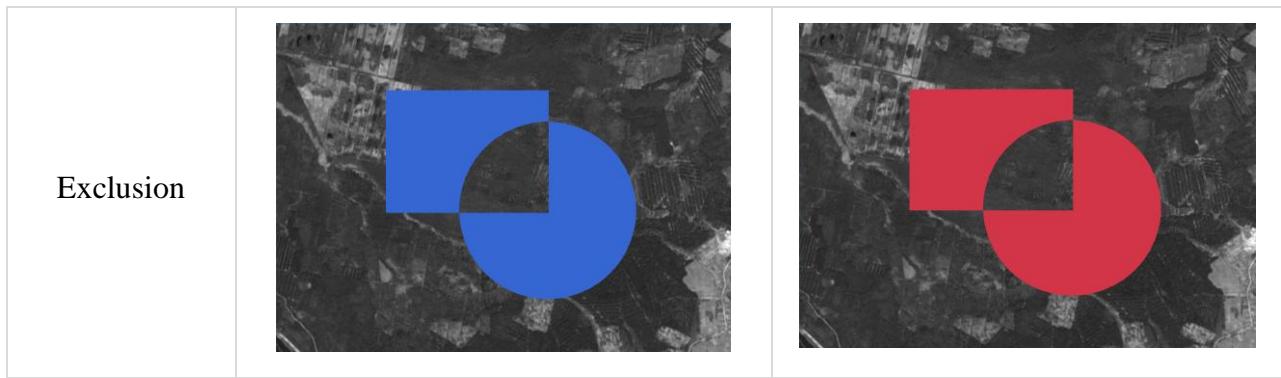
Fig. 385. «Combine» menu item

Logical operations are applicable to the vector objects of the same layer. Perform a left mouse button click on each object, and then perform a right mouse button click to carry out the operation.

Table 15 shows the examples of the logical operation between objects.

Table. 15. Combine functions

Original vector objects		
Operation name	The results if the operation	
	First selected a rectangle, then a circle	First selected a circle, then a rectangle
Addition		
Subtraction		
Intersection		



5.7.4.3 Delete

«Delete» menu item is used to delete a selected vector object.

5.7.4.4 Move

«Move...» menu item is designed to change the location of the vector object. User can adjust the parameters of the movement in the «Offset» dialog box. (Fig. 386).

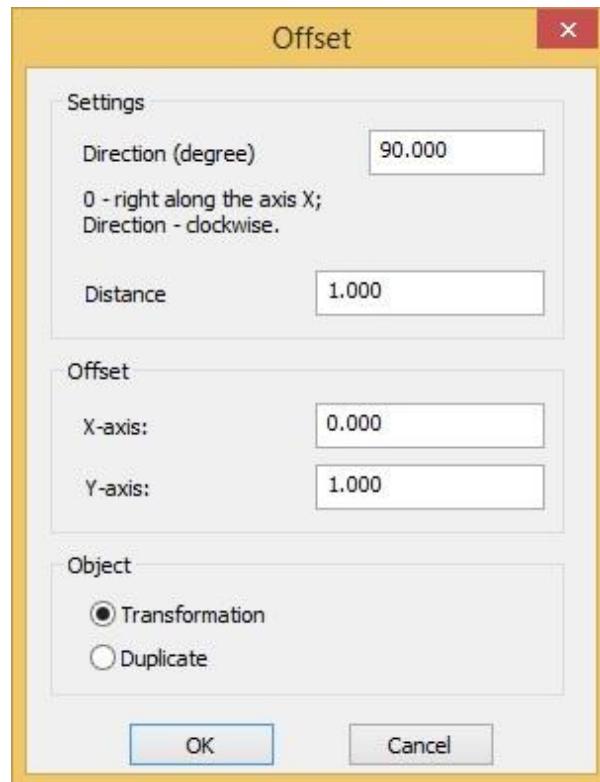


Fig. 386. «Offset» dialog box

5.7.4.5 Rotation

«Rotation...» menu item is designed to perform a rotation of vector object by an arbitrary angle. User can adjust the parameters of the rotation in the «Rotation» dialog box (Fig. 387).

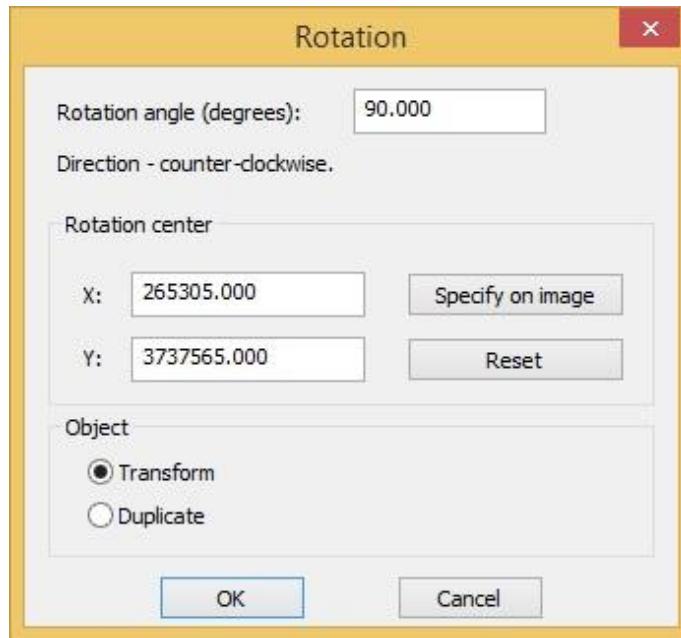


Fig. 387. «*Rotation*» dialog box

5.7.4.6 Convert to line

«*Convert to line*» menu item is designed to convert the selected polygonal vector objects into line.

5.7.4.7 Convert to polygon

«*Convert to polygon*» menu item is designed to convert the selected linear vector objects into polygons.

5.7.4.8 Convert to point

«*Convert to point*» menu item is designed to convert the selected linear or polygonal vector objects into points.

5.7.4.9 Convert to selection

«*Convert to selection*» menu item is designed to convert the selected polygonal vector objects into the selection. A new selection layer will be created

5.7.4.10 Merge

«*Merge*» menu item is designed to merge the selected vector objects of the same type and same layer into one object.

5.7.4.11 Smoothing

«Smoothing» menu item is designed to perform smoothing of the edges of vector objects. (Fig. 388).

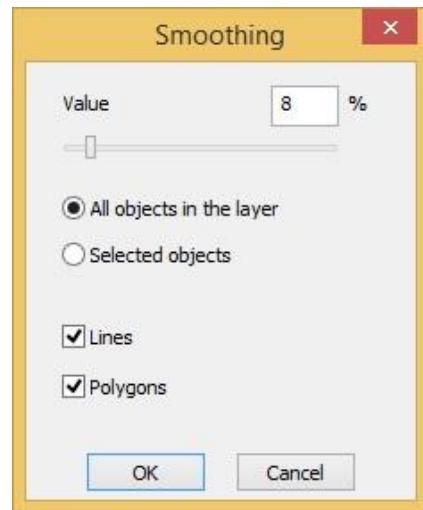


Fig. 388. «Smoothing» dialog box

«Value» parameter defines the degree of smoothing.

Smoothing can be applied to the selected objects or to all objects of the layer.

Put a tick next to the type of the vector object to smoothen.

To perform a smoothing of vector objects during the vectorization process, use the parameters listed in the «Settings» panel (Fig. 389).

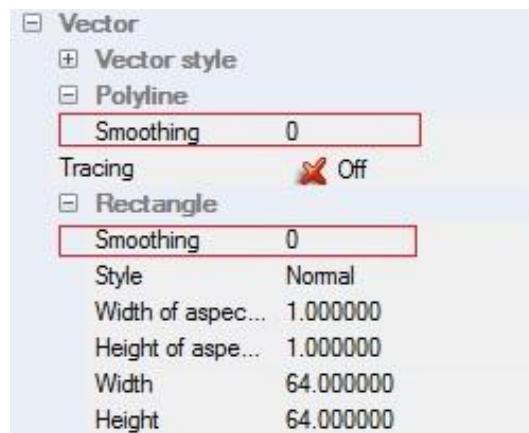


Fig. 389. Settings panel

5.7.4.12 Split layer by object type

If vector layer contains different types of vector objects (polygons, lines, points), it can be split into separate layers for each type of vector objects. Select «Vector» - «Split layer by object type» menu item to split the vector layer.

5.7.4.13 Split objects

Select «*Vector*» – «*Edit*» – «*Split objects*» menu item to split the complex polygon into separate polygons (Fig. 390).

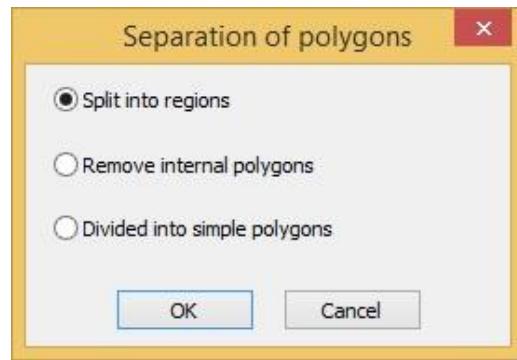


Fig. 390. «*Split objects*» dialog box

5.7.4.14 Cut off objects

Select «*Vector*» – «*Edit*» – «*Split objects*» menu item to delete vector objects outside of the selection borders.

5.7.4.15 Intersection of polygons

Select «*Vector*» – «*Edit*» – «*Intersection of polygons*» menu item to create a vector layer of the intersecting areas of two polygonal layers (Fig. 391).

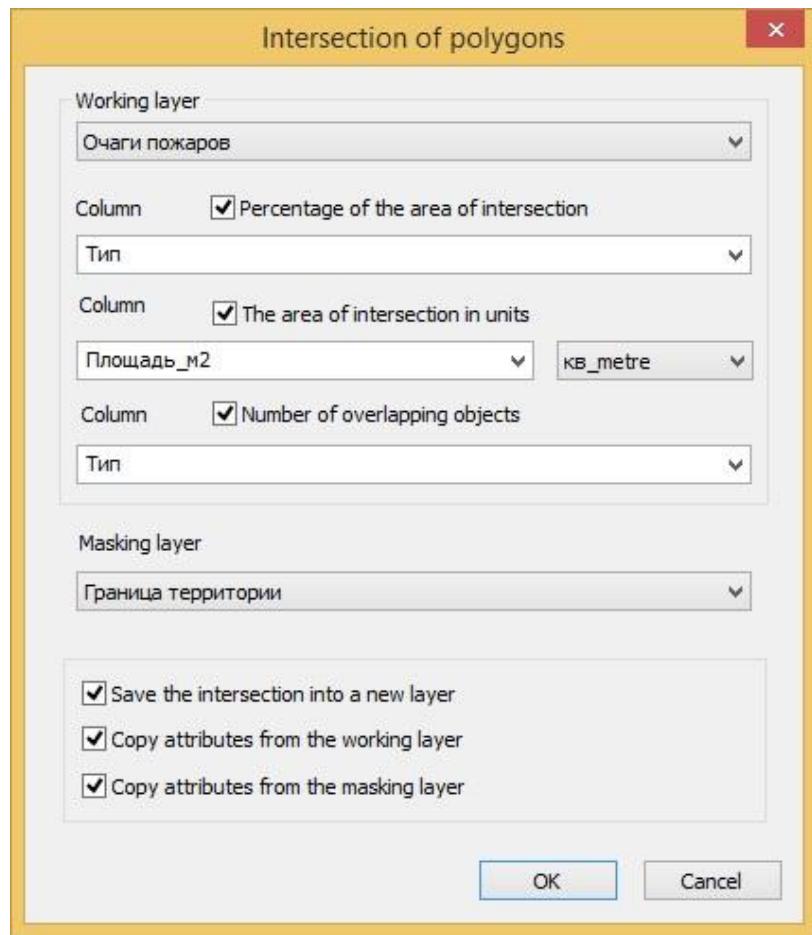


Fig. 391. «Intersection of polygons» menu item

5.7.4.16 Smoothing methods

To achieve optimal smoothing results it is possible to use various combinations of smoothing methods.

User can choose between following algorithms:

Moving window – user can set the size of the window and transformation method.

B-spline, Bezier curves – user can set the degree and step of smoothing.

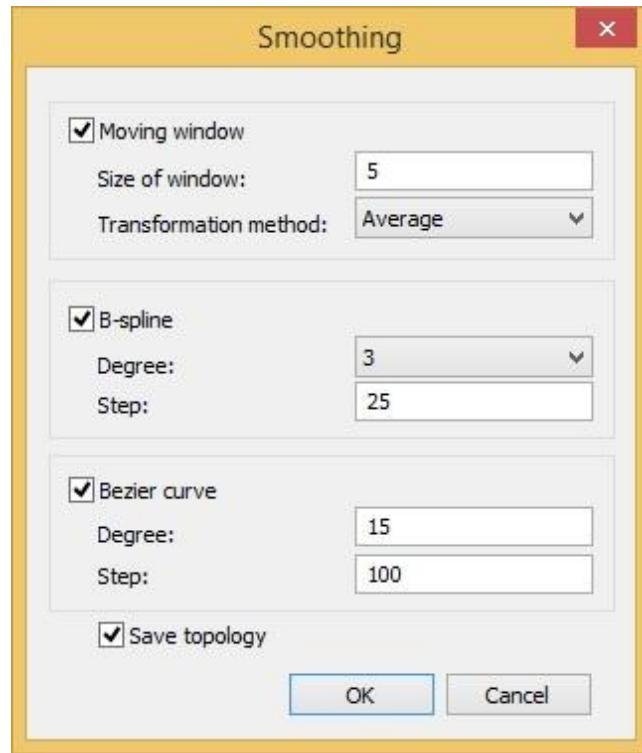


Fig. 392. «*Smoothing*» dialog box

5.7.4.17 Cut polygon by lines

Select «*Vector*» –«*Edit*» – «*Cut polygon by lines*» menu item to split a vector polygon with line. Perform a left mouse button click on polygon, then on the line, and then perform a right mouse button click to complete the action.

5.7.4.18 Cut lines

Select «*Vector*» –«*Edit*» – «*Cut lines*» menu item to split a vector line with another vector line. Perform a left mouse button click on the first line, then on the second line, and then perform a right mouse button click to complete the action.

5.7.4.19 Extend / cut line

Select «*Vector*» –«*Edit*» – «*Extend / cut line*» menu item to extend or cut vector line. Perform a left mouse button click on the line that should be extended or cut, then on the line to which line should be extended or with which it should be cut, and then perform a right mouse button click to complete the action.

5.7.4.20 Extend / cut lines

Select «*Vector*» –«*Edit*» – «*Extend / cut lines*» menu item to extend or cut vector lines. Set the necessary parameters in the opened dialog box and press «*OK*» button to complete the operation.

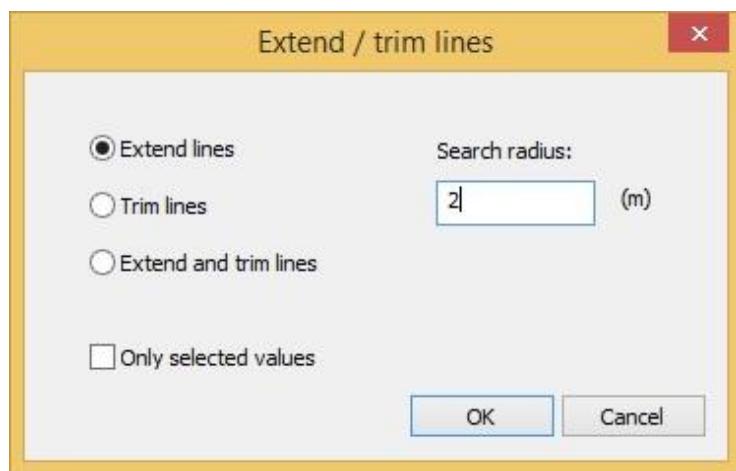


Fig. 393. –«*Extend / cut lines*» dialog box

5.7.4.21 Generalization

Select «*Vector*» –«*Edit*» – «*Generalization*» to open «*Generalization of points*» dialog box (Fig. 387). Generalization of points can be performed only when the vector objects are selected.

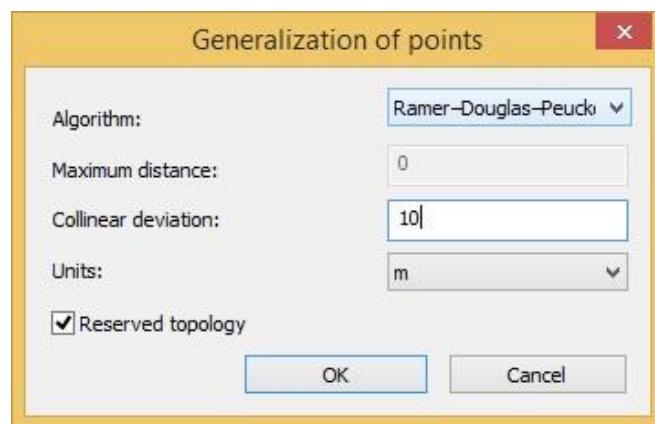


Fig. 394. «*Generalization of points*» dialog box

Set the necessary parameters in the dialog box and press «*OK*» button to perform generalization.

Press «*Cancel*» to cancel the operation.

5.7.5. Create vector objects

5.7.5.1 Manual creation of vector objects

To create a vector object, select «*Vector – New object*» menu section, or use the «*Vector tools*» tool bar (Fig. 395).

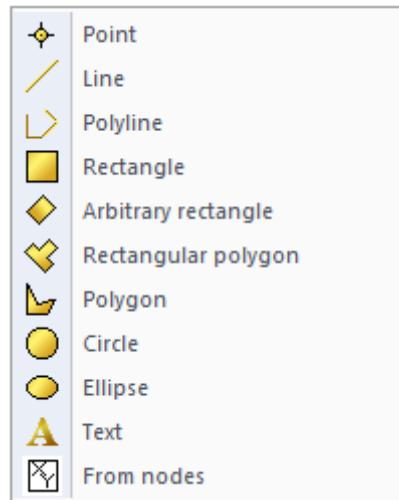


Fig. 395. «*New object*» menu section

«*New object*» menu section contains following tools:

«*Point*» – create vector point;

«*Line*» – create vector line;

«*Polyline*» – create vector polyline;

«*Rectangle*» – create vector rectangle;

«*Arbitrary rectangle*» – create vector rectangle at arbitrary angle;

«*Rectangular polygon*» – create vector rectangular polygon;

«*Polygon*» – create vector polygon;

«*Circle*» – create vector circle;

«*Ellipse*» – create vector ellipse;

«*Text*» – create vector text;

«*From nodes*» – create vector objects from combination of angle coordinates.

5.7.5.2 Creating vector object by its coordinates

To create vector objects by their coordinates, select «*Vector* – «*New object*» – «*From nodes*» menu item or use the or use the «*Vector tools*» tool bar (Fig. 396).



Fig. 396. «Vectorization» tool bar

«Create object by coordinates» dialog box will open (Fig. 397).

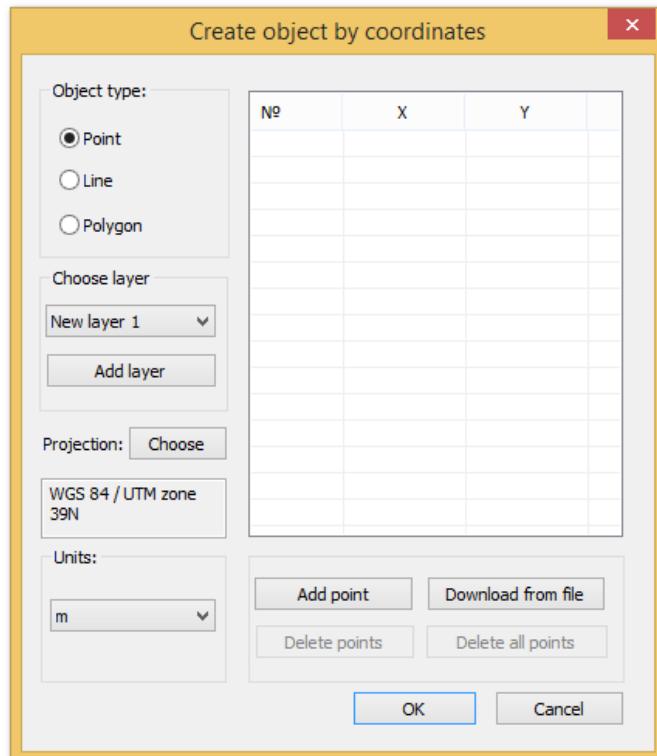


Fig. 397. «Create object by coordinates» dialog box

Select the type of object you want to create, then select the layer where the new object will be placed or create a new layer (Fig. 398).

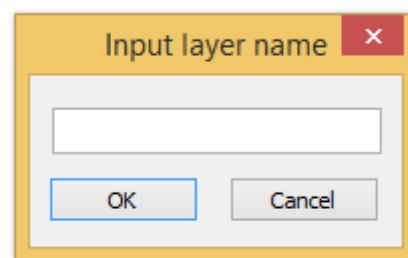


Fig. 398. «Layer name» dialog box

Select the map projection of the layer. The projection of the document will be selected by default.

Press the «*Choose projection*» button to open the list of projections (Fig. 399).

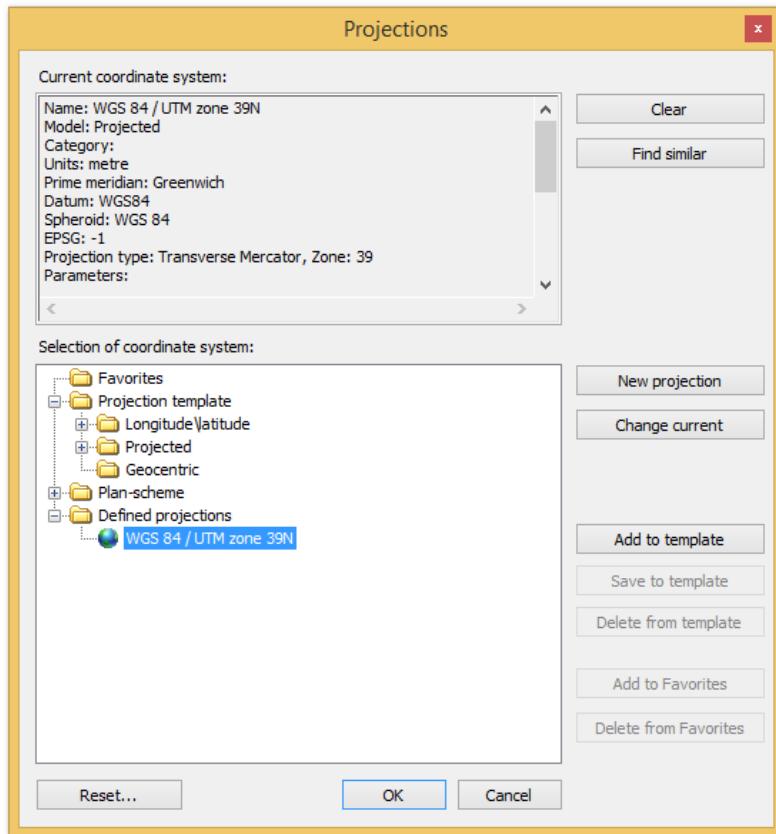


Fig. 399. «*Projections*» dialog box

Select the units of measurement. The units of the document will be selected by default.

Press «*Add point*» button to enter the coordinates of the point. Default value is (0, 0).

Press «*Download from file*» button to open the dialog box (Fig. 400).

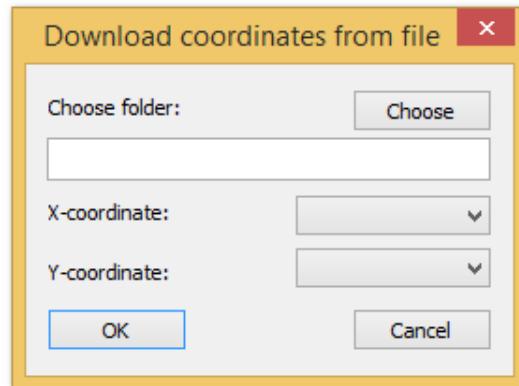


Fig. 400. «*Download coordinates from file*» dialog box

To download coordinates from file, set the path to the directory with file and press «OK» button.

5.7.6. Styles of vector objects

5.7.6.1 Line

Select «Vector» – «Styles» – «Line» menu item to adjust the style of vector line. «Line style selection» dialog box will open (Fig.401).

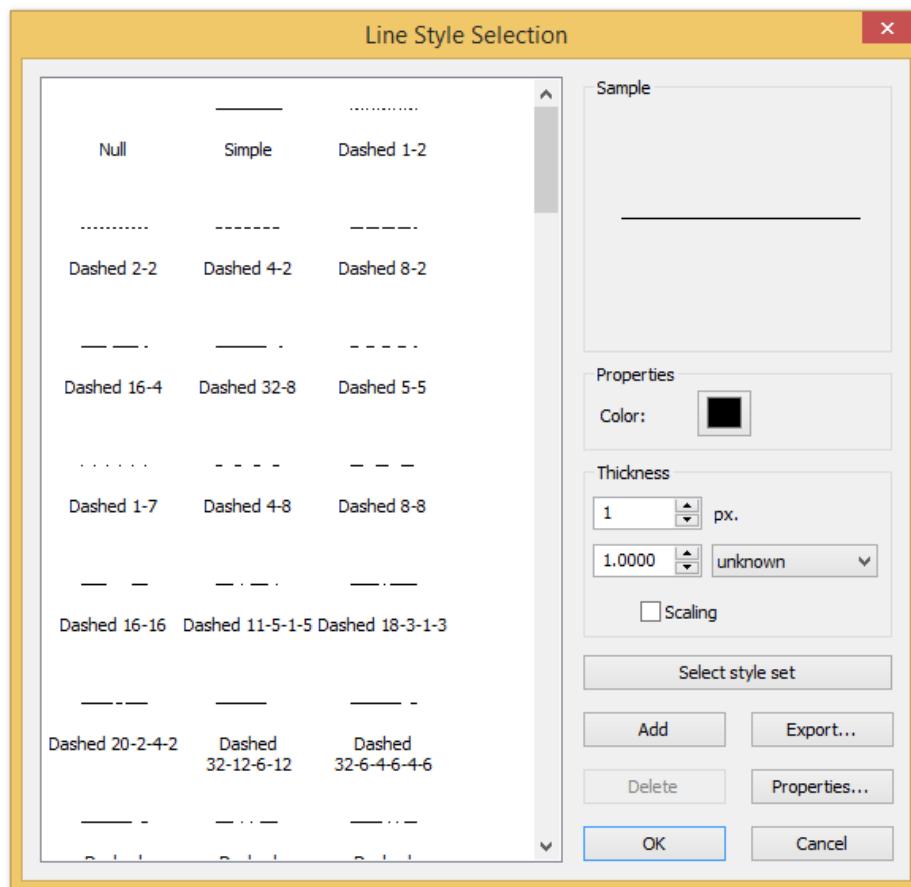


Fig. 401. «Line style selection» dialog box will open

In «Sample» section displays the line style preview.

In «Properties» section user can set the main line properties.

«Color» parameter defines the color of the line.

In «Thickness» section user can adjust the thickness parameter in pixels or geographic measurements units.

When the «Scaling» parameter is active, image georeferencing is performed.

Press «Select layer set» button to select one of the existing style or create a new one (Fig. 402).

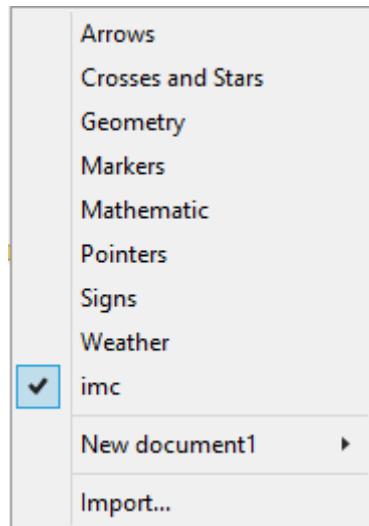


Fig. 402. *Style set*

Press «Add» to open a «New line style» dialog box (Fig. 403).

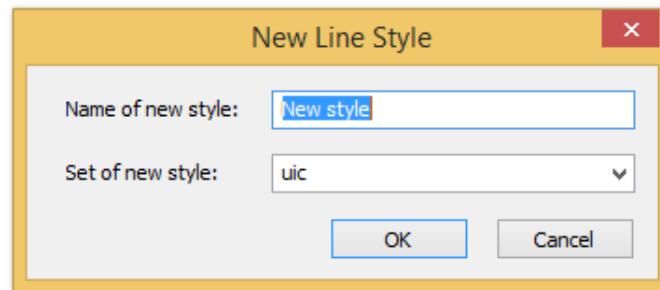


Fig. 403. «*New line style*» dialog box

In «*Name of the new style*» field enter the name of the style.

In «*Set of the new style*» filed select the set from the list of the existing sets.

Press «*Export...*» button to save the style of the line in the*.fls file format (Fig. 404).

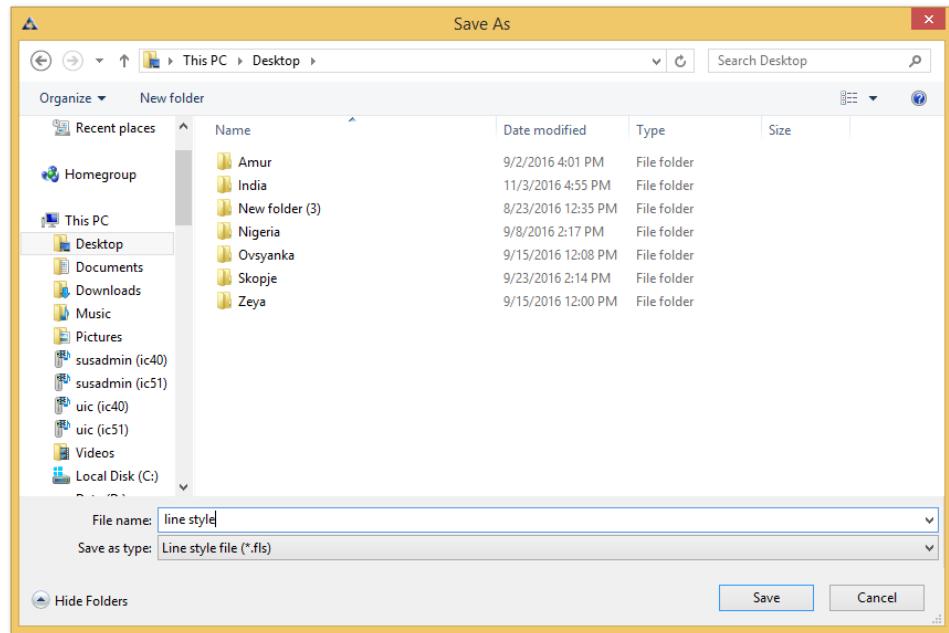


Fig. 404. «Save as» dialog box

Press «Delete» button to remove the selected style from the set.

Press «Properties...» button to open «Line Style Properties» dialog box (Fig. 405).

Press «OK» to apply changes to the line style.

Press «Cancel» button to close the dialog box without applying the changes.

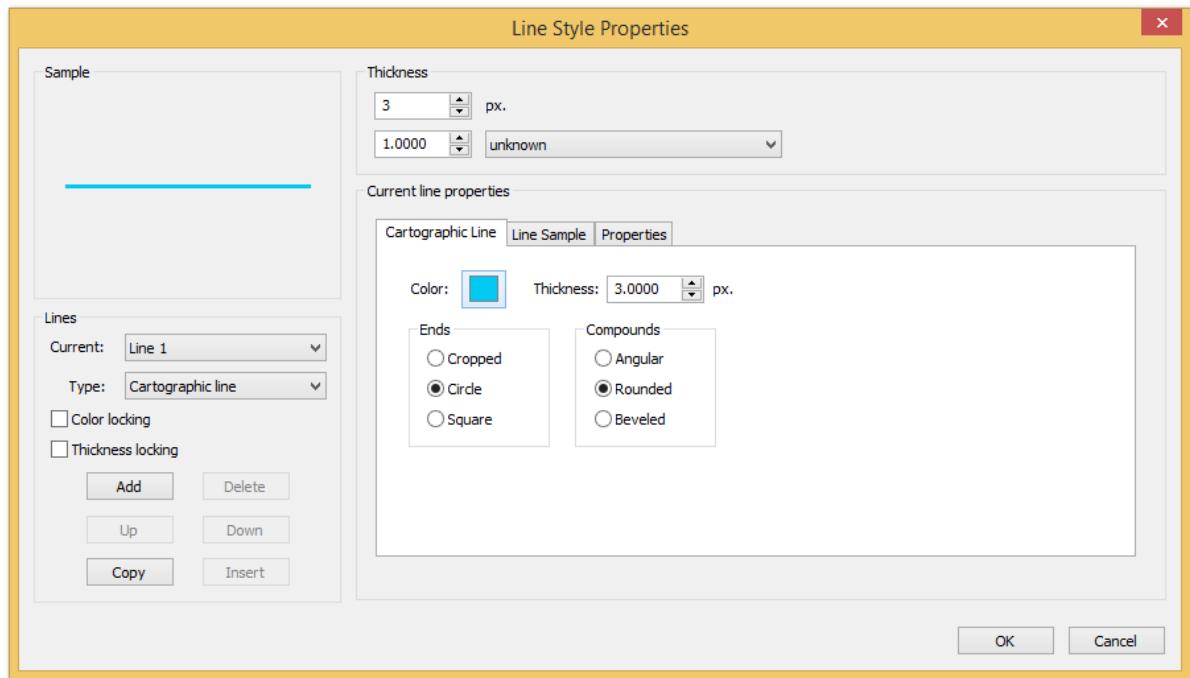


Fig. 405. «Line Style Properties» dialog box

«Sample» section displays the style of the line.

«Lines» section contains line style parameters.

Select the vector line layer to edit from «*Current*» drop-down list.

Select one of the following types of the line from «*Type*» drop-down list: line, cartographic line, dashed line, marker line.

When the «*Color locking*» parameter is active, the color of the vector line will not change when the adjustments are made in the «*Line style selection*» dialog box.

When the «*Thickness locking*» parameter is active, the width of the vector line will not change when the adjustments are made in the «*Line style selection*» dialog box.

Press «*Add*» button to create a new vector line layer, it will appear in the «*Current*» drop-down list.

Press «*Delete*» button to delete current vector line layer.

Use «*Up*» / «*Down*» buttons to change the position of the current vector line layer in the list.

Press «*Copy*» button to copy the current line layer to the clipboard.

Press «*Insert*» button to paste the vector line layer from the clipboard.

In «*Thickness*» section user can set the width of the vector line in pixels or geographic measurement units.

«*Current line properties*» section displays the main properties of the current line. The set of properties depends on the type of the line.

5.7.6.2 Marker

Select «*Vector*» – «*Style*» – «*Marker style*» to adjust the style of the vector points. «*Marker style selection*» dialog box will open (Fig.).

«*Sample*» section displays the marker style preview.

«*Properties*» section defines the main parameters of the vector point.

«*Color*» parameter defines the color of the vector point.

«*Rotation*» parameter allows user to adjust the rotation of the vector point (counterclockwise).

«*Size*» parameter defines the size of the marker in points (pt) or geographic measurements units.

When the «*Scaling*» parameter is active, image georeferencing is performed

Press «*Select layer set*» button to select one of the existing style or create a new one (Fig. 406).

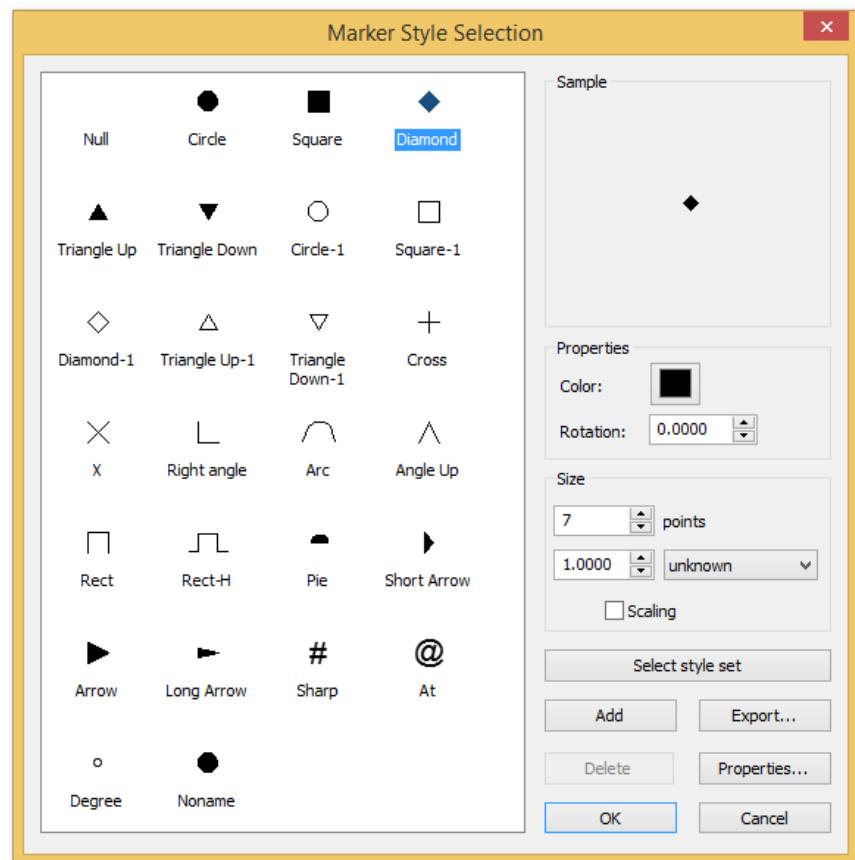


Fig. 406. «Marker style selection» dialog box

Press «Add» to open a «New marker style» dialog box (Fig. 407).

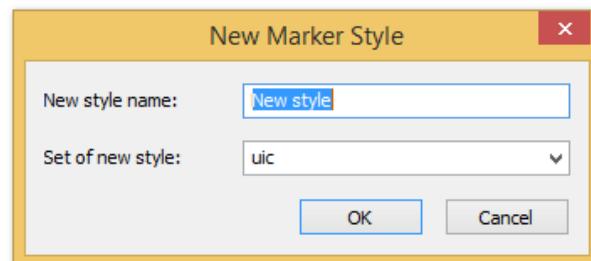


Fig. 407. «New marker style» dialog box

In «New style name» field enter the name of the style.

In «Set of the new style» filed select the set from the list of the existing sets.

Press «Export...» button to save the style of the marker in the*.fms file format.

Press «Delete» button to remove the selected style from the set.

Press «Properties...» button to open «Marker Style Properties» dialog box (Fig. 408).

Press «OK» to apply changes to the marker style.

Press «Cancel» button to close the dialog box without applying the changes.

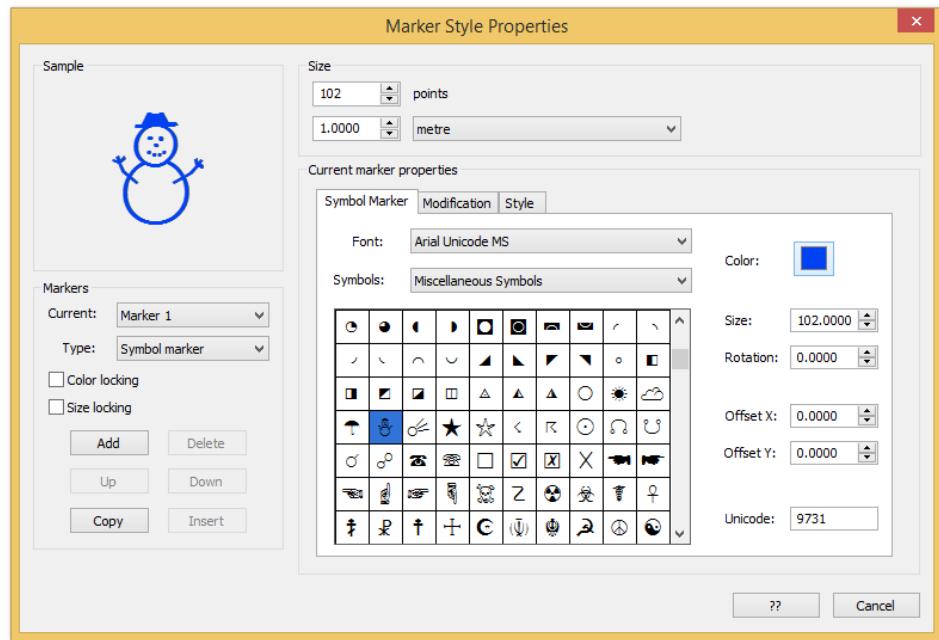


Fig. 408. «Marker style properties» dialog box

«Sample» section displays the style of the vector point.

«Markers» section contains marker style parameters.

Select the vector point layer to edit from «Current» drop-down list.

Select one of the following types of the vector point from «Type» drop-down list: marker, symbol marker, arrow marker.

When the «Color locking» parameter is active, the color of the vector point will not change when the adjustments are made in the «Marker style selection» dialog box.

When the «Size locking» parameter is active, the size of the vector point will not change when the adjustments are made in the «Marker style selection» dialog box.

Press «Add» button to create a new vector point layer, it will appear in the «Current» drop-down list.

Press «Delete» button to delete current vector point layer.

Use «Up» / «Down» buttons to change the position of the current vector point layer in the list.

Press «Copy» button to copy the current point layer to the clipboard.

Press «Insert» button to paste the vector point layer from the clipboard.

In «Size» section user can set the size of the vector marker in points or geographic measurement units.

«Current marker properties» section displays the main properties of the current vector point. The set of properties depends on the type of the marker.

5.7.6.3 Polygon

Select «Vector» – «Style» – «Polygon style» to adjust the style of the vector polygon. «Polygon style selection» dialog box will open (Fig. 409).

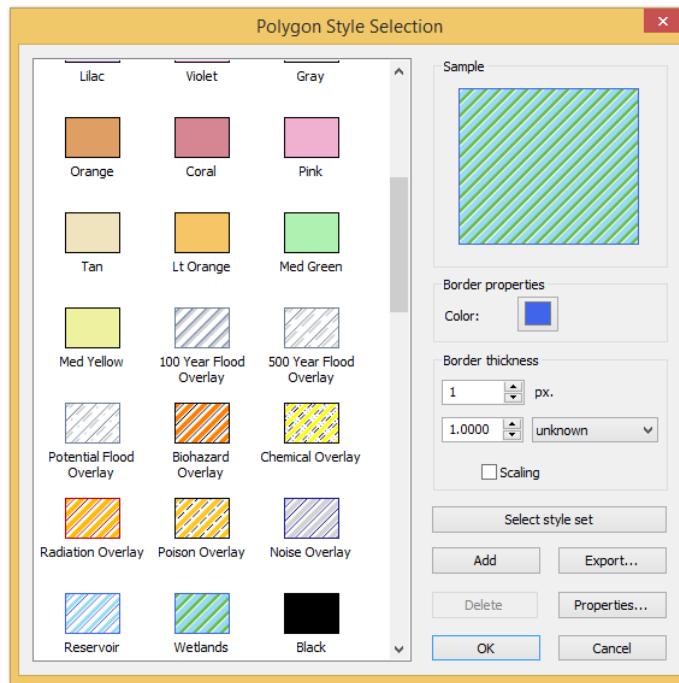


Fig. 409. «Polygon style selection» dialog box.

«Sample» section displays the polygon style preview.

«Border properties» section defines the main parameters of the border of vector polygon.

«Color» parameter defines the color of the border of vector polygon.

«Border thickness» parameter defines the width of the border of polygon in pixels or geographic measurements units.

When the «Scaling» parameter is active, image georeferencing is performed.

Press «Select layer set» button to select one of the existing style or create a new one (Fig. 409).

Press «Add» to open a «New polygon style» dialog box (Fig. 410).

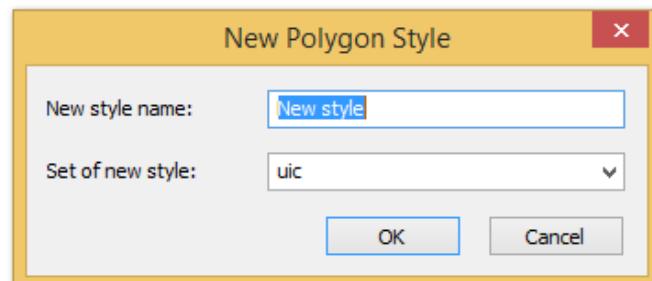


Fig. 410. «New polygon style» dialog box

In «*New style name*» field enter the name of the style.

In «*Set of the new style*» filed select the set from the list of the existing sets.

Press «*Export...*» button to save the style of the polygon in the*.fls file format.

Press «*Delete*» button to remove the selected style from the set.

Press «*Properties...*» button to open «*Polygon Style Properties*» dialog box (Fig. 411).

Press «*OK*» to apply changes to the polygon style.

Press «*Cancel*» button to close the dialog box without applying the changes.

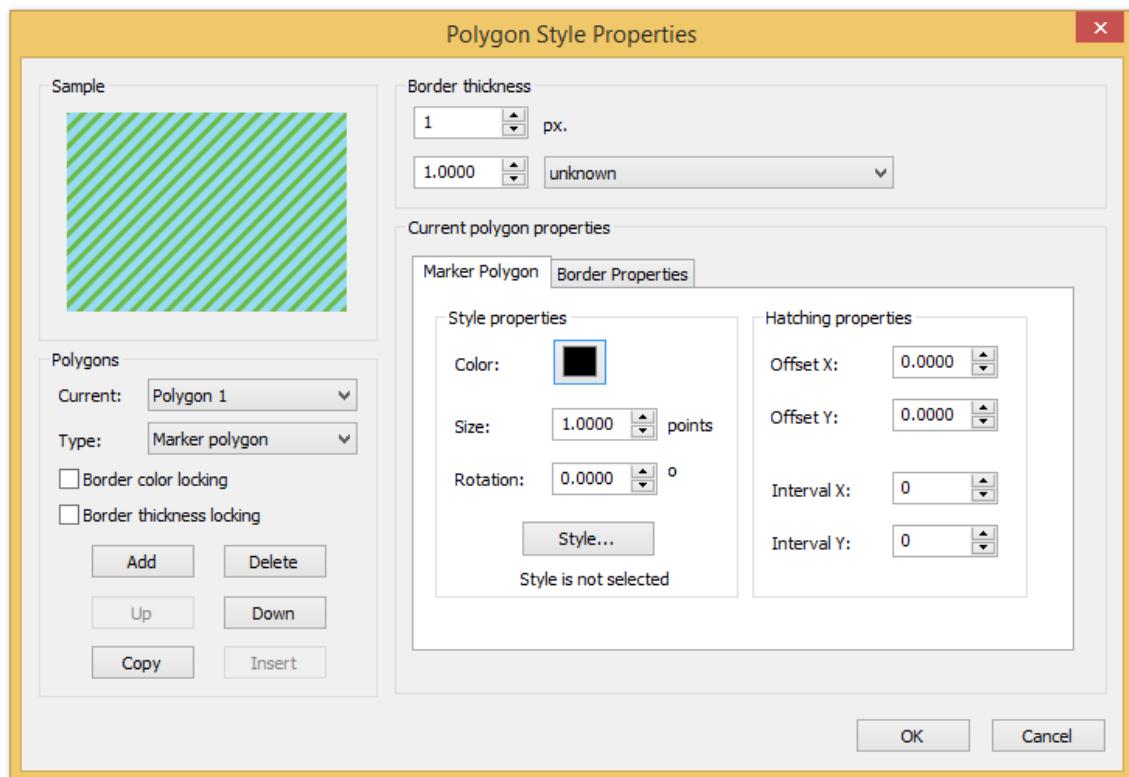


Fig. 411. «*Polygon style properties*» dialog box

«*Sample*» section displays the style of the vector polygon.

«*Polygons*» section contains polygon style parameters.

Select the vector polygon layer to edit from «*Current*» drop-down list.

Select one of the following types of the vector point from «*Type*» drop-down list:
polygon, linear polygon, marker polygon, gradient polygon, sketch polygon.

When the «*Border color locking*» parameter is active, the color of the border of polygon will not change when the adjustments are made in the «*Polygon style selection*» dialog box.

When the «*Border thickness locking*» parameter is active, the width of the border of polygon will not change when the adjustments are made in the «*Polygon style selection*» dialog box.

Press «Add» button to create a new vector polygon layer, it will appear in the «Current» drop-down list.

Press «Delete» button to delete current vector polygon layer.

Use «Up» / «Down» buttons to change the position of the current vector polygon layer in the list.

Press «Copy» button to copy the current polygon layer to the clipboard.

Press «Insert» button to paste the vector polygon layer from the clipboard.

In «Border thickness» section user can set the width of the border of polygon in pixels or geographic measurement units.

«Current polygon properties» section displays the main properties of the current vector polygon. The set of properties depends on the type of the polygon.

5.7.6.4 Text

Select «Vector» – «Style» – «Text style» to adjust the style of the vector text. «Text style selection» dialog box will open (Fig. 412).

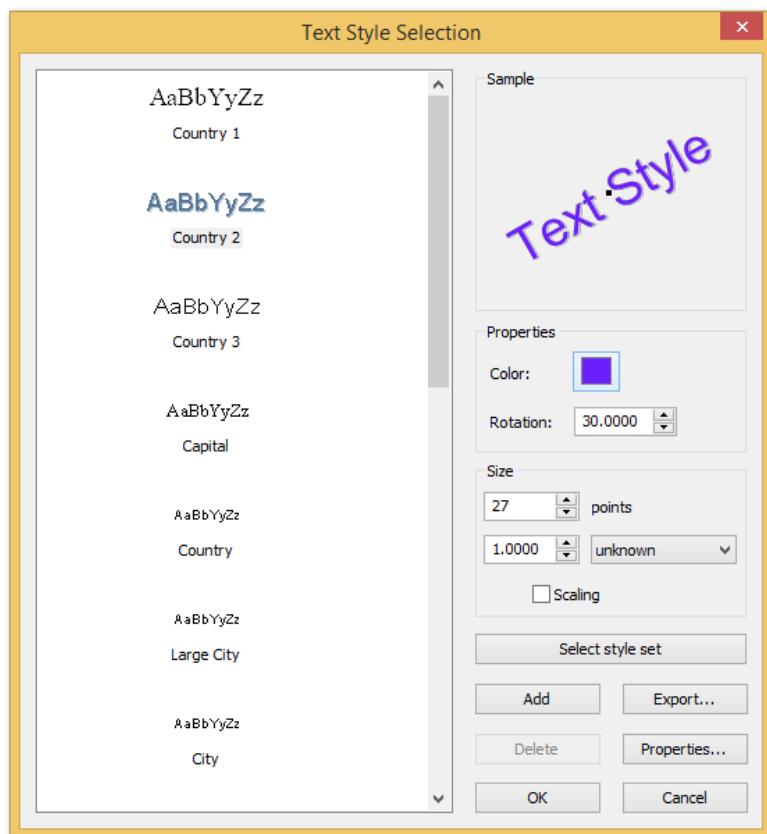


Fig. 412. «Text style selection» dialog box

«Sample» section displays text style preview.

«Properties» section defines the main parameters of the vector text.

«Color» parameter defines the color of the vector text.

«Rotation» parameter allows user to adjust the rotation of the vector text (counterclockwise).

«Size» parameter defines the size of the text in points (pt) or geographic measurements units.

When the «Scaling» parameter is active, image georeferencing is performed.

Press «Select layer set» button to select one of the existing style or create a new one (Fig. 412).

Press «Add» to open a «New text style» dialog box (Fig. 413).

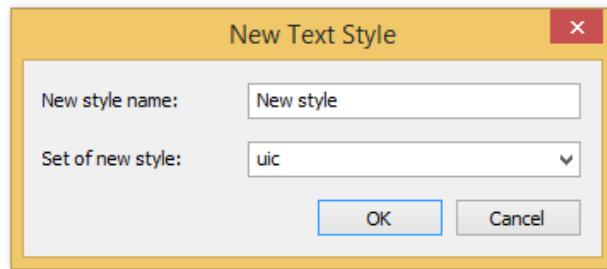


Fig. 413. «New text style» dialog box

In «New style name» field enter the name of the style.

In «Set of the new style» filed select the set from the list of the existing sets.

Press «Export...» button to save the style of the polygon in the*.fls file format.

Press «Delete» button to remove the selected style from the set.

Press «Properties...» button to open «Text Style Properties» dialog box (Fig. 414).

Press «OK» to apply changes to the text style.

Press «Cancel» button to close the dialog box without applying the changes.

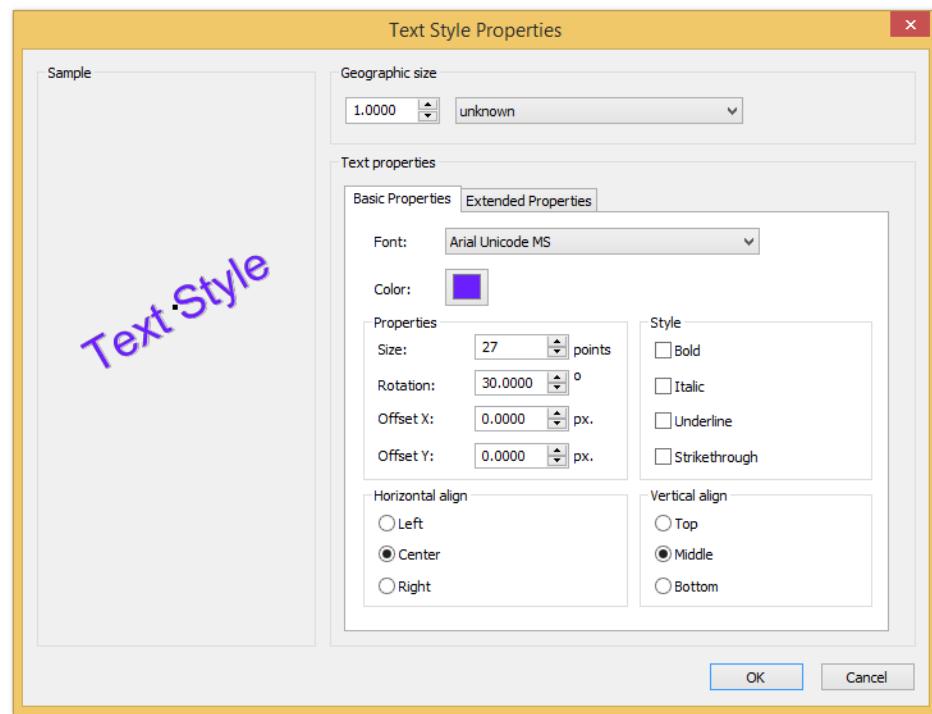


Fig. 414. «Text style properties» dialog box

«Sample» section displays the text style polygon.

«Geographic size» section defines the size of the text in geographic measurement units (in case if the layer is georeferenced).

«Text properties» section defines the text properties.

«Basic properties» tab contains the basic parameters of the text (Fig. 415).

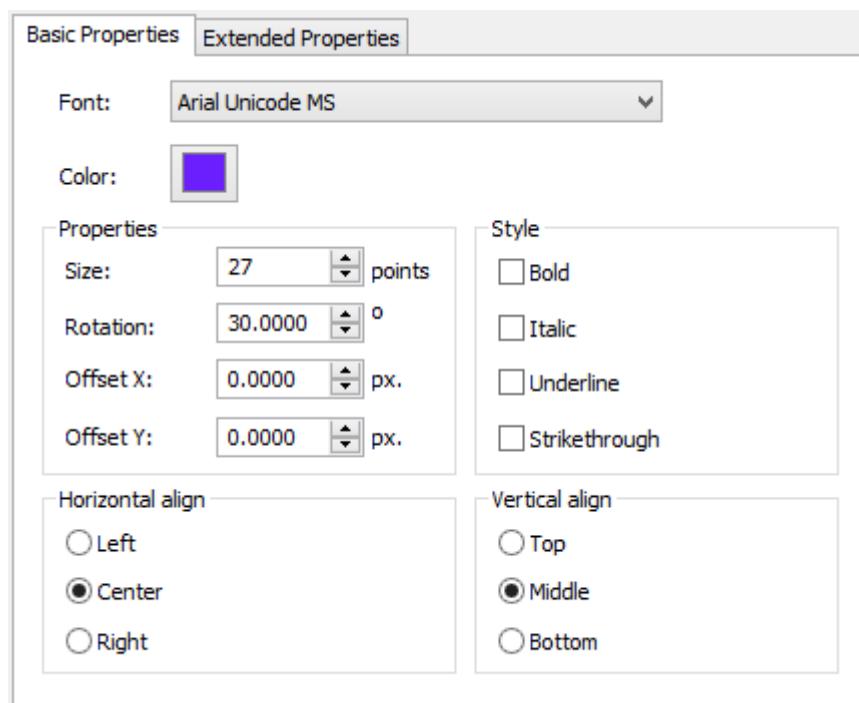


Fig. 415. «Basic properties» tab

Select the font of the text from «Font» drop-down list.

«Color» parameter defines the color of the text.

«Properties» section contains the set of main text parameters.

«Size» field defines the size of the text in pixels.

«Rotation» parameter allows user to adjust the rotation of the vector text (counterclockwise).

«Offset X» and «Offset Y» parameters define the offset of the text along the horizontal or vertical axis.

«Style» section defines the style of the font and contains following options: «Bold», «Italic», «Underline» or «Strikethrough».

«Horizontal align» and «Vertical align» sections define the text aligning and contain following options: left, center, right, top, middle bottom.

«Extended properties» tab contains the additional parameters of the text, such as background color and shadow (Fig. 416).

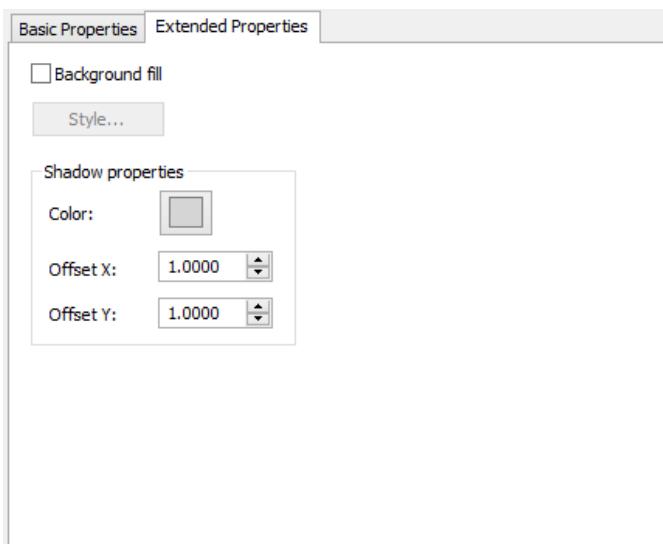


Fig. 416. «*Extended properties*» tab

To add a background color to the text, activate the «Background fill» parameter.

«Style...» parameter defines the text background style. Press the button to open «Text background properties» dialog box (Fig. 417).

«Shadow properties» section contains the parameters of the shadow.

«Color» parameter defines the color of the shadow.

«Offset X» and «Offset Y» parameters define the offset of the shadow along the horizontal or vertical axis.

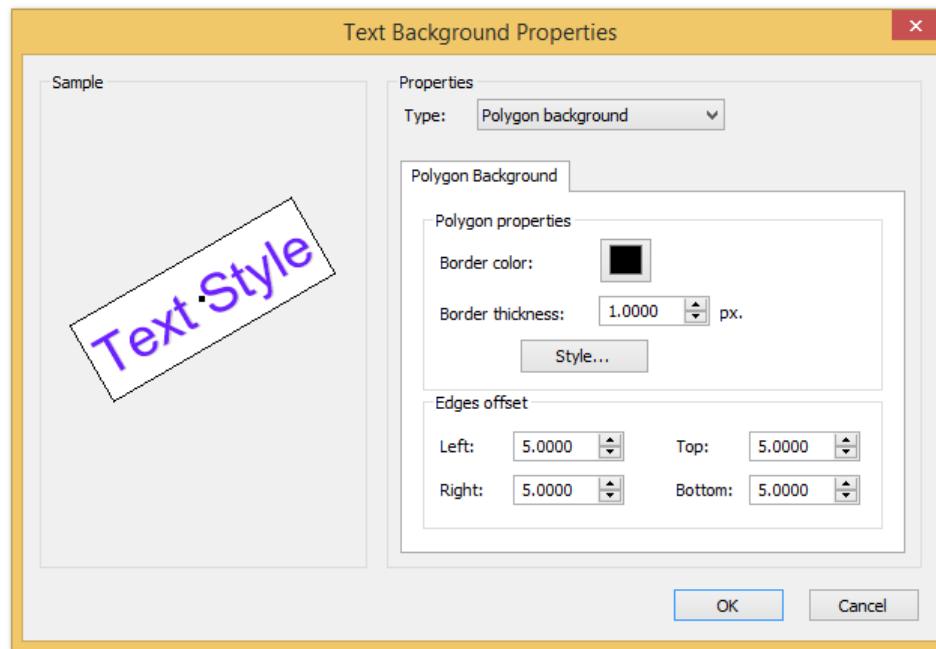


Fig. 417. «Text background properties» dialog box

«Sample» section displays text style preview.

«Properties» section defines the main parameters of the vector text.

Select one of the following types of the background from «Type» drop-down list: marker background, polygonal background.

5.7.7. Vector objects selection

«Vector» – «Select objects» menu section is used to select vector objects (Fig. 418).

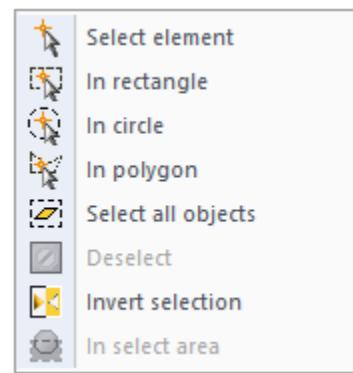


Fig. 418. «Select objects» menu item

«Select element» menu item is used to select vector objects.

Double click on the vector object to open «Information» dialog box that displays the basic information about the object (Fig. 419).

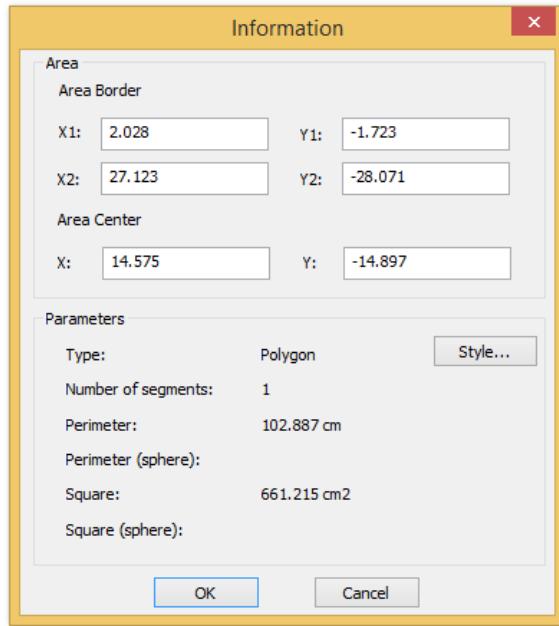


Fig. 419. «Information» dialog box

Press «Style» button in the opened dialog box to change its style.

«In rectangle» menu item is used to select vector objects within rectangular selection;

«In circle» menu item is used to select vector objects within circular selection;

«In polygon» menu item is used to select vector objects within polygon;

«Select all objects» menu item is used to select all vector objects of the layer;

«Deselect» menu item is used to deselect the objects;

«Invert selection» menu item is used to invert selection;

«In select area» menu item is used to select vector objects within selection;

5.7.8. Buffer zones of vector objects

5.7.8.1 Buffer zones

First, select vector objects to create buffer zones. Then select «Vector» – «Buffer zones» – «Buffer zones» menu item. Set the parameters of buffer zones in the opened dialog box (Fig. 420) and press «OK» button.

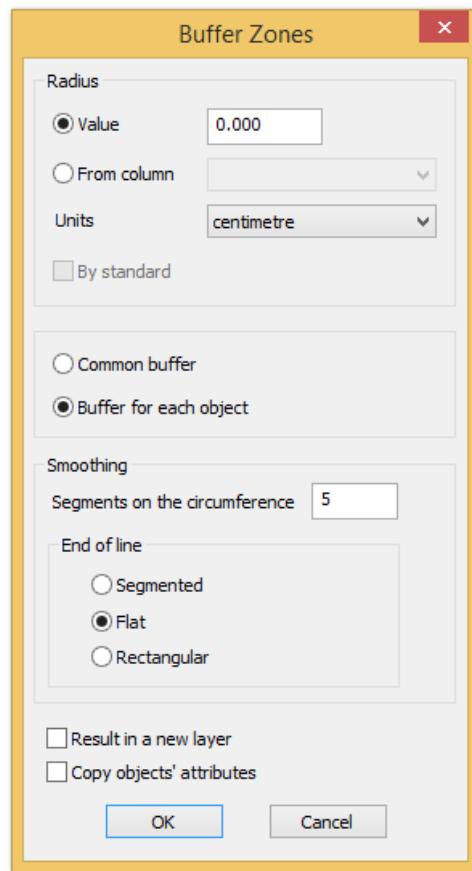


Fig. 420. «*Buffer zones*» dialog box

5.7.8.2 Buffer zones of intersection objects

Select «Vector» – «Buffer zones» – «Buffer zones of intersecting objects» menu item. . . Set the parameters of buffer zones in the opened dialog box (Fig. 421) and press «OK» button

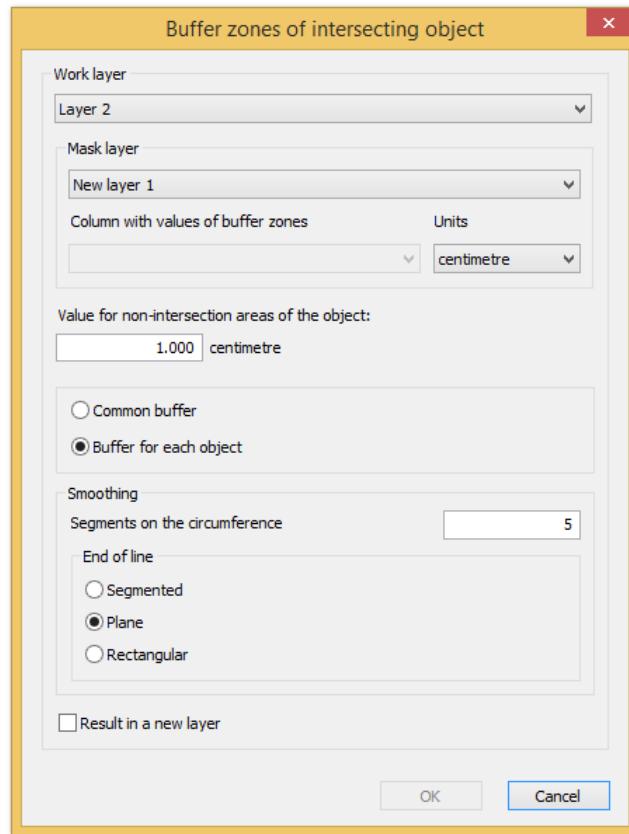


Fig. 421. «Buffer zones of intersecting objects» dialog box

5.7.9. Information

Select «Vector» – «Information» menu item to view the information about the selected vector object (Fig. 422).

Information		
Layers:	<All layers>	
Localities_flooded	NAME	Skopje
Skopje	REGION	
Localities_flooded	SUBJECT	Skopje
Skopje	COUNTRY	Macedonia
	NUMBER_OF_	670000.000000
	AREA_M2	92369138.300000
	AREA_KM	92.369138
	AREA_HA	9236.913830
	TYPE_LOC	City

Fig. 422. «Information» dialog box

5.8. «Selection» menu

«Selection» menu contains a set of tools to create the selections of different.

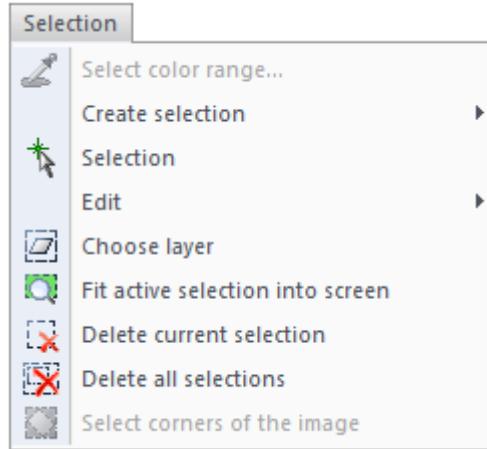


Fig. 423. «Selection» menu

5.8.1. Select color range

«Select color range» tool is designed to select all the pixels of the selected color on the image. Select «Selection» – «Select color range» to open the «Range of selection» panel.

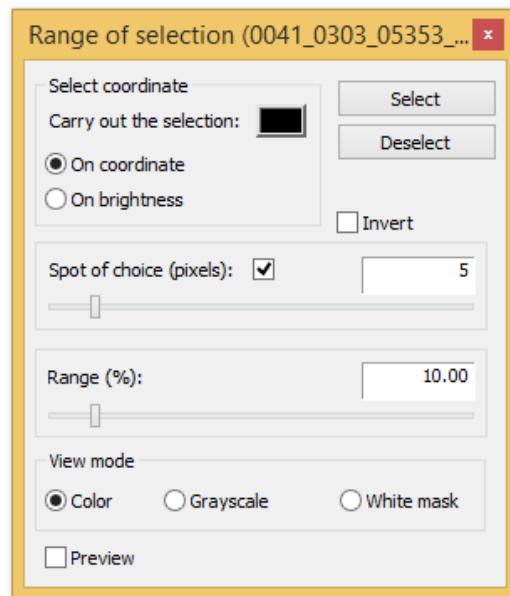


Fig. 424. «Range of selection» panel

Click on the pixel to choose the color of selection.

User can adjust following parameters in the «Range of selection» panel:

- Perform the selection according to color coordinate or pixel brightness;
- Spot of selection;

- range of selection (percents);
- preview mode.

5.8.2. Create selection

«Create selection» menu section (Fig. 425) contains tools to create selections of different shapes.



Fig. 425. «Create selection» menu section

«*Rectangle selection*» menu item allows user to create rectangular selection. Selection is displayed on the image as a dotted line.



Fig. 426. *Rectangle selection*

«*Poligonal selection*» – menu item allows user to create polygonal selection.



Fig. 427. *Poligonal selection*

«*Circle selection*» – menu item allows user to create circular selection.



Fig. 428. *Circle selection*

«*Ellipse selection*» – menu item allows user to create elliptical selection.



Fig. 429. *Ellipse selection*

«*Arbitrary selection*» – menu item allows user to create selection of arbitrary shape.

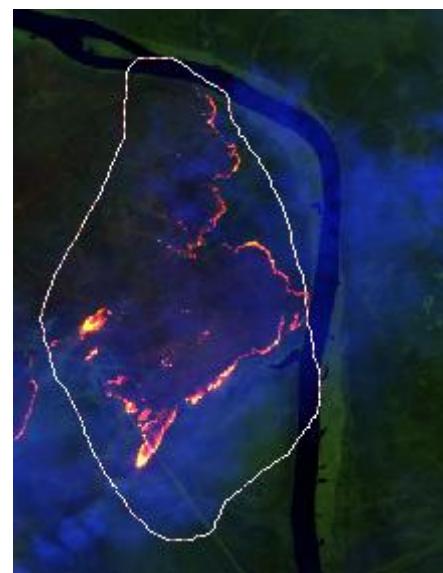


Fig. 430. *Arbitrary selection*

«*Selection “magnetic lasso”*» – menu item allows user to perform an edge detection selection.

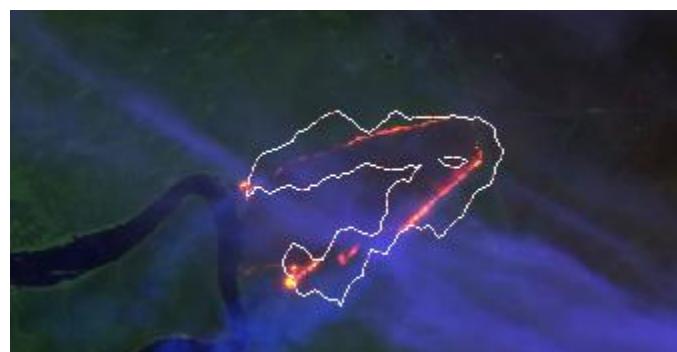


Fig. 431. «*Selection “magnetic lasso”*»

«Color range» menu item allows user to create selection of color range.

Click on the pixel with «Color range» selection tool and the area of the similar color around the pixel will be selected. The precision of the color range selection depends on the color tolerance of the tool which can be adjusted in the «Settings» panel.

5.8.3. Choose selection

«Choose selection» menu item allows user to choose and move any of the existing selections.

5.8.4. Edit selection

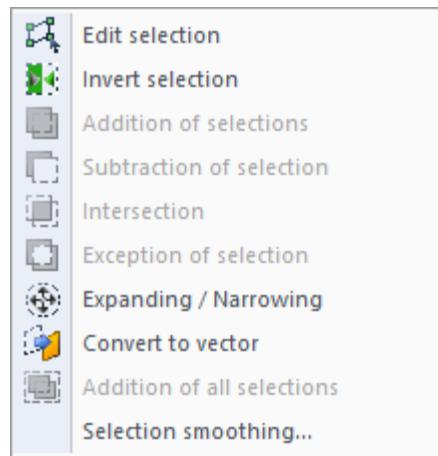


Fig. 432. «Edit» section of «Selection» menu.

«Edit selection» menu item allows user to modify the shape of the selection.

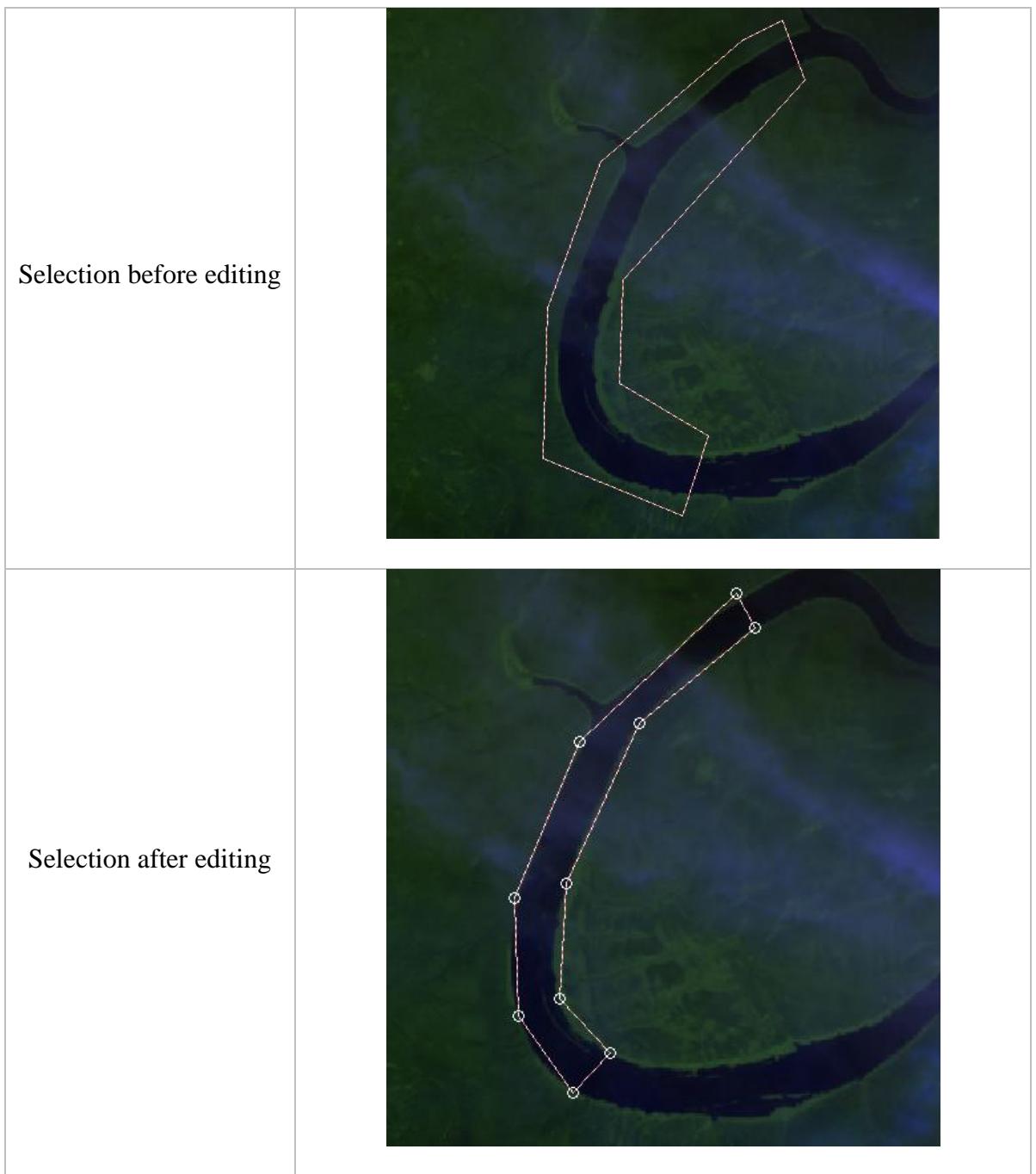


Fig. 433. *Editing of the selection*

«*Invert selection*» menu item is used to select the area of the whole document except for the current selection;

«*Addition of selections*» menu item is used to combine two selections

To combine selections, click inside the first selection, then inside the second selection, and then perform a right mouse button click.

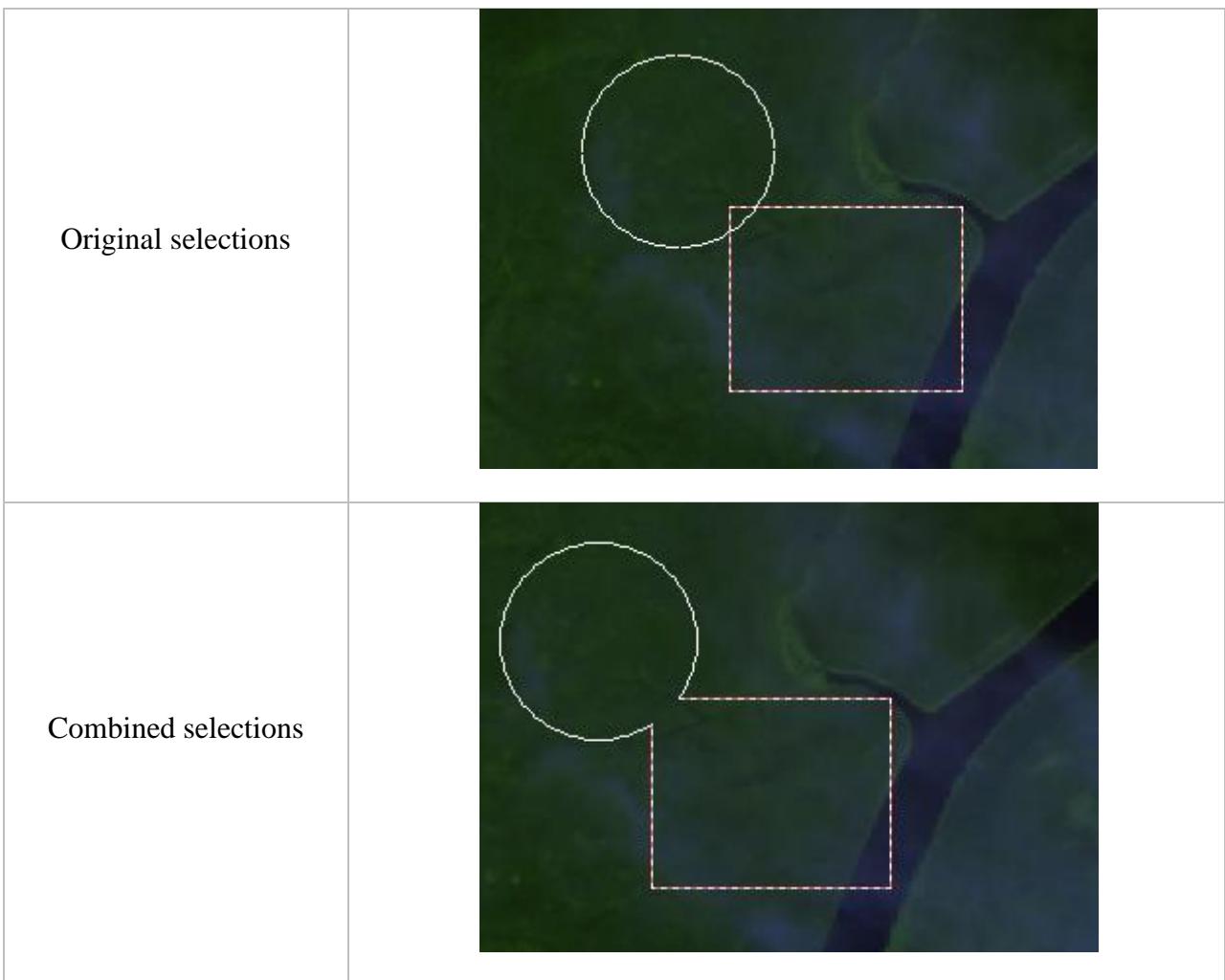


Fig. 434. *Addition of selections*

«*Subtraction of selection*» menu item is used to subtract one selection from another.



Fig. 435. *Subtraction of selections*

«Intersection» menu item is used to create selection on the area of overlapping of two selections.

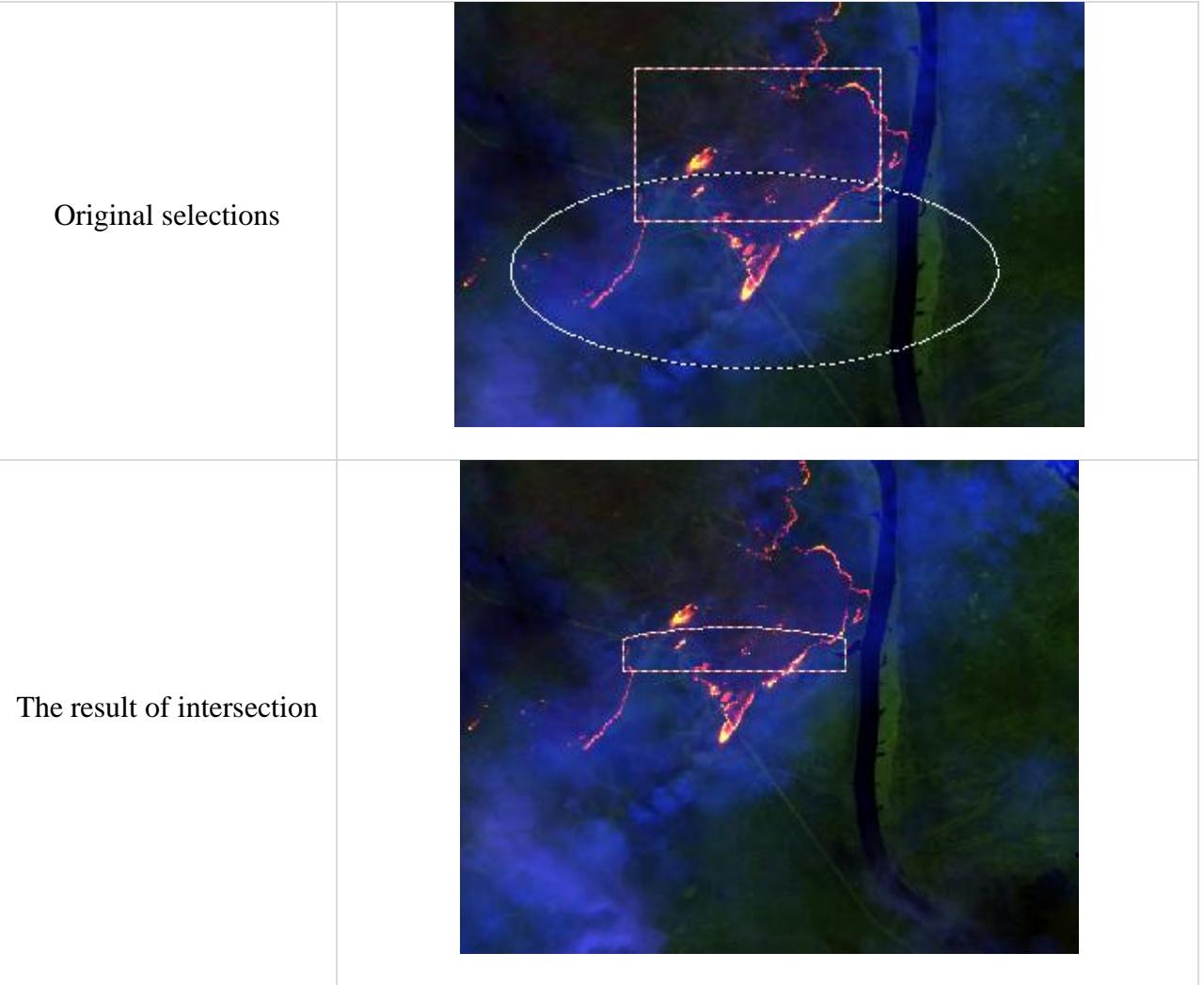


Fig. 436. *Intersection of selections*

«*Exception of selection*» menu item is used to create selection which excludes the area of intersection of two selections.



Fig. 437. *Exclusion of selections*

«*Expanding / Narrowing*» menu item allows user to expand or narrow selection. In the opened dialog box user can set the parameters of expanding or narrowing of the selection. Negative value stands for narrowing, positive – for expanding.

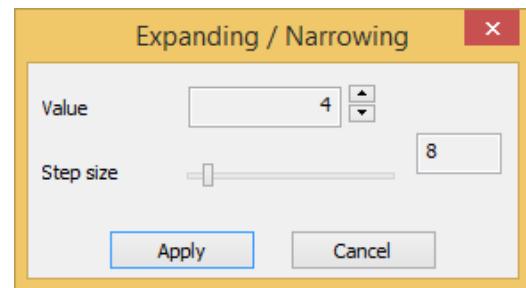


Fig. 438. «Expanding / Narrowing» dialog box

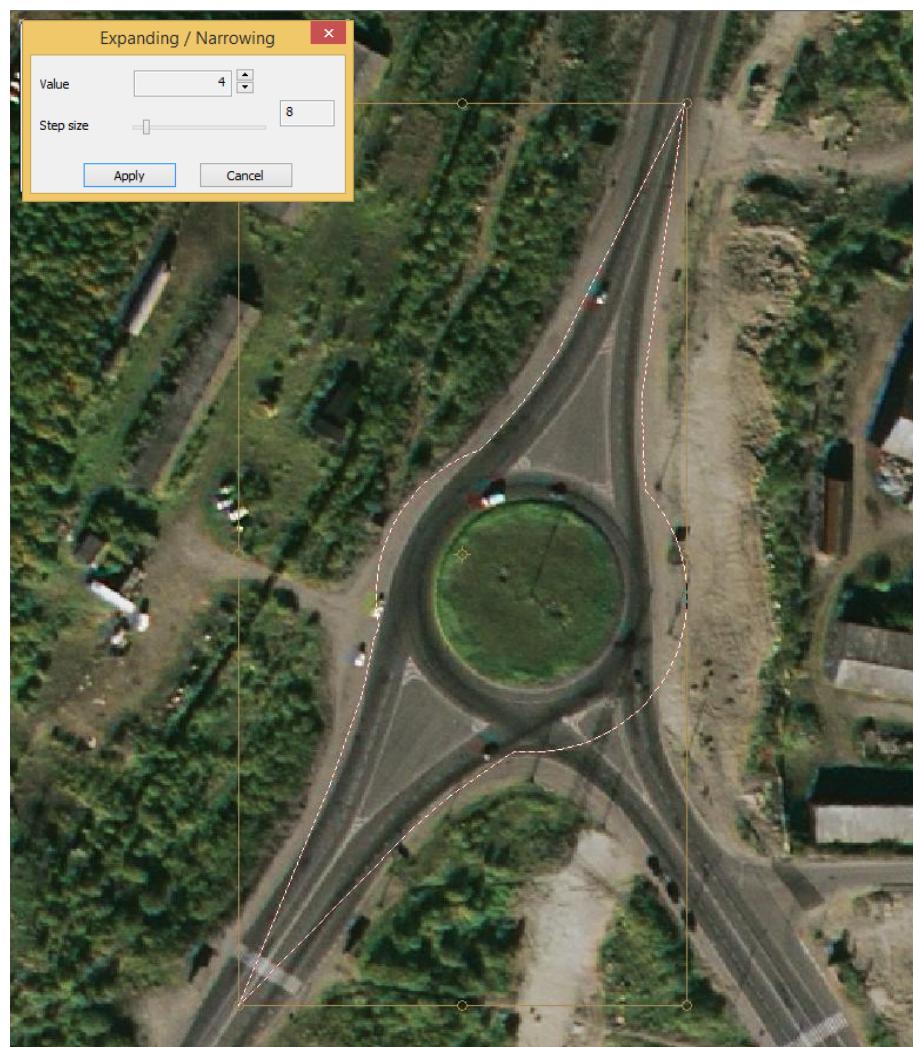


Fig. 439. Expanding the selection

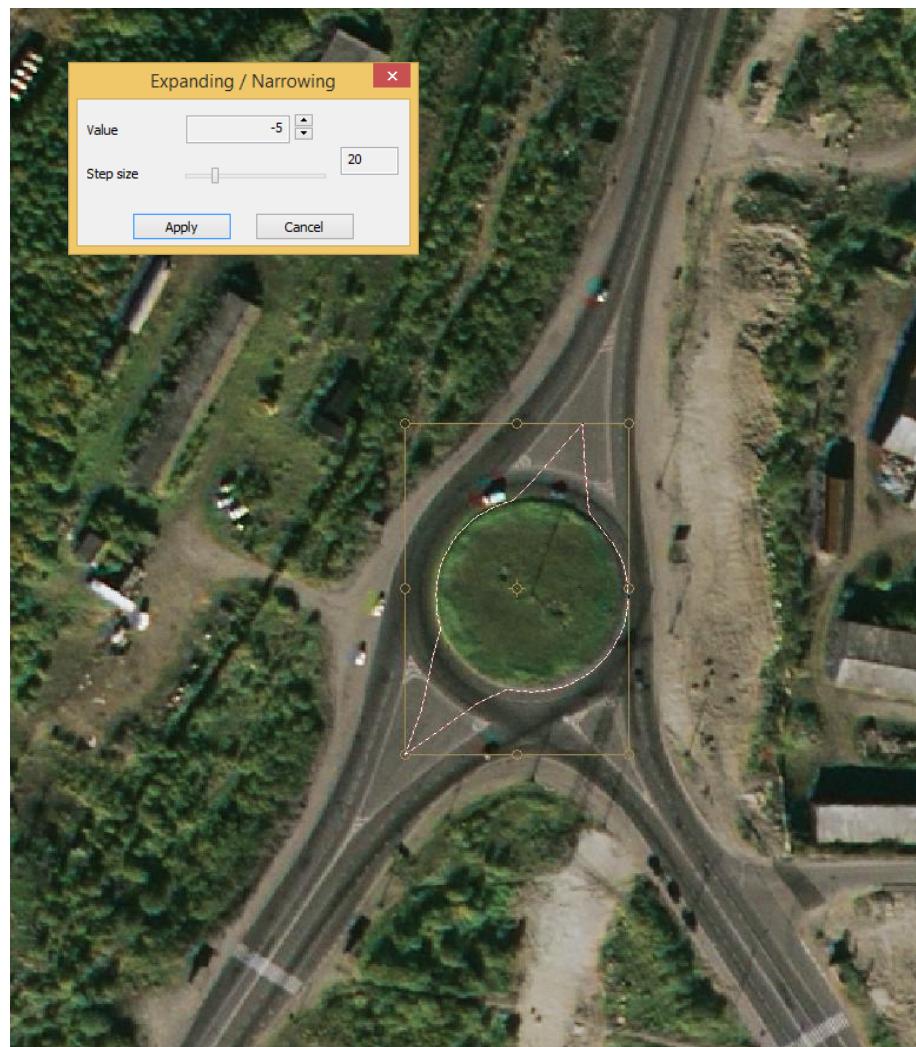


Fig. 440. *Narrowing the selection*

«*Addition of all selections*» menu item allows user to combine all selections in the active layers.



Fig. 441. *Addition of all selections*

«Convert to vector» menu item is used to transform selection into vector object.

Selection



Selection converted to a
vector object

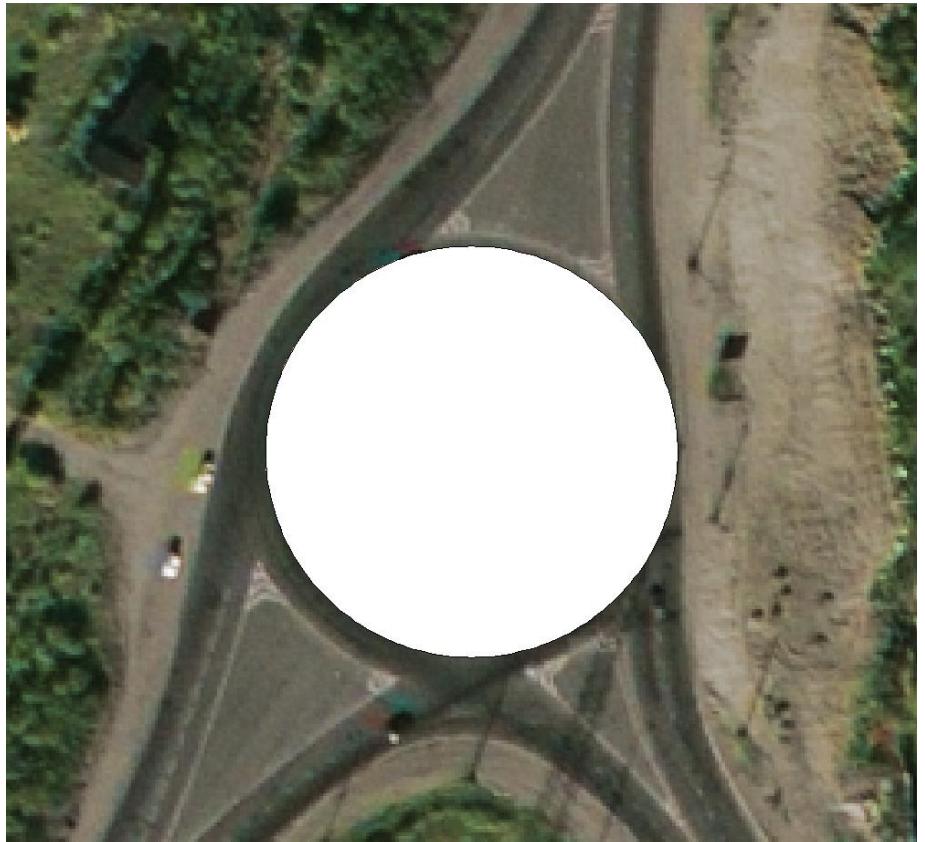


Fig. 442. *Convert selection to vector*

«Selection smoothing...» menu item is used to smoothen the edges of selection

In the opened dialog box user can adjust the degree of smoothing and select «All selections» options to apply smoothing to all selections in the layer.

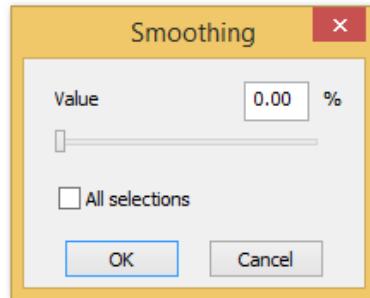


Fig. 443. «Selection smoothing» dialog box

5.8.5. Selection and visualization

«Choose layer» menu item is used to select all selections in the layer.

«Fit active selection into screen» menu item is used to fit the selection into the screen.

5.8.6. Delete selection

«Delete current selection» menu item is used to delete current selection.

«Delete all selections» menu item is used to delete all selections in the layer.

5.8.7. Select the corners of the image

«Select corners of the image» menu item is used to create selection to delete the empty corners of the image.

Empty corners of the image will be selected (Fig. 444), in «Layers» panel new selection layer will appear (Fig. 445).

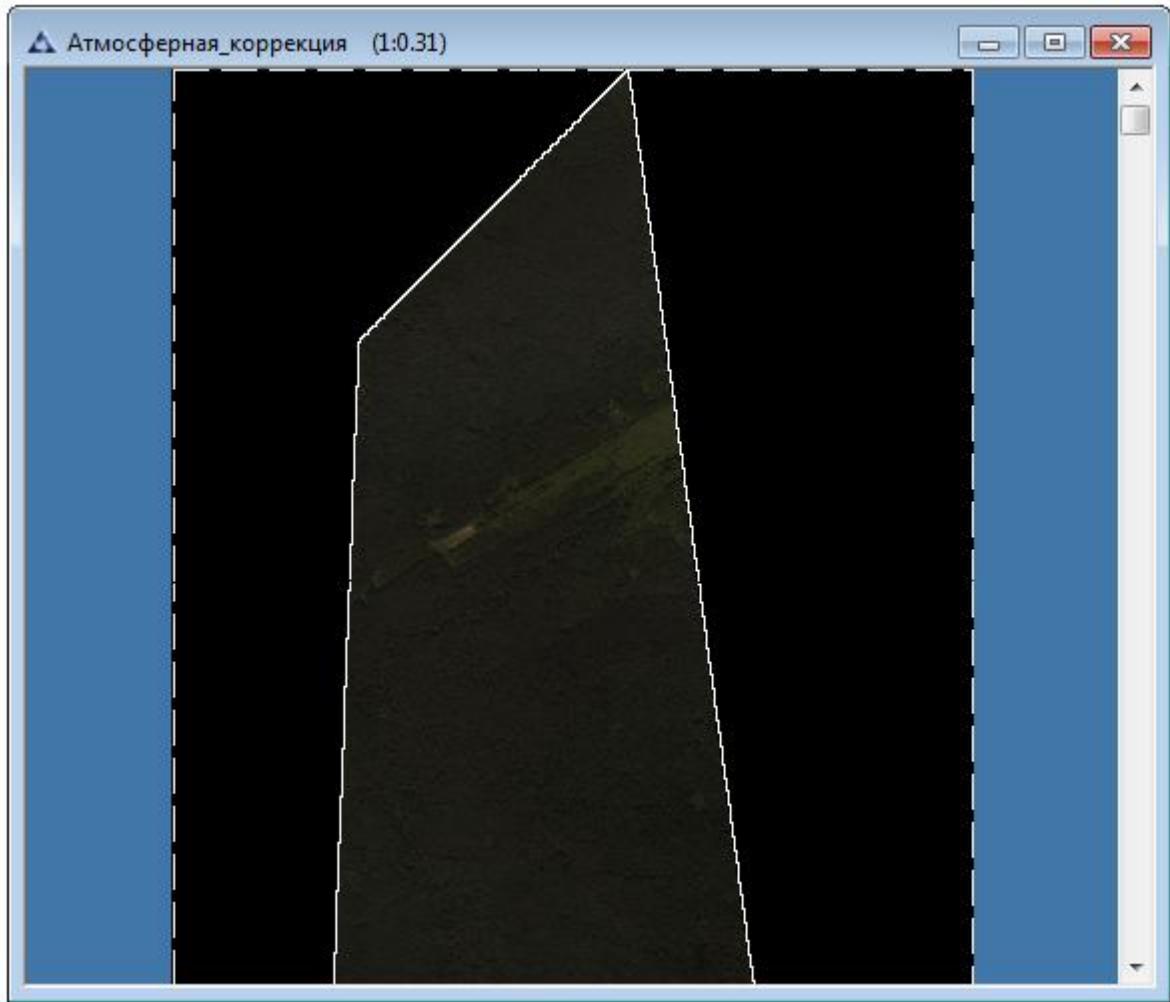


Fig. 444. Selecting empty corners of the image

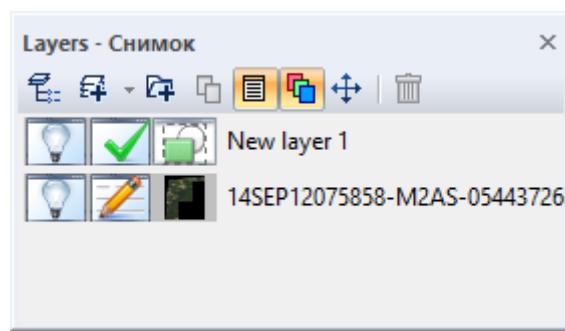


Fig. 445. «Layers» panel

5.9. Menu «Layers»

Menu «Layers» is intended to work with layers – create a new layer, delete layer, merge layers and duplicate them (Fig. 446).

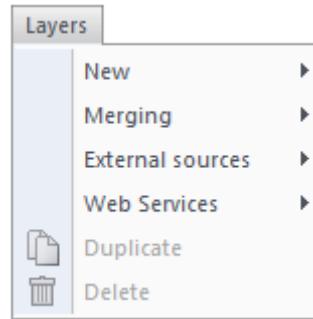


Fig. 446. *Menu «Layers»*

Menu item «New» is intended to create a new layer.

The new layer is created empty. Information will be written in the new layer only after selecting the appropriate tool and performing the required actions. Creating layers function is intended to organized work with layers in the document. At first, user is able to create all necessary layers of required types for work, give them names, determine an order of drawing, and only then fill the layers with the corresponding information.

To create layer, move mouse cursor to the «New» menu item, and in opened window select required type (Fig. 447): «Raster» - to create raster layer, «Vector» – to create vector layer, «Georeference» – to create georeference layer, «Text» - to add text information, «Selection» – to add selection area, «From file» - to add layer from file, «From Directory» - to add layer from the selected folder.

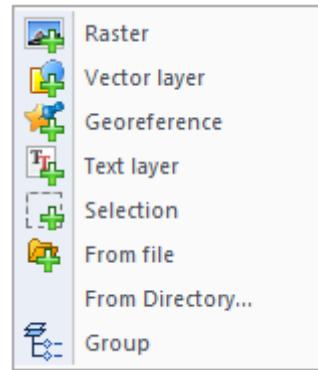


Fig. 447. *List of the layers types*

When user creates layer, the dialog window «New raster layer» will open to set the parameters of layer (Fig. 448).

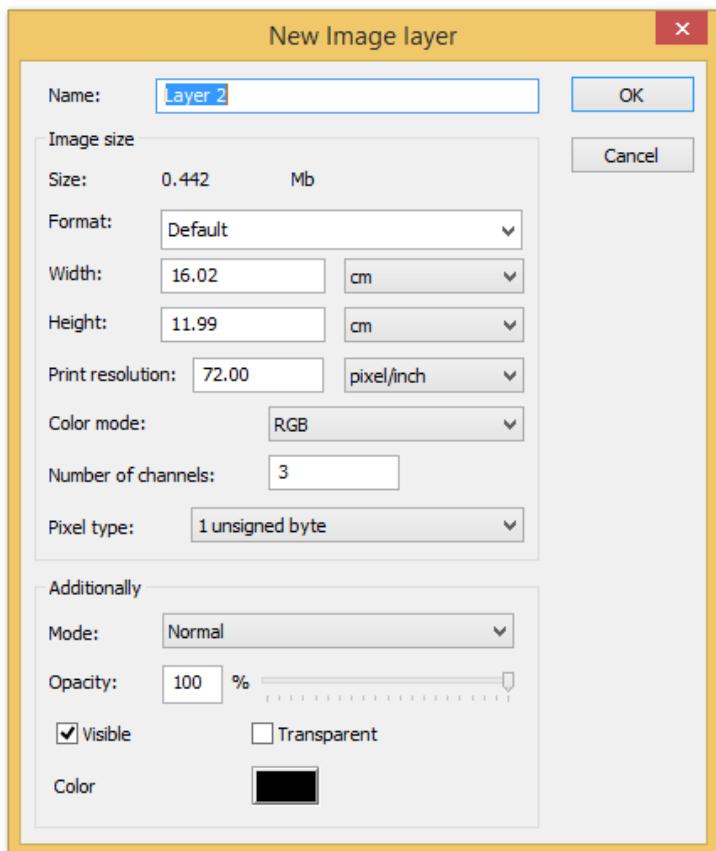


Fig. 448. Dialog window «New raster layer»

In the «Name» field enter name of the new layer.

In the «Image size» section specify the image parameters.

In the «Format» parameter select in the dropdown list the image format.

In the «Width» and «Height» parameters set the width and height in centimeters, millimeters, or pixels (select in the dropdown list by pressing the left mouse button).

In the «Print resolution» parameter choose resolution in pixels per decimeter, pixels per centimeter or pixels per millimeter (select in the dropdown list by pressing the left mouse button).

In the «Color mode» parameter select color mode in the dropdown list.

The value of «Pixel type» parameter select in the in the dropdown list.

In the «Additionally» section set the layer parameters.

In the «Mode» parameter select the blending mode in the dropdown list.

In the «Opacity» parameter set the opacity value as a percentage.

In the «Group» parameter select the existing layer with which will be grouped a new layer.

To make the new layer visible, set the «tick» in the «Visible» parameter.

To make the new layer transparent, set the «tick» in the «Transparent» parameter.

The color of the new layer sets in the «Color» parameters. To select color, press the left mouse button on the color box and choose the required color in the opened dialog window.

5.9.1. Load layer

To load layer from file to the document, select menu «*Layers – New – From file*» or press on the button  in the «*Layers*» panel (Fig. 449).

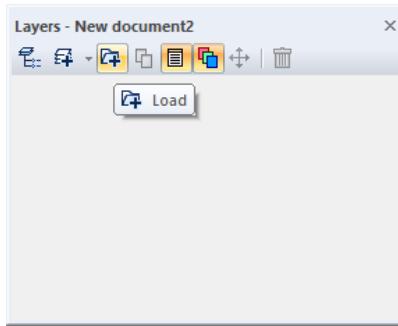


Fig. 449. «*Layers*» panel

Dialog window «*Open*» will open (Fig. 476), in this window select the file to load and press the button «*Open*». To load multiple files from this folder, select them by pressing the *Ctrl* or *Shift* keys.

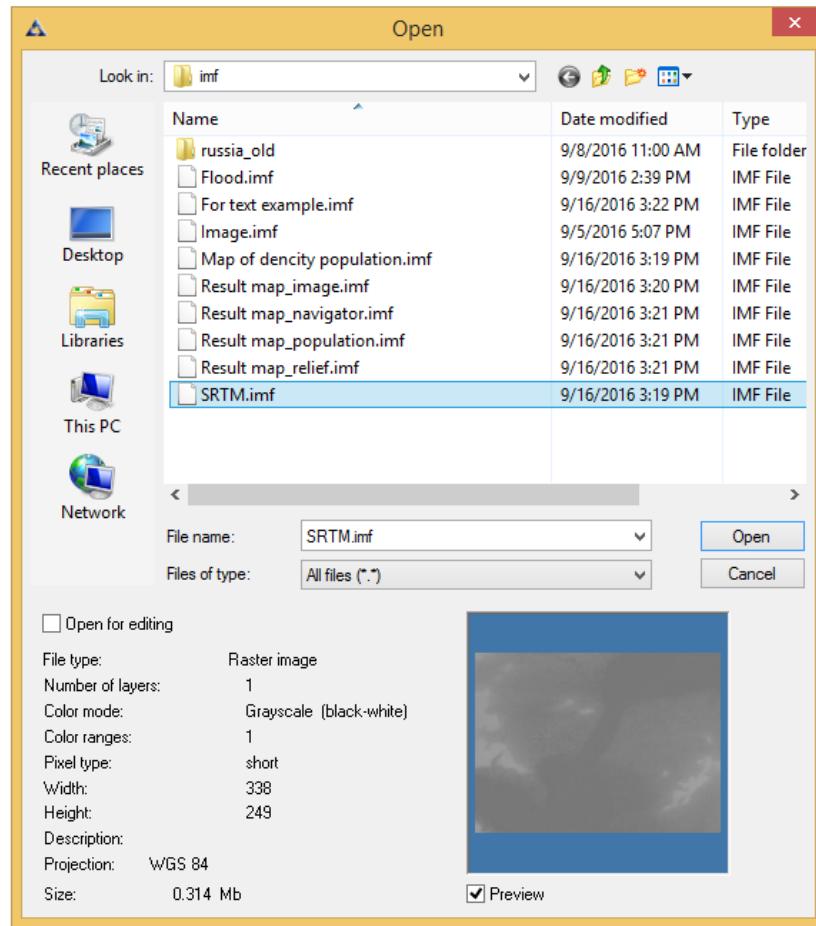


Fig. 450. Dialog window «Open»

In case of geographic projection mismatch between the document and the opened file, after user presses the «Open» button, the window «Geographic projection» will appear (Fig. 451).

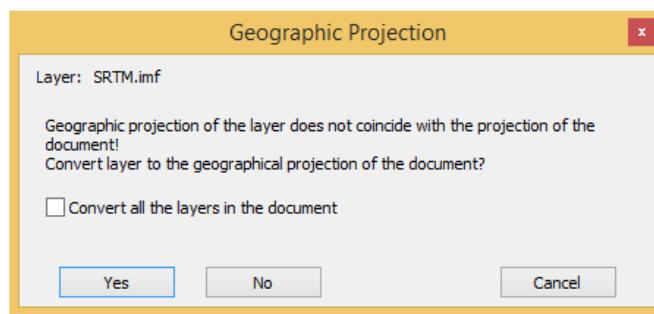


Fig. 451. Dialog window «Geographic projection »

To change the projection of the loaded file to the document projection (projection «Planscheme» uses in new document by default) press the «Yes» button. To save the file projection

and to change the document projection, press the «*No*» button. To cancel the load, press the «*Cancel*» button.

If more than one file is loaded or file contains several layers, set the «tick» in the box «*Convert all the layers in the document*» before making a decision to change the geographic projection.

The selected file will be displayed in the «*Layers*» panel (Fig. 452).

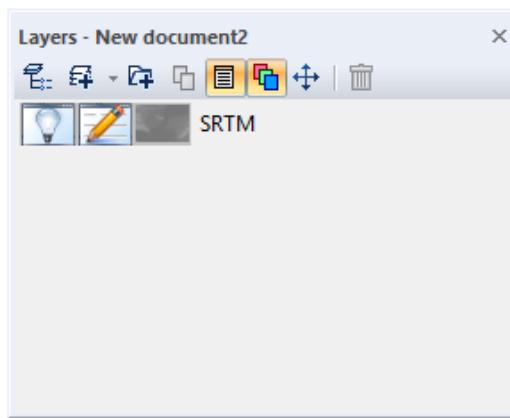


Fig. 452. «*Layers*» panel

When user selects the menu item «From directory», dialog window «Load from directory» will open with prompt to choose the required folder (Fig. 453).

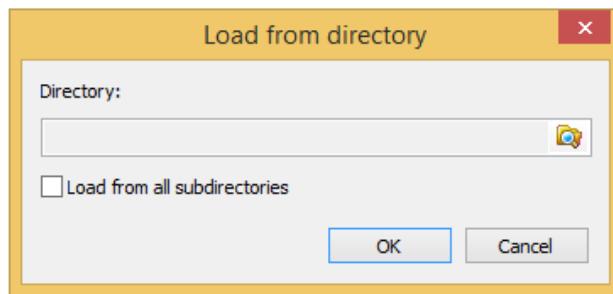


Fig. 453. «*Load from directory*» window

To load layers from subdirectories, set the «tick» in the «Load from all subdirectories».

To start the load, press the «*OK*» button.

To cancel the process, press the «*Cancel*» button.

Menu item «*Duplicate*» duplicates active layer. To duplicate layer, move the cursor to the «*Duplicate*» and press the left mouse button.

Menu item «*Delete*» deletes active layer. To delete layer, move the cursor to the «*Delete*» and press the left mouse button.

Menu item «Merging» allows user to merge layer with lower layer, or merge all visible layers, or merge layers with the same name (Fig. 454).

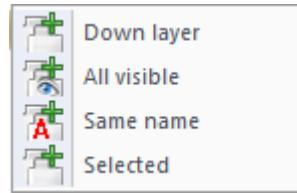


Fig. 454. *Menu item «Merging»*

To merge layer with the lower layer, move the cursor to the menu item «Merging» and in opened window select «Down layer».

To merge all visible layers, move the cursor to the menu item «Merging» and in opened window select «All visible».

To merge layers with the same name, make sure that layers have the same name, move the cursor to the menu item «Merging» and in opened window select «Same name».

5.9.2. Work with external sources

5.9.2.1 Google Maps

This function is designed to create layer from Google geoportal in the editable document. The layer represents the imagery basemap with satellite data from Google service.

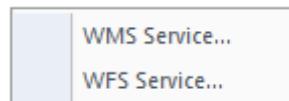


Fig. 455. *Web services section*

Tool allows user to visualize on the imagery basemap the location of the processes and the phenomena presented in vector.

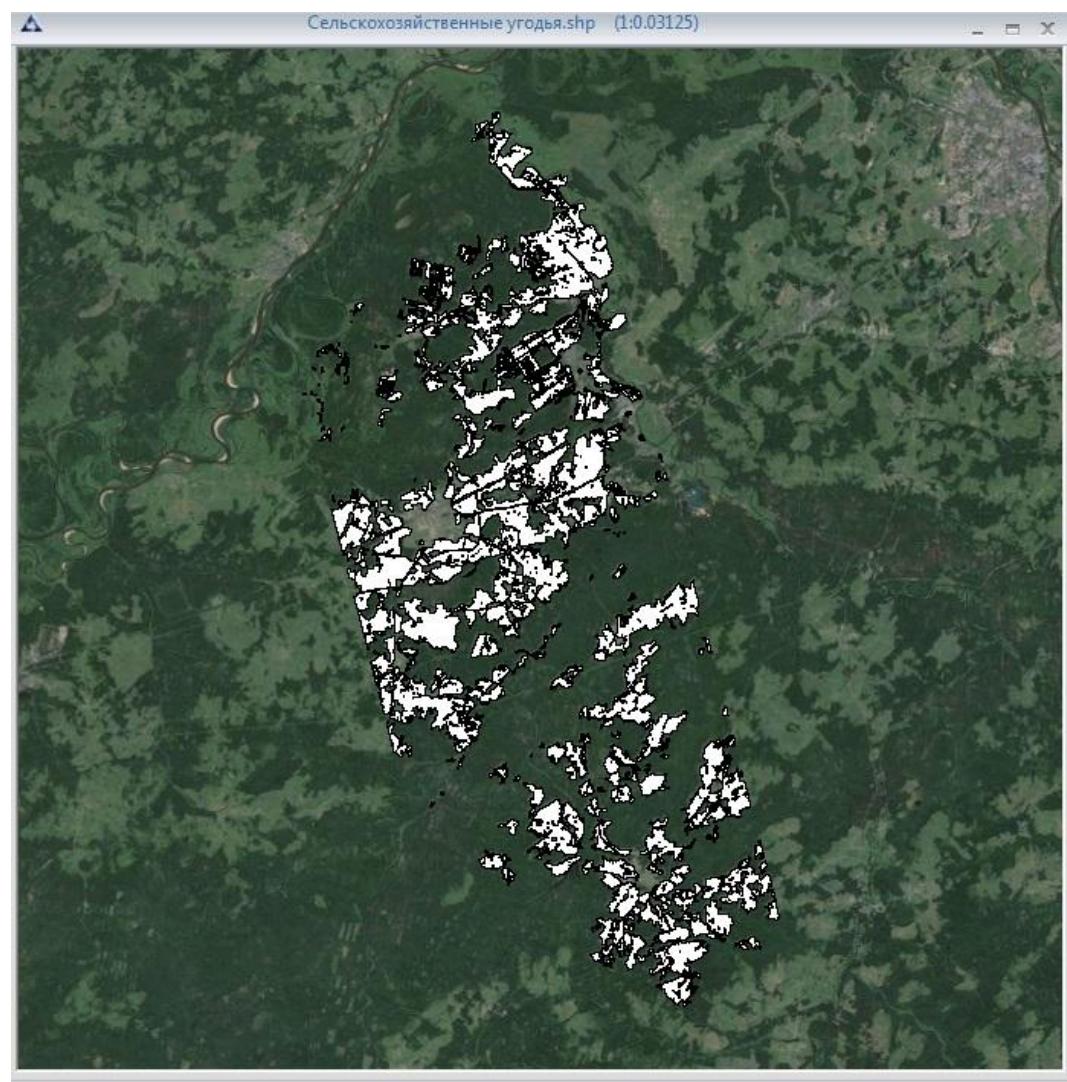


Fig. 456. An example of the displaying layer from the Google geoportal as a imagery basemap to a vector data

5.9.2.2 Meteorological data

The module is designed to load meteorological information from external sources and called from menu item «*Layers – External sources – Meteorological data*». User is able to load several types of data within the work area of the active document. Also, user is able to load forecast data for some types.

The loaded data is stored in the folder ...\\Username\\AppData\\Roaming\\Innovative Centre\\Image Media Center\\5\\Meteorological data on the local disk and displayed in the table of the «*Meteorological data*» window. Some kind of data automatically loaded as a separate layer in the active document, while others user has to load from the folder above.

To load meteorological data, user has to:

- 1) Select menu item «*Layers – External sources – Meteorological data*».

2) In the «*Meteorological data*» window select the data source and load parameters (Fig. 457).

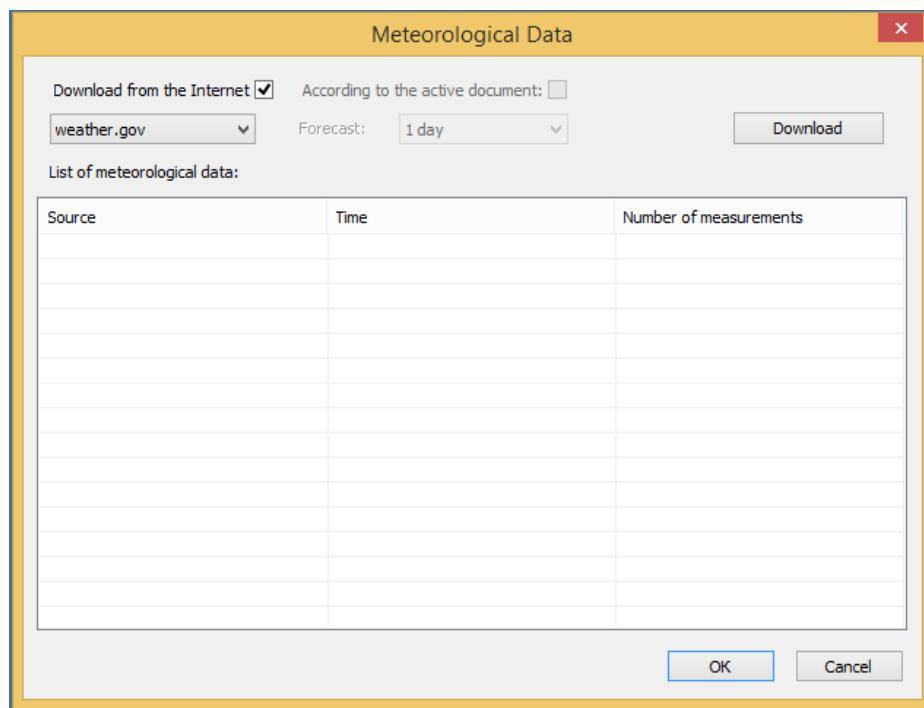


Fig. 457. *Dialog window «Meteorological data»*

3) Click on the «*Download*» button to download data. After the download, the data will be stored in the directory ...\\Username\\AppData\\Roaming\\Innovative Centre\\Image Media Center\\5\\Meteorological data and displayed in the table of the window (Fig. 458).

Source	Time	Number of measurements
gismeteo.ru	10.11.2016 21.00	7
gismeteo.ru	11.11.2016 03.00	7
gismeteo.ru	11.11.2016 09.00	7
gismeteo.ru	11.11.2016 15.00	7
weather.gov	10.11.2016 20.21	2674

Fig. 458. *List of the loaded data*

To open the directory with the data, click the right mouse button in the window table and in the context menu press on the «*Open the folder with the data*». The data are presented in *.shp format and add to the program in the standard way.

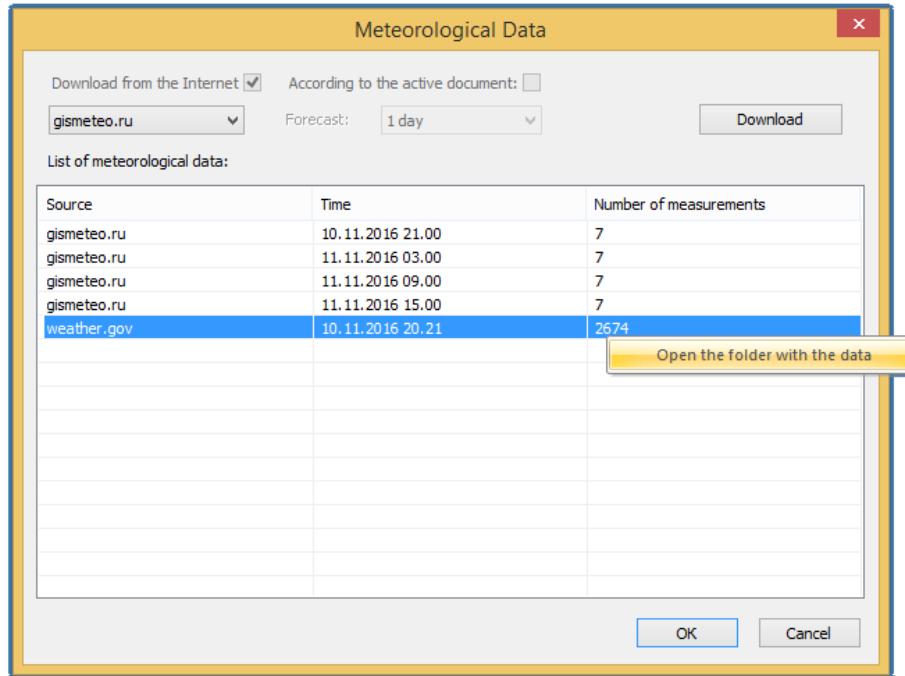


Fig. 459. *Open the folder with the meteorological data*

User is able to customize the object style to display the data. The work with data is similar to work with the vector data. The figure below shows an example of the attribute information of the layer with meteorological data.

Information	
Layers: <All layers>	
weather.gov_10.11.2016 2	LATITUDE -88.621300
07:00 10.11.2016	LONGITUDE 40.923270
	TIME_MEAS 07:00 10.11.2016
	ID_STATION KPNT
	LOCATION Pontiac Municipal Airport,
	TEMP_F 58.000000
	TEMP_C 14.500000
	REL_HUMID 54.000000
	WIND_DIR Southwest
	WIND_DIR_D 240.000000
	WIND_SP_MP 24.200000
	PRESS_IN 30.140000
	PRESS_MB 99999.000000
	DEW_TEMP_F 41.400000
	DEW_TEMP_C 5.200000
	VISIB_MILE 10.000000

Fig. 460. *An example of the attribute information of the meteorological data*

5.9.3. Web Services

5.9.3.1 WMS Service

To add web layer in the document, select the menu item «*Layers*» – «*Web-Service –WMS Service*» (Fig. 461).

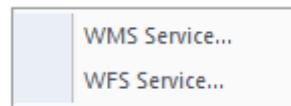


Fig. 461. «*Web-services*» section

Dialog window «*WMS*» will open (Fig. 462).

To find the required *WMS* – service, use lines «*Name*» and «*Address*», in which specify service path. It is also possible to select required *WMS*-service from the presented address list. The last ten addresses, that were used, saved in the line «*Address*».

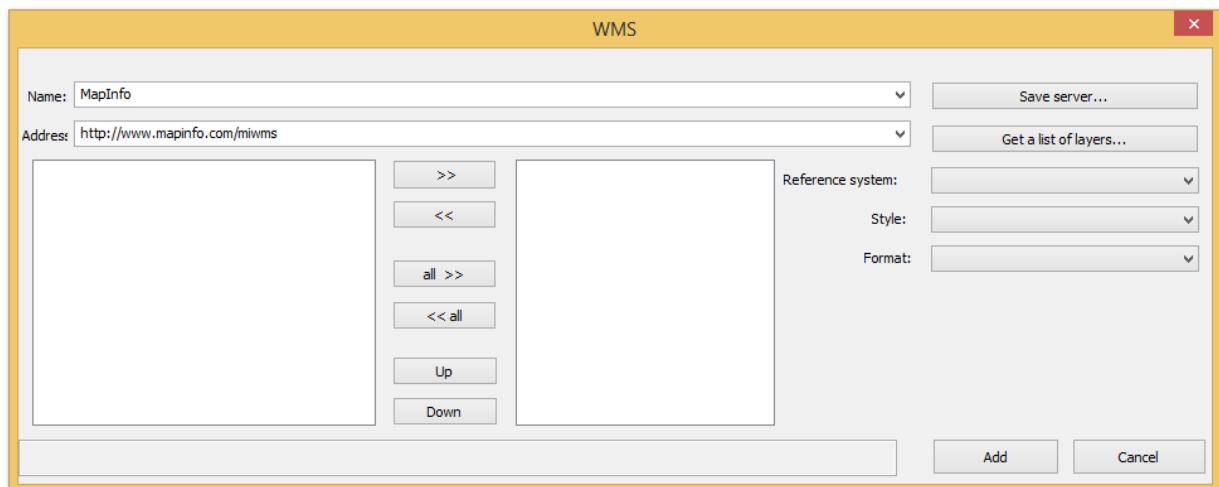


Fig. 462. Dialog window «*WMS*»

After user selects resource, click on the «*Get a list of layers* » button. In the left box the catalog scheme will open, that contains available layers from selected *WMS*-service (Fig. 489).

To download layer from this catalog, select the layer, by clicking the left mouse button twice, or press the left mouse button on the layer and then press the button >> . As a result, the required layer will be added in the right field.

Also, at the right user is able to customize the layer coordinate system, its style and format.

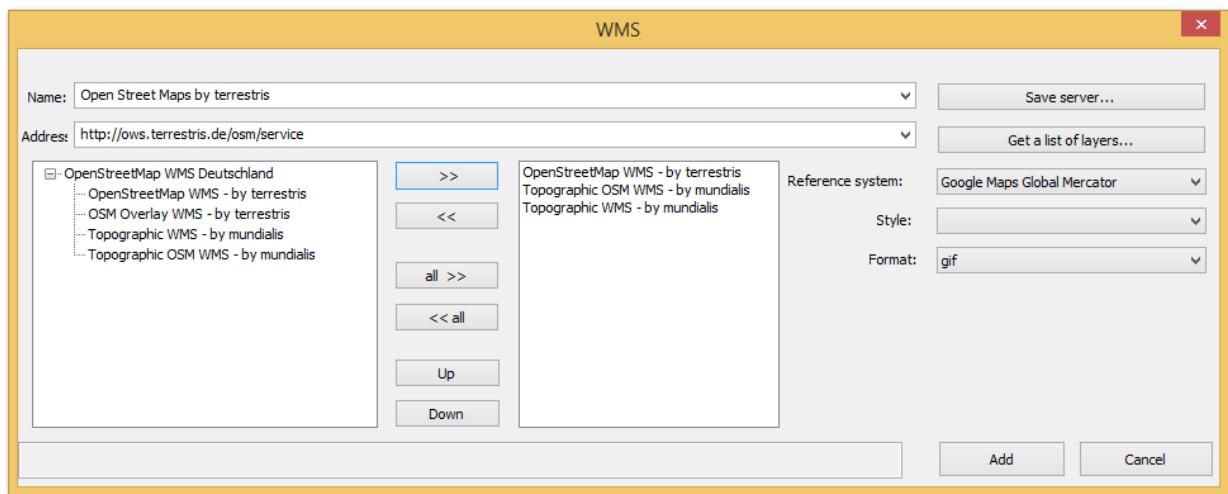


Fig. 463. Dialog window «WMS»

User can change the display order of the layers, by pressing the buttons «Up», «Down». To do this, choose required layer or sever layers while holding the *Ctrl* or *Shift* keys.

To turn off the layer, press the button .

After carrying out all required operations, add selected layer into the document by pressing the «Add» button.

The new raster layer WMS will be loaded in the document (Fig. 464).



Fig. 464. WMS layer from OpenStreetMap source

Selected layers will be displayed in the «Layer» panel (Fig. 465).

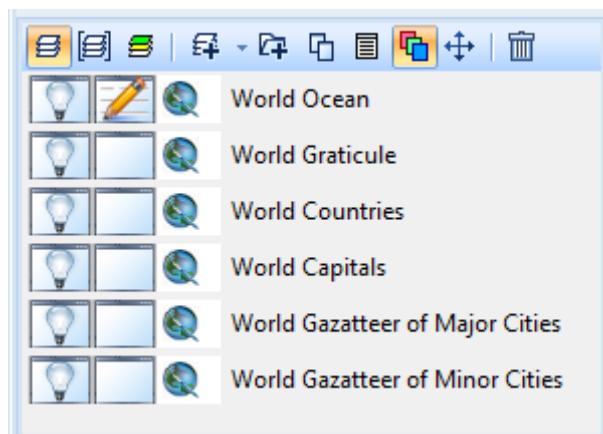


Fig. 465. «Layer» panel

5.9.3.2 WFS Service

To add web layer WFS in the document, select the menu item «*Layers*» – «*Web-Service – WFS Service*» (Fig. 466).

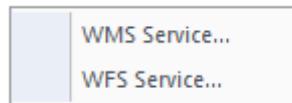


Fig. 466. «*Web-services*» section

Dialog window «*WFS*» will open (Fig. 467). To find the required WMS – service, use line «*Address*», in which specify service path. It is also possible to select required WMS-service from the presented address list. The last ten addresses, that were used, saved in the line «*Address*».

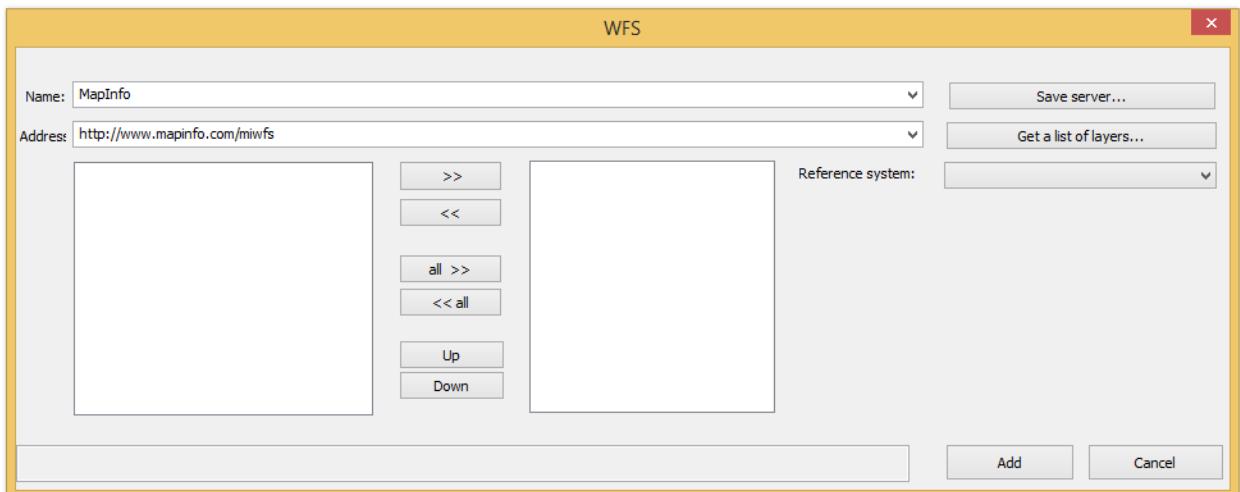


Fig. 467. Dialog window «*WFS*»

After user selects resource, click on the « *Get a list of layers*» button. In the left box the catalog scheme will open, that contains available layers from selected WFS-service (Fig. 494).

To download layer from this catalog, select the layer, by clicking the left mouse button twice, or press the left mouse button on the layer and then press the button >> . As a result, the required layer will be added in the right field (Fig. 468). To add all layers from the catalog, press the button >> .

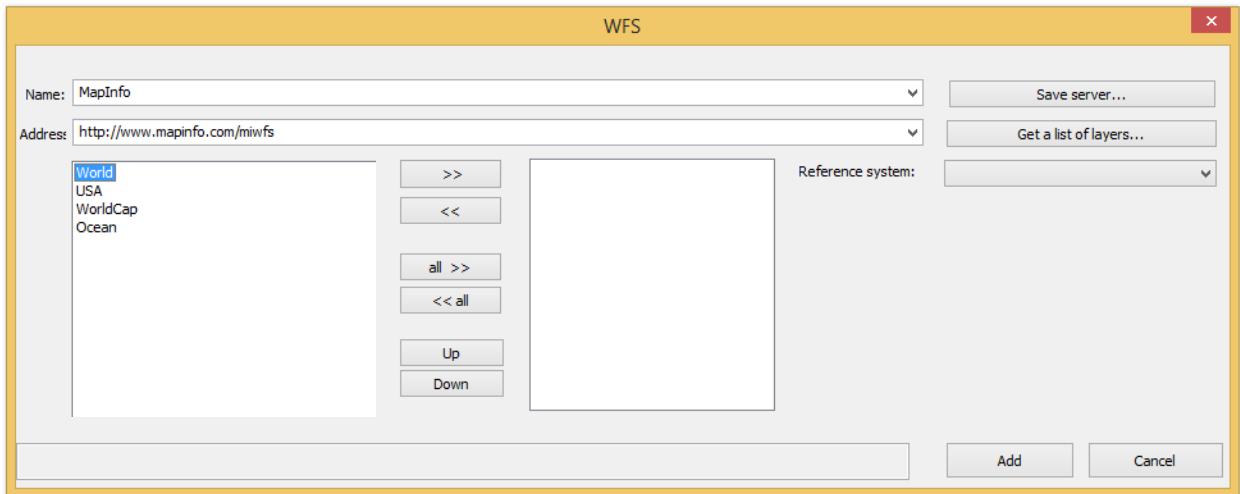


Fig. 468. Dialog window «WFS»

User can change the display order of the layers, by pressing the buttons «Up», «Down». To do this, choose required layer or sever layers while holding the Ctrl or Shift keys.

To turn off the layer, press the button , to turn off all layers, press the button .

After carrying out all required operations, add selected layer into the document by pressing the «Add» button.

The new raster layer WFS will be loaded in the document (Fig. 469).

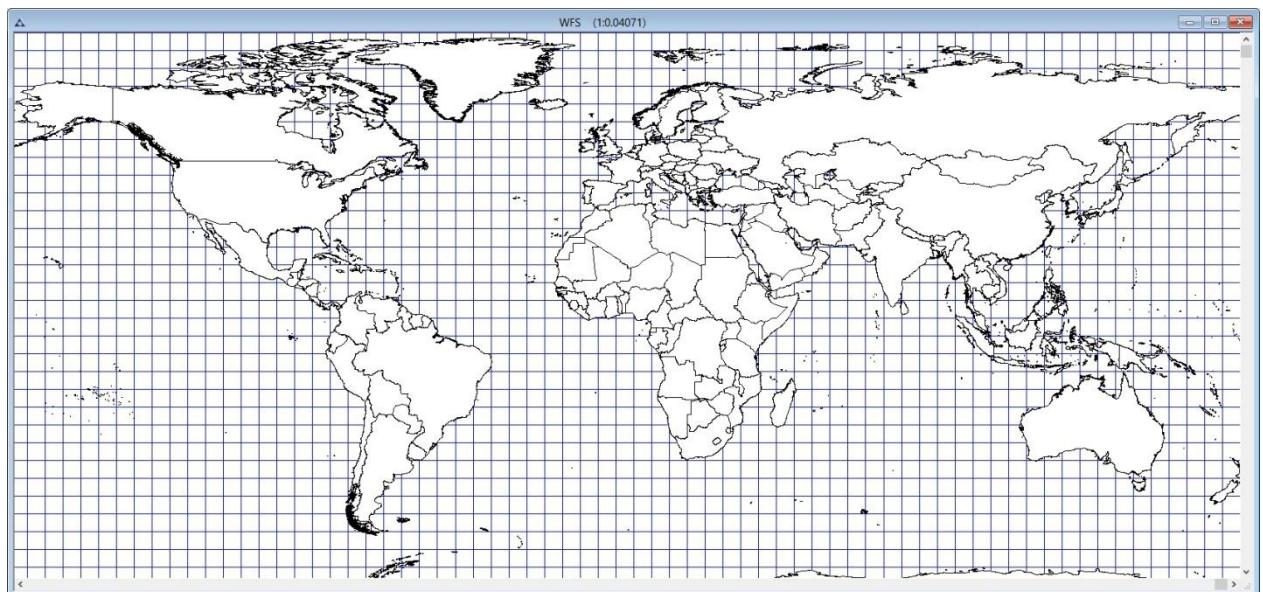


Fig. 469. WFS layer from MapInfo source

Selected layers will be displayed in the «Layers» panel (Fig. 470).

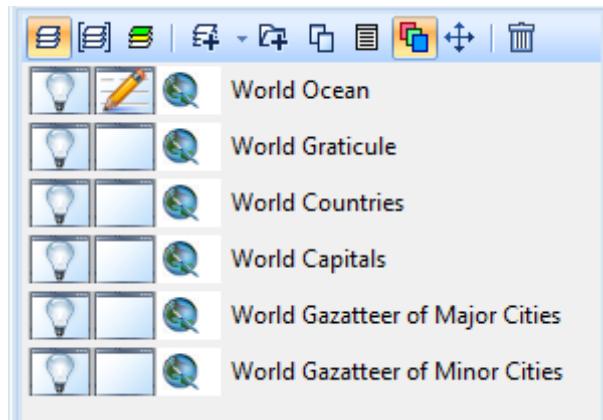


Fig. 470. «*Layers*» panel

5.9.3.3 Setting the layer properties: the blending mode, layers transparent

«*Layer properties*» panel (Fig. 471) allows user to edit the layer parameters.

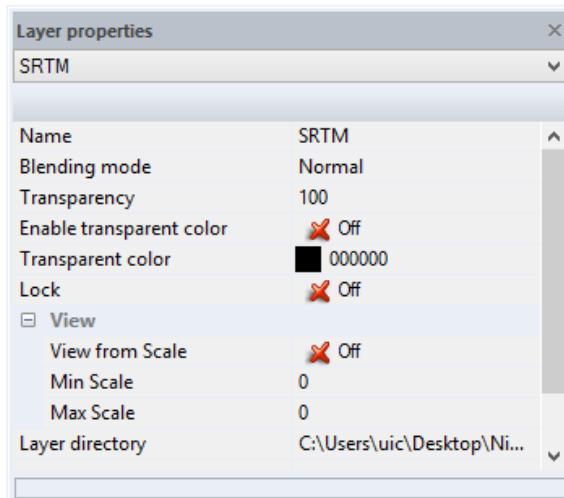


Fig. 471. «*Layer properties*» panel

The «*Name*» parameter allows user to edit the name of the layer.

The «*Group*» parameter allows user to group layers.

The «*Blending mode*» parameter allows user to select the blending mode from the list: normal, dissolve, multiply, screen, overlay, soft light, hard light, addition, subtraction, darken, lighten, difference, exclusion, hue, saturation, color, brightness.

The «*Transparency*» parameter determines the degree of opacity of the screen. Full nontransparent screen has a value of 100, and a completely transparent has value of 0.

The «*Enable transparent color*» parameter allows user to set transparency not for entire layer, but for a certain color, which sets in the «*Transparent color*» parameter. To enable the transparent color, set the «*On*» value.

User can set the transparent color for the layer in the «*Transparent color*» parameter, only if the value of the «*Enable transparent color*» is «*On*».

5.10. «View» menu

Menu "View" contains a set of basic tools for working with image.

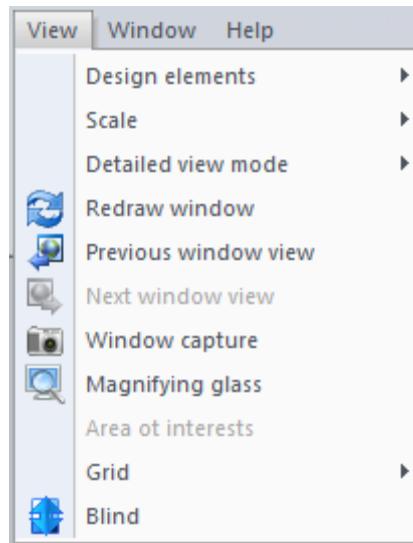


Fig. 472. «View» menu

5.10.1. Compass

To add a compass on the image or map, select «*View*» - «*Design elements*» – «*Compass*» menu item(Fig. 473).

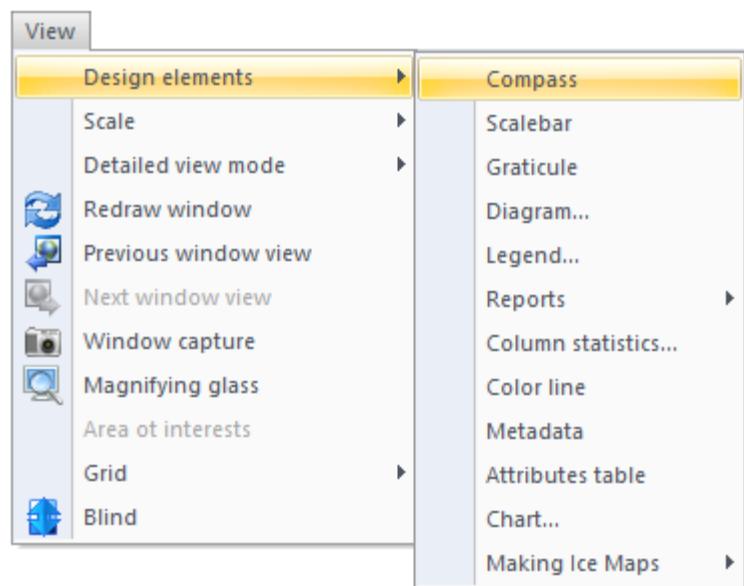


Fig. 473. Adding compass

«Compass» layer will appear on the «Layers» panel (Fig. 474).

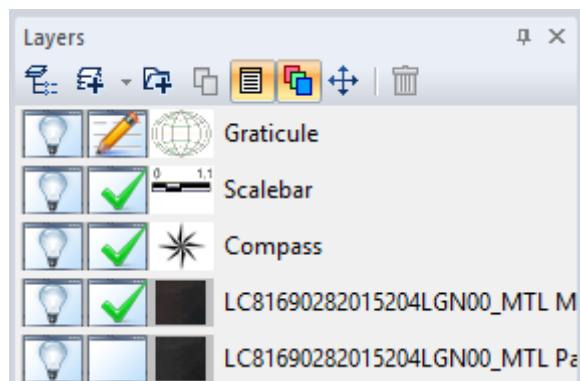


Fig. 474. «Layers» panel

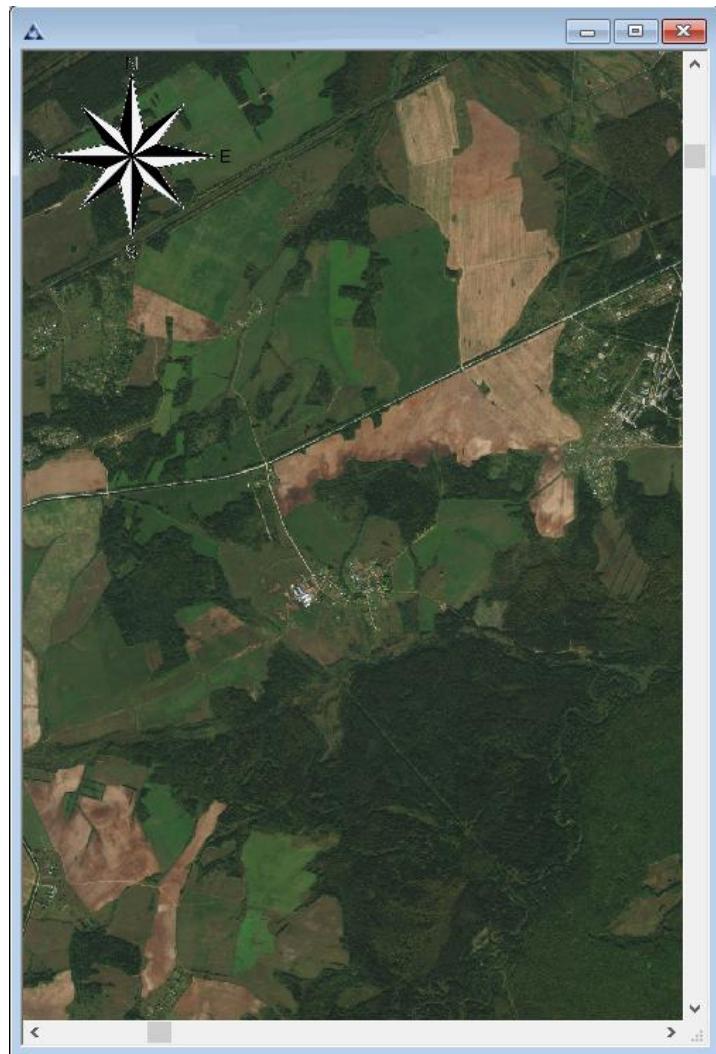


Fig. 475. An example of the design element "Compass"

User can set the parameters of compass in the «Layer properties» panel (Fig. 476).

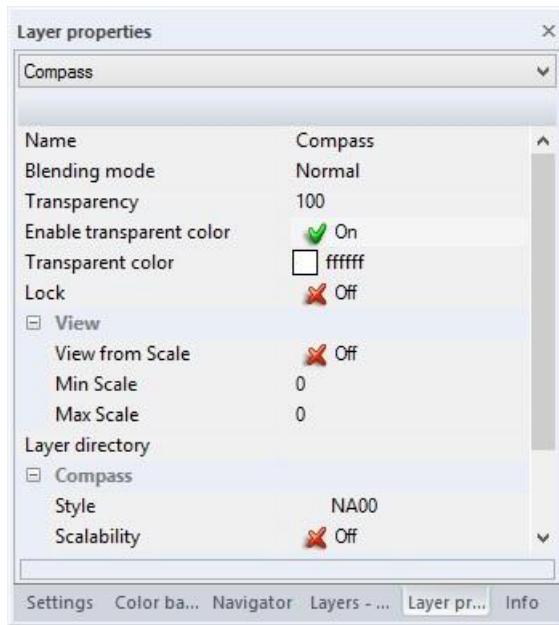


Fig. 476. «Layer properties» panel

5.10.2. Scalebar

To add a scale bar on the image or map, select «View» - «Design elements» – «Scalebar» menu item (Fig. 477).

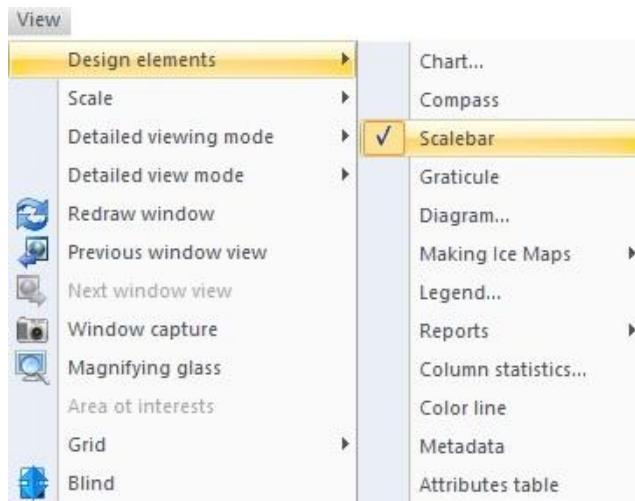


Fig. 477. «Scalebar» menu item

«Scalebar» layer will appear on the «Layers» panel (Fig. 478).

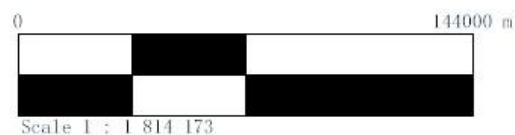


Fig. 478. Scale bar

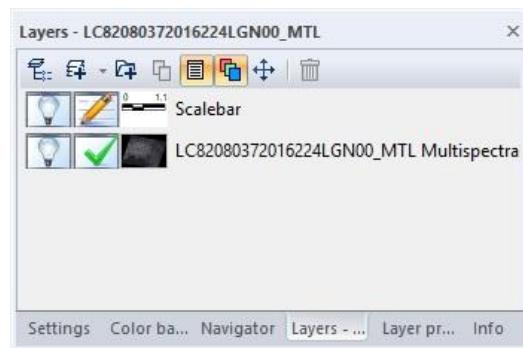


Fig. 479. «Layers» panel

User can set the parameters of scale bar in the «*Layer properties*» panel (Fig. 480):

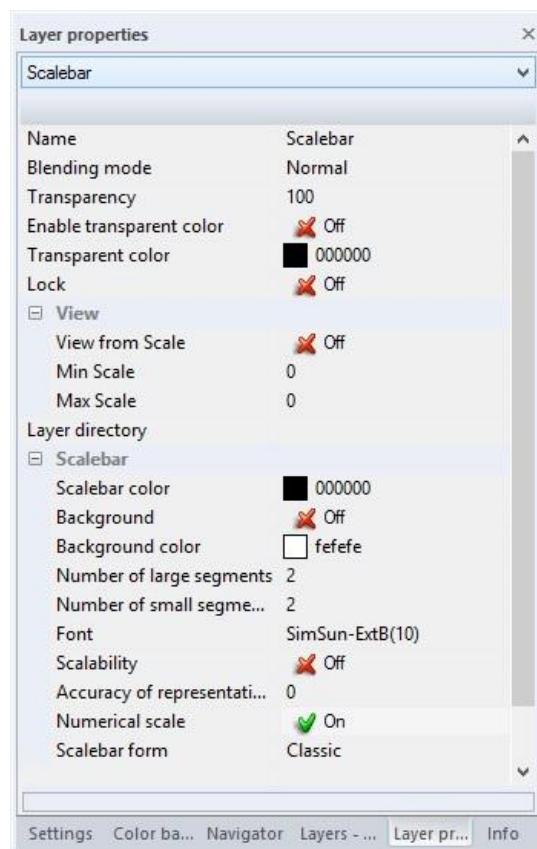


Fig. 480. «*Layer properties*» panel

Also, user can change the properties of the scale bar in the «Scalebar style» dialog box. To open the dialog box, perform a right mouse button click on the scale bar and select «Properties» item.

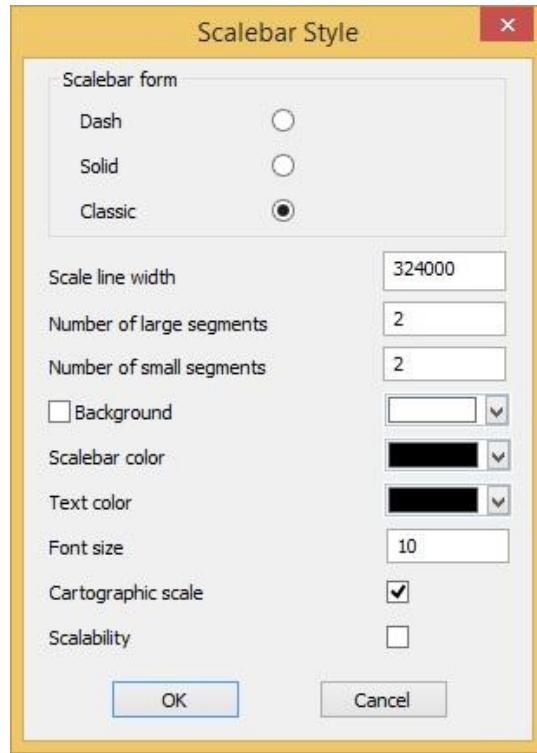


Fig. 481. «Scalebar style» dialog box

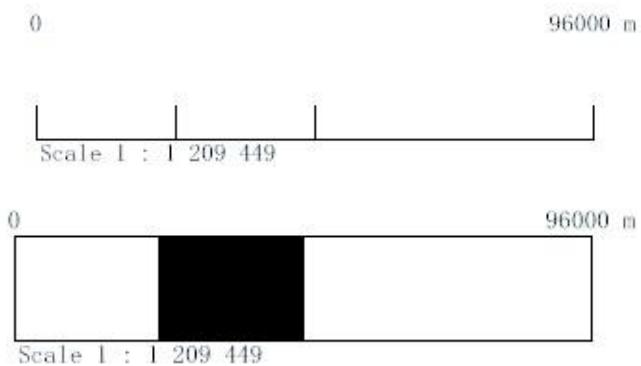


Fig. 482. Different styles of the scale bar

5.10.3. Graticule

To add a graticule on the image or map, select «View» - «Design elements» – «Graticule» menu item (Fig. 483).

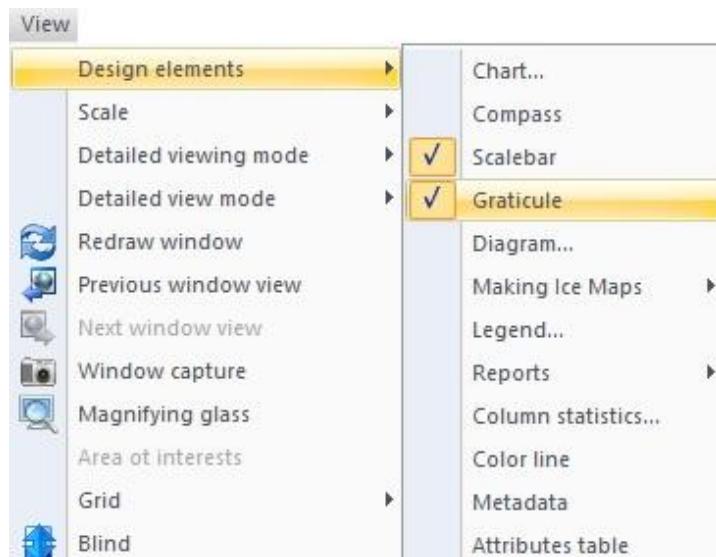


Fig. 483. «*Graticule*» menu item

Grid will appear over the image.

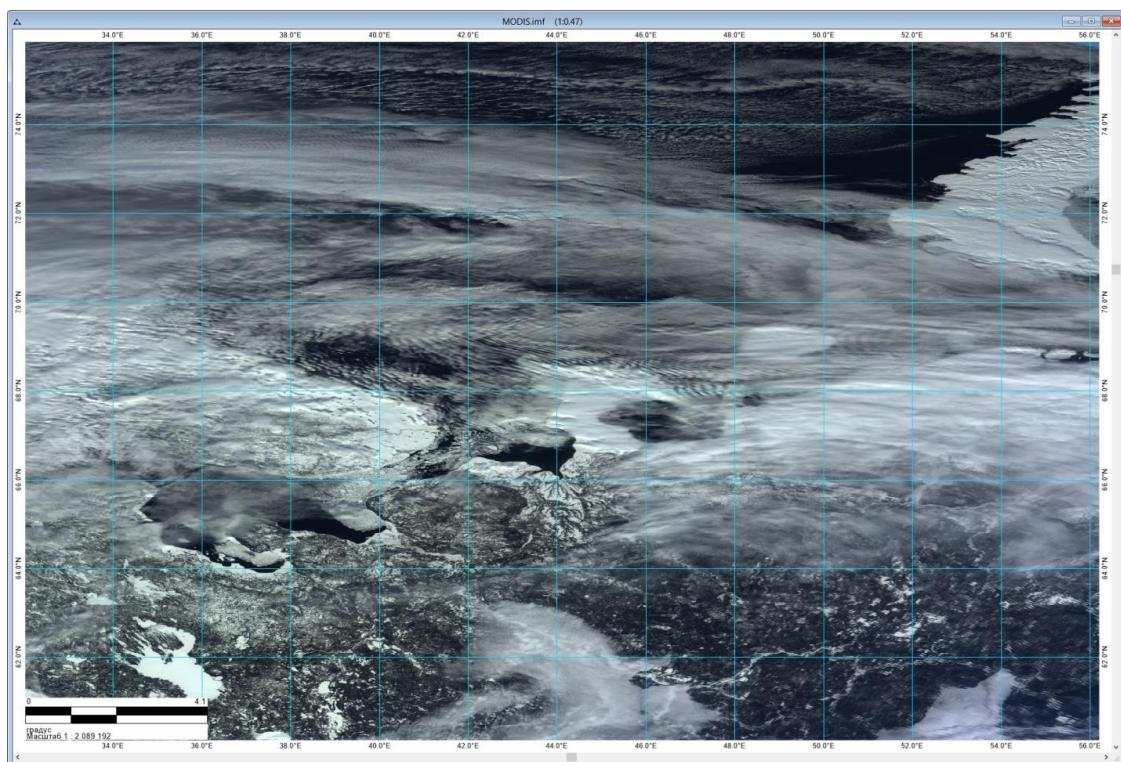


Fig. 484. *Graticule*

«*Graticule*» layer will appear on the «*Layers*» panel (Fig. 485).

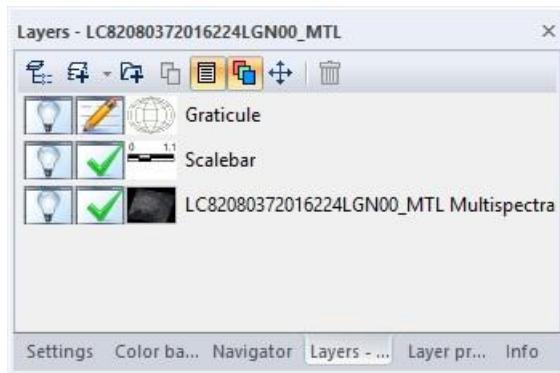


Fig. 485. «*Layers*» panel

User can set the parameters of grid in the «*Layer properties*» panel (Fig. 486)

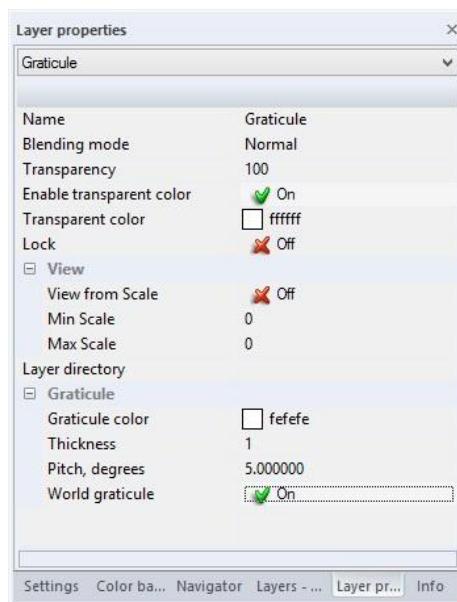


Fig. 486. «*Layer properties*» panel

5.10.4. Diagram

«*Diagram*» item is used as a design element of the resulting report for the thematic maps. It is good for the visualization of the ratio of different kinds of objects To add a diagram on the image, map or report, select «*View*» - «*Design elements*» – «*Diagram*» menu item.

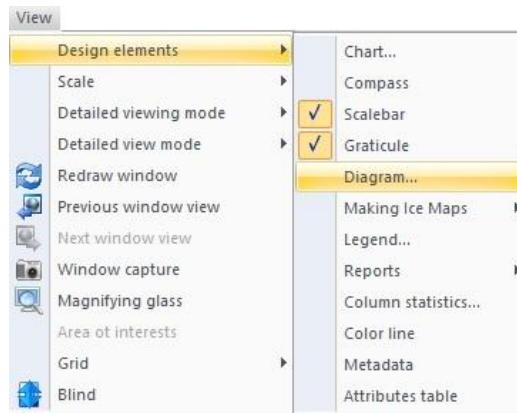


Fig. 487. «Diagram» menu item.

In the «Diagram» dialog box user can adjust various parameters of the diagram, such as its name, background color, labels, and scaling factor; also user can select the document, vector layer and the attributes which will be displayed on the diagram.

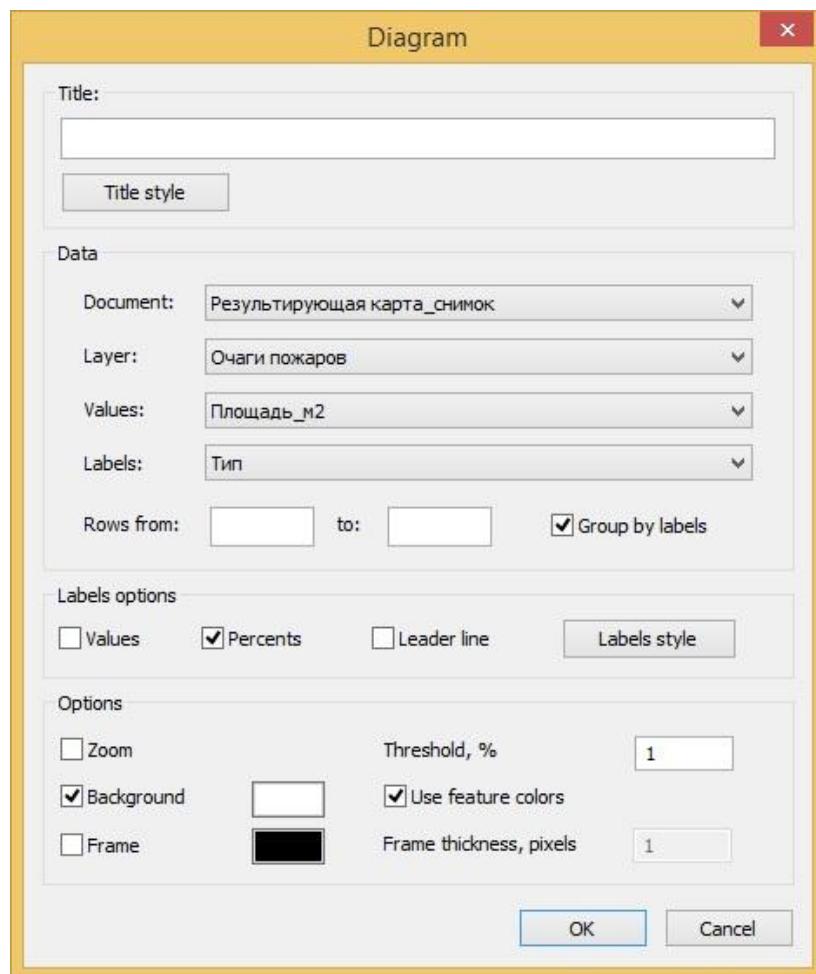


Fig. 488. «Diagram» dialog box.

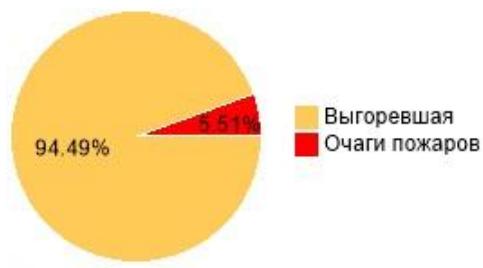


Fig. 489. *Diagram example.*

5.10.5. Legend

To add a legend on the image or map, select «View» - «Design elements» – «Legend» menu item (Fig. 490).

In «Legend», dialog box user can set the following parameters:

- Name of the legend
- Header style
- List of the elements to display in the legend:
- Attribute information
- Number of columns
- Color and thickness of the border
- Scale factor
- Background color
- Style of the labels.

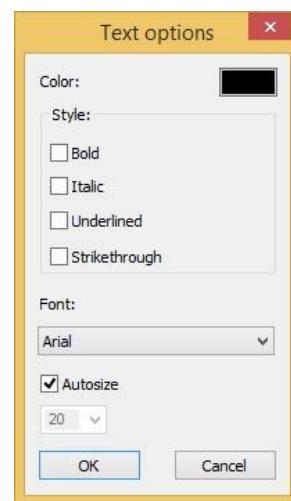


Fig. 490. «Text options» dialog box

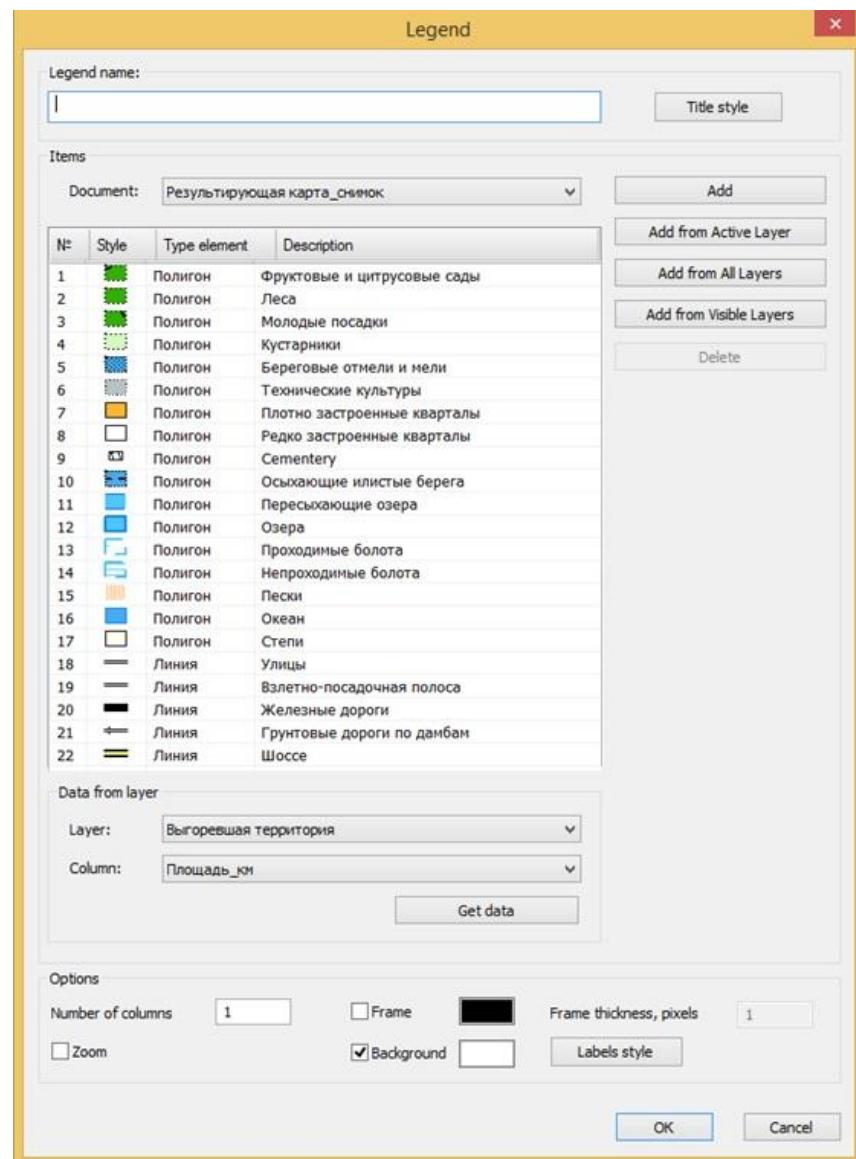


Fig. 491. «Legend» dialog box

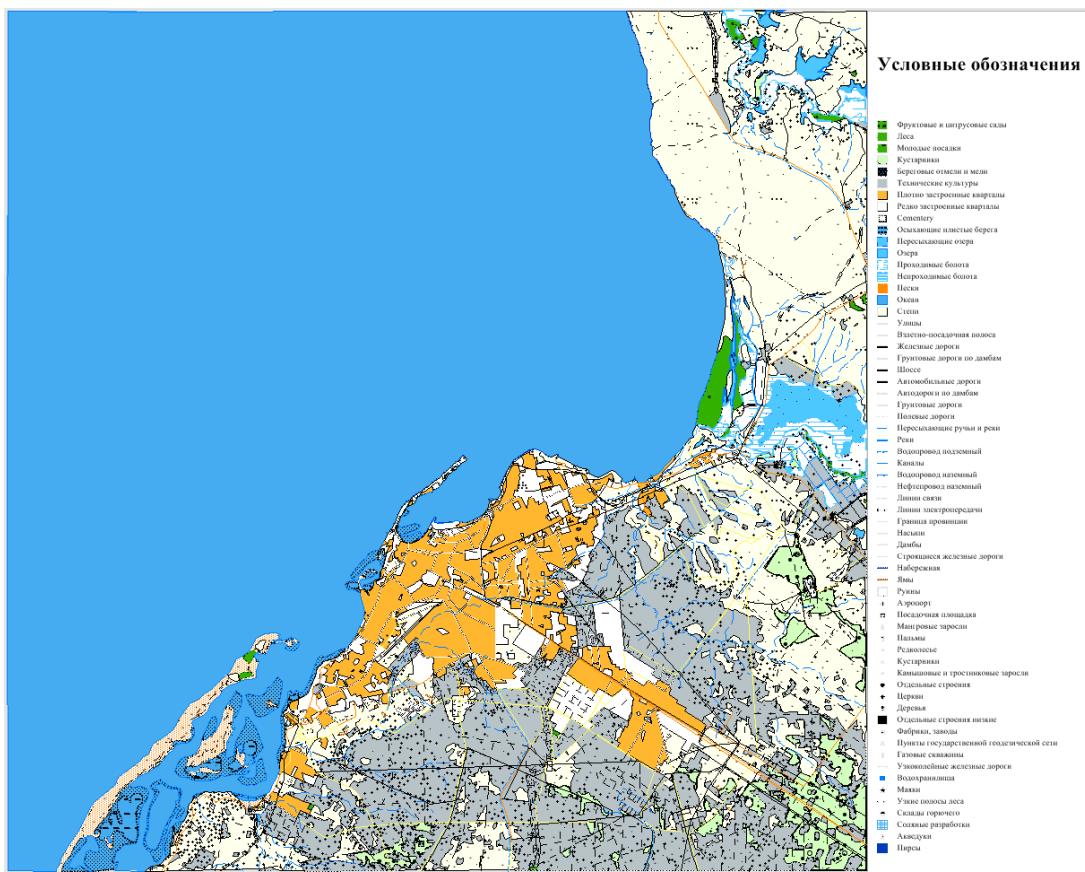


Fig. 492. Legend on the vector map

The example of the legend which displays attribute data is shows on the Fig. 493, 494.

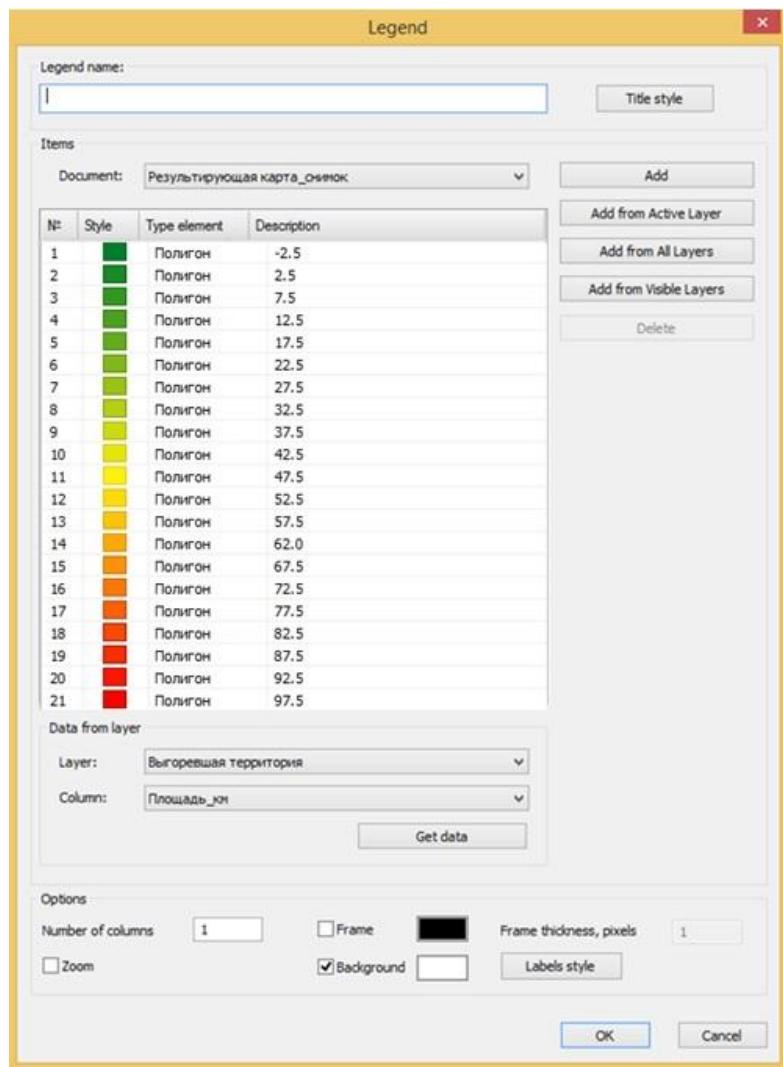


Fig. 493. Adding attribute information to the description of the legend

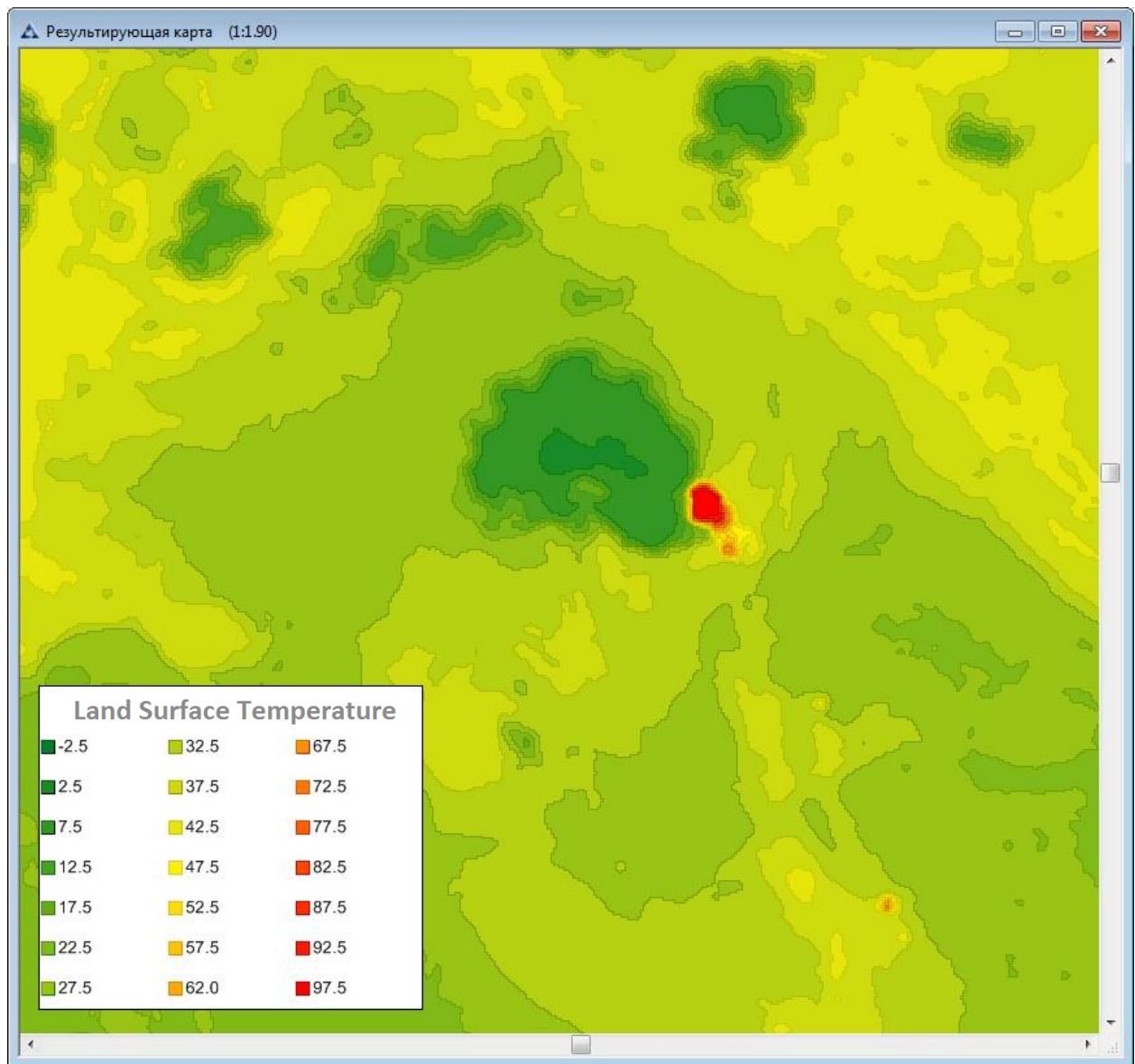


Fig. 494. The example of the legend of the temperature map

5.10.6. Report creation

Report creation is performed based on the documents, opened in IMC workspace.

5.10.6.1 Report template creation.

Press «New report» button  and set the basic parameters of the report in the opened «New document» dialog box (Fig. 495).

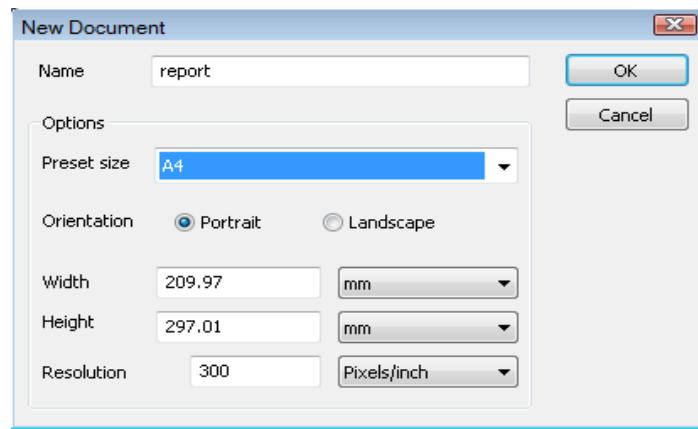


Fig. 495. *Creating new report*

The empty report will be generated. User should fill it with design elements (Fig. 496).

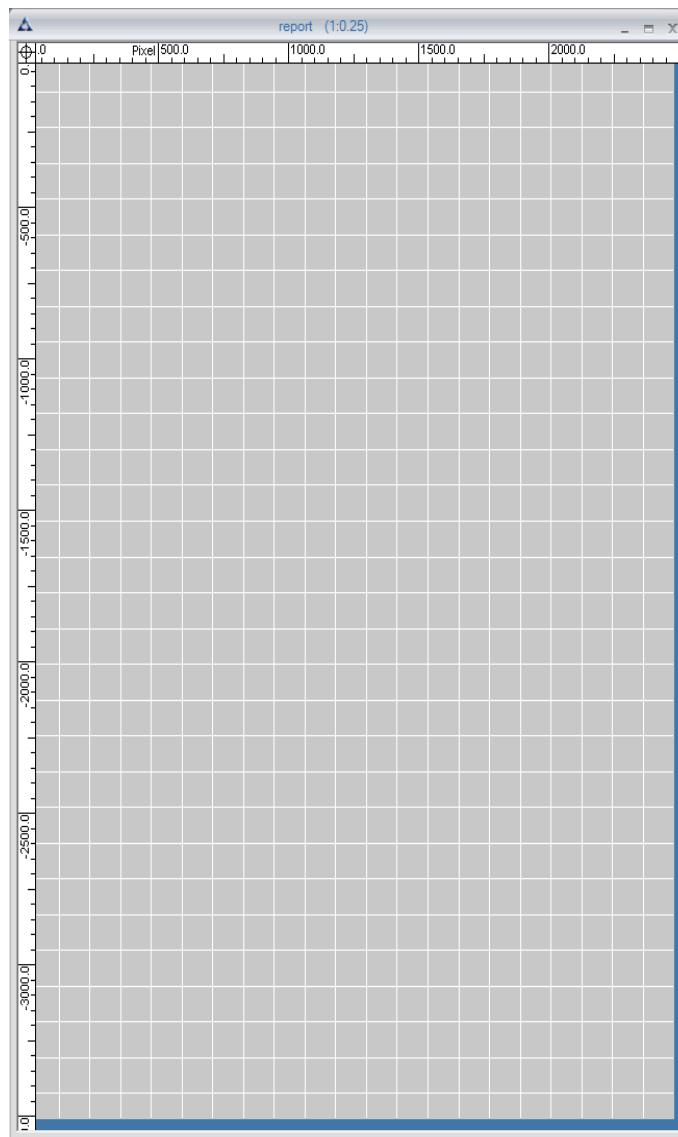


Fig. 496. *Empty report template*

Add design elements with the «Cursor» tool , press and hold left mouse button and frame the area where the design element should be placed. After the mouse button is released, «Window selection» dialog box will open (Fig. 497).

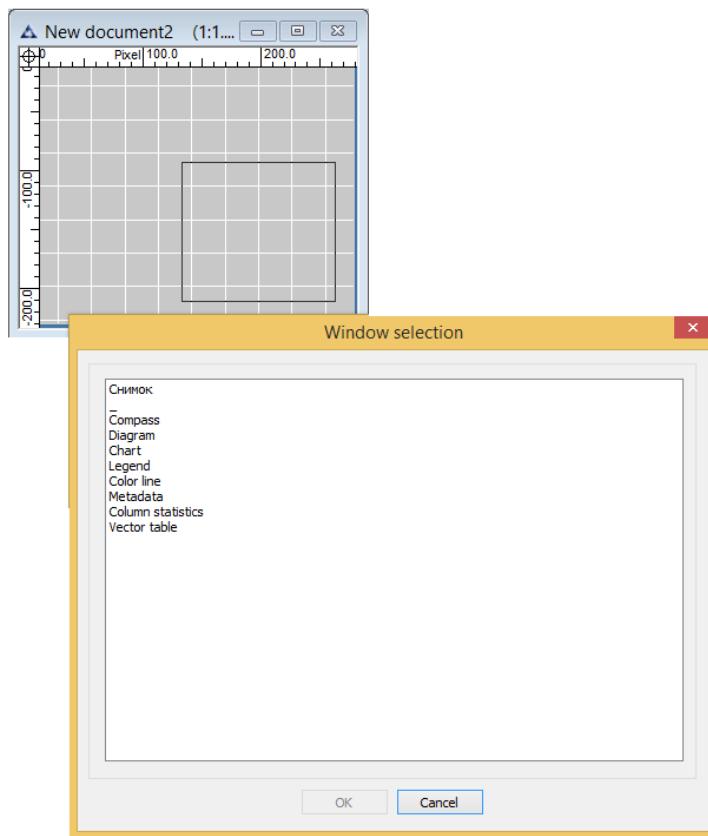


Fig. 497. «Window selection» dialog box

Select the design element from the list and press «OK» button (Fig. 498) The dialog box will close and the design element will be added to the report template (Fig. 499).

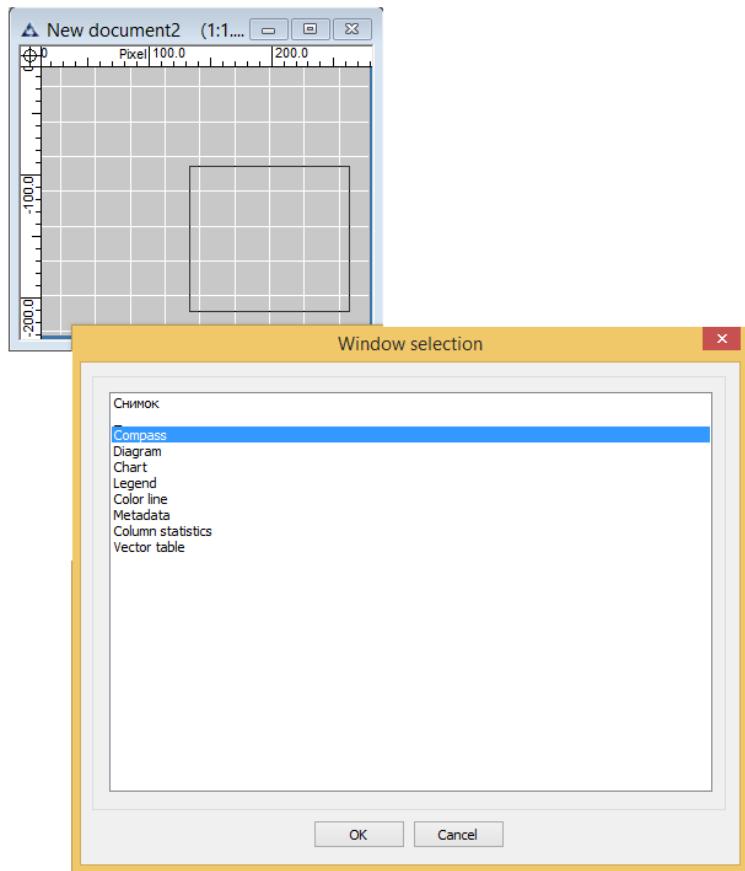


Fig. 498. *Selecting the design element to add on the report template*

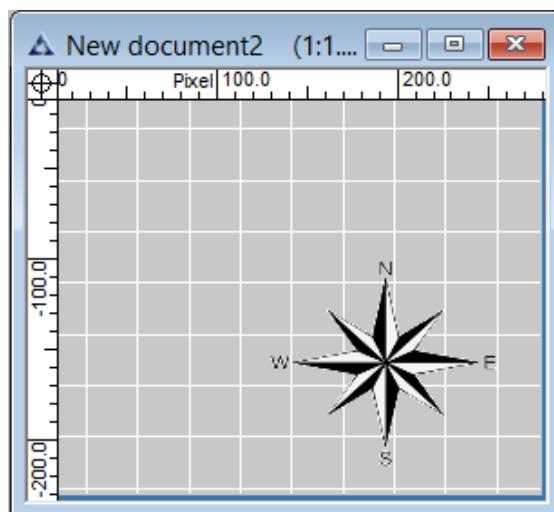


Fig. 499. *Design element on the report template*

Following elements can be added to the report template: opened documents (image or map will be located in the specified area of the report template), compass, diagram, graph, legend, color scale, metadata of the image, vector layer statistics, and attribute table of vector layer (Fig. 500).

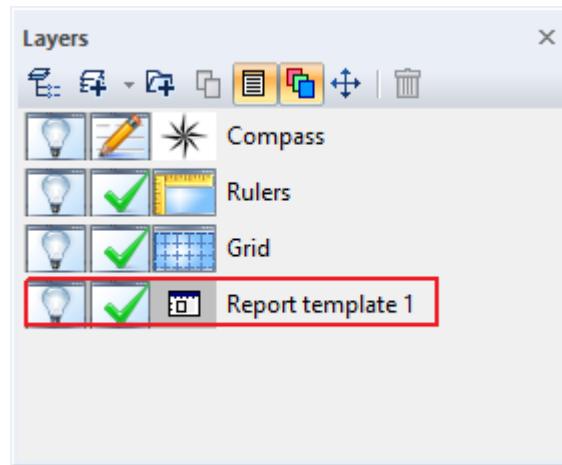


Fig. 500. «Report template» layer

Each element can be customized in the «Layer properties» panel (Fig. 501, 502). Make sure that the layer you want to customize is selected.

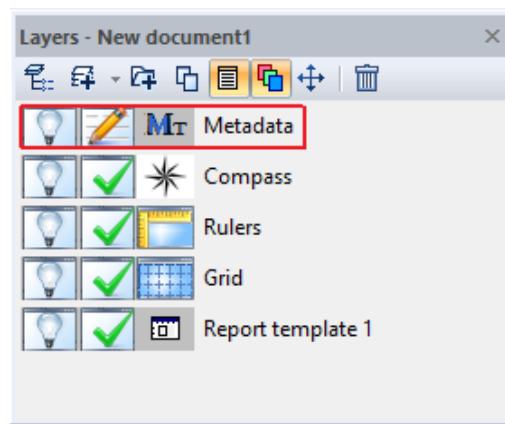


Fig. 501. Selecting the layer to edit

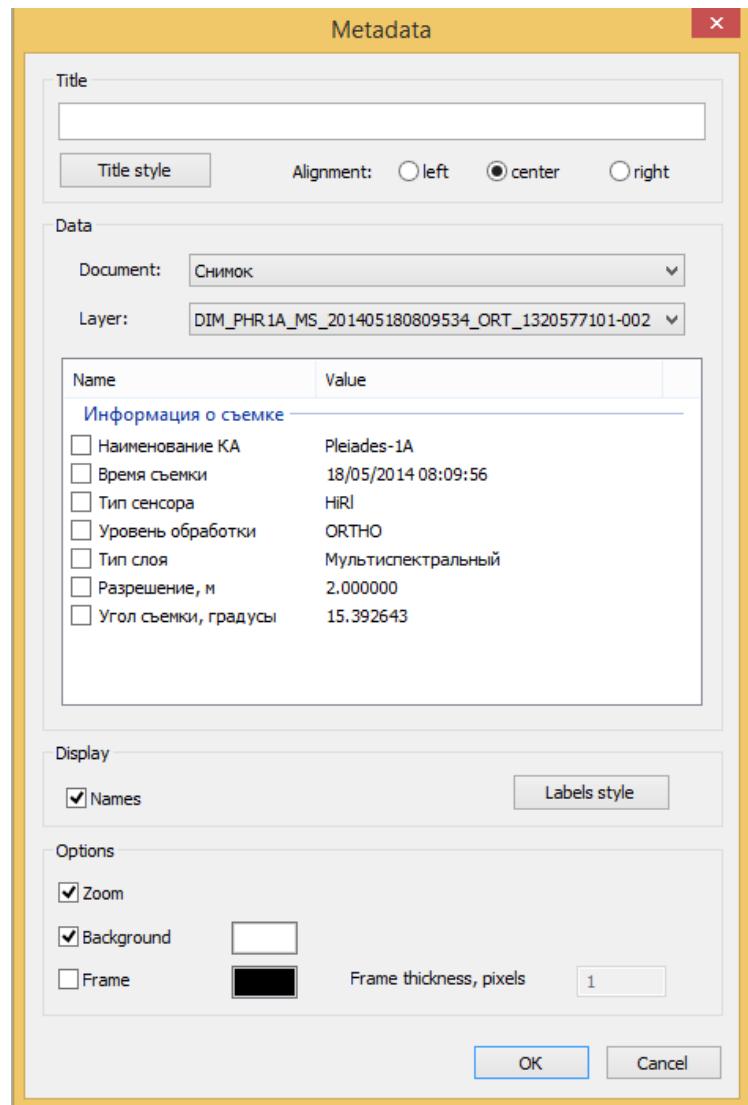


Fig. 502. *Image's metadata editing dialog box*

5.10.6.2 Updating report template

Once the report template is created and saved, it can be used to generate reports for different thematic processing. To update the report according to the new document, press «Update report» button .

5.10.6.3 Generating report

To generate the report, press «Generate report» button .

5.10.6.4 Saving report

To save the report, press «Save report» button  and select file extension *.jpeg or *.pdf.

5.10.7. Column statistics

To visualize the information from attribute table, select «View» - «Design elements» - «Column statistics» menu item.

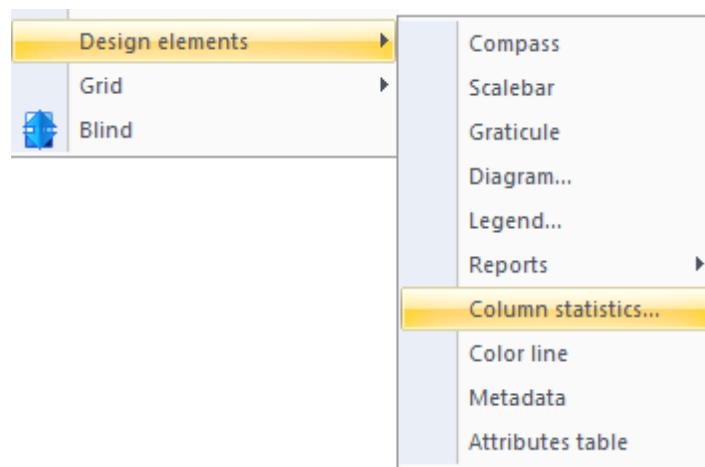


Fig. 503. «Column statistics» menu item

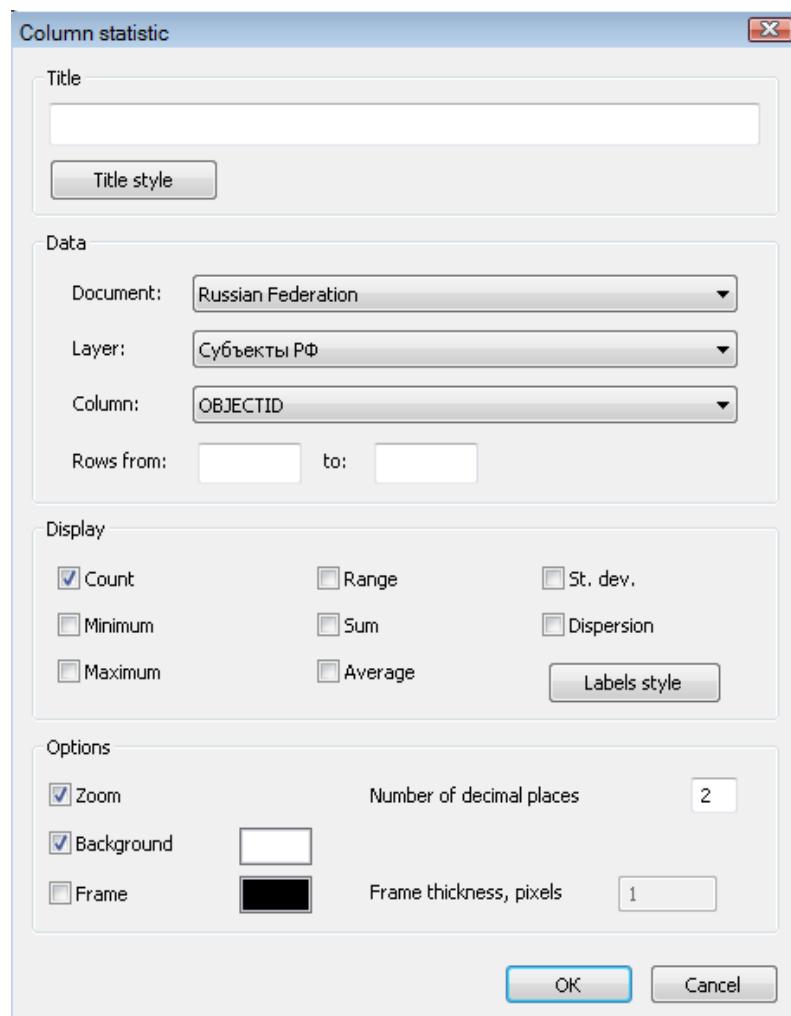


Fig. 504. «Column statistics» dialog box

5.10.8. Color line

Color line is used as a design element of temperature maps. Color line represents the temperature range from -100 to +100 degrees Celsius.

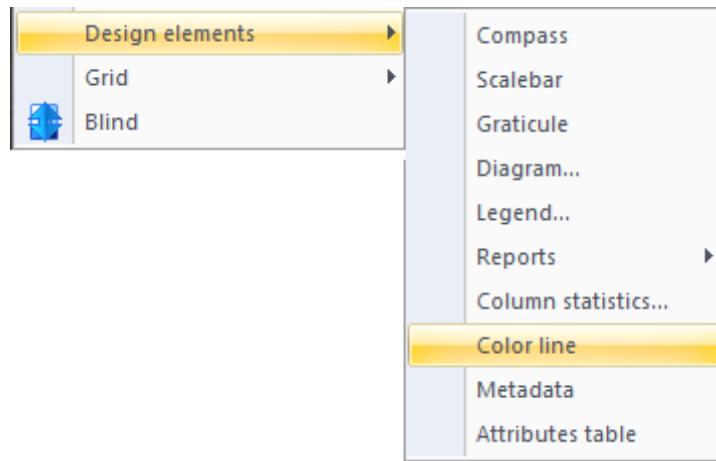


Fig. 505. «Color line» menu item

Fig. 552 shows the default view of the color line.

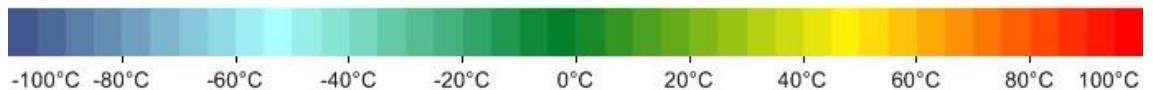


Fig. 506. Color line

Right click on the color line to open context menu «Properties».

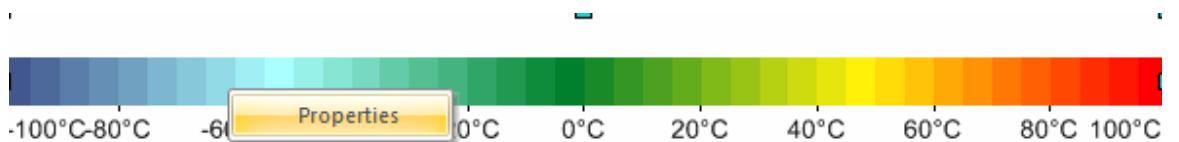


Fig. 507. Context menu «Properties»

User can adjust following color line properties:

- 1) Minimum and maximum values
- 2) Range
- 3) Direction (vertical or horizontal)
- 4) Colors
- 5) Labels
- 6) Units
- 7) Scale factor
- 8) Background color

9) Border style

10) Decimal precision

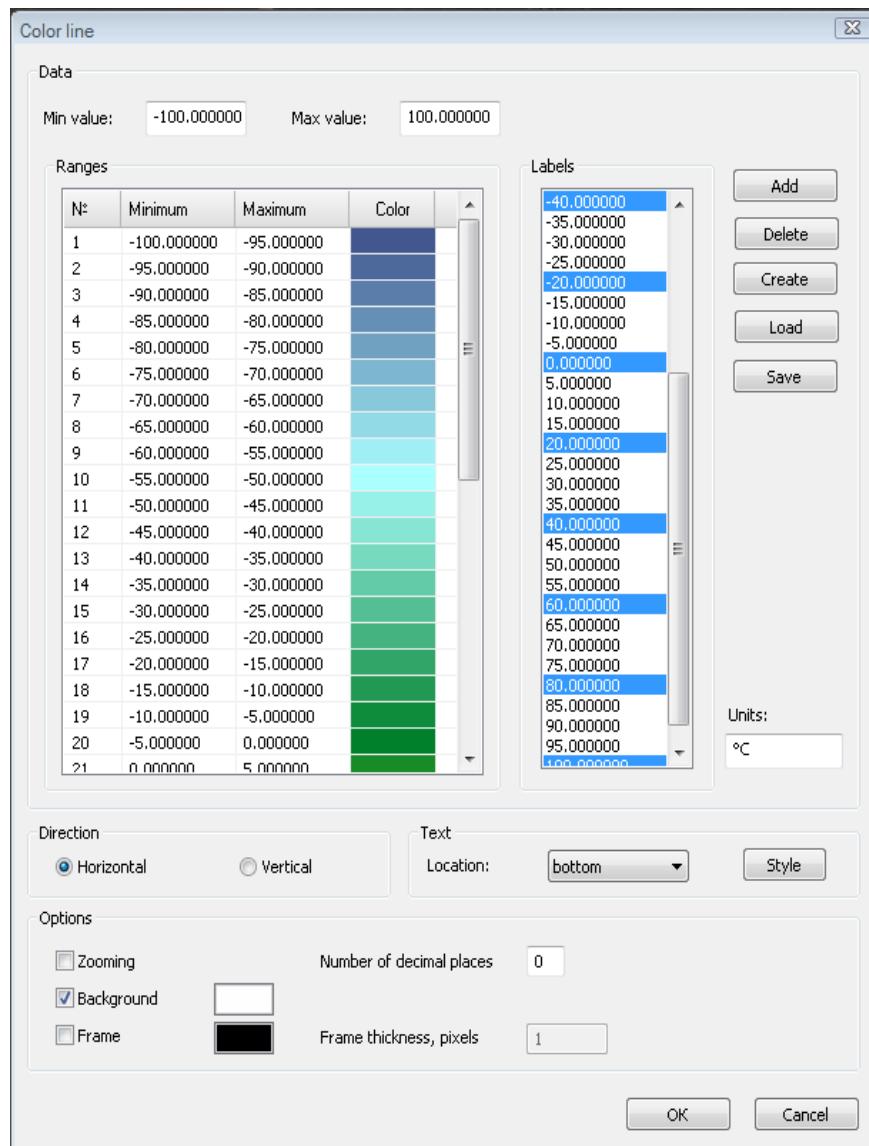


Fig. 508. «Color line» dialog box

5.10.9. Metadata

«Metadata» item is used as a design element for resulting reports. It visualizes the information about the satellite and equipment of shooting. Select «View» - «Design elements» - «Metadata» menu item (Fig. 509) to open «Metadata» dialog box.

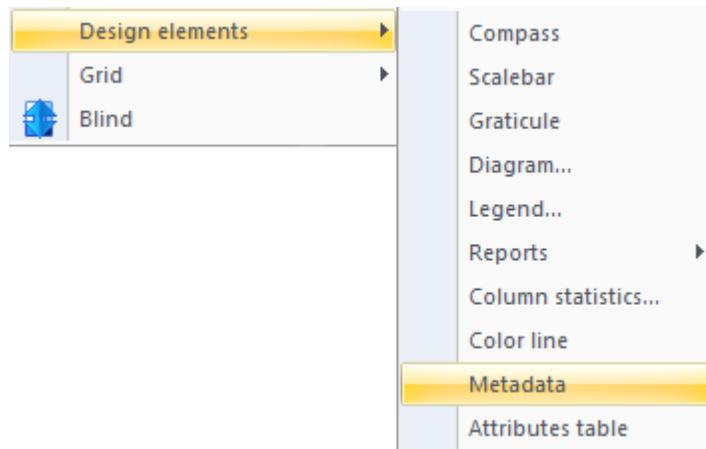


Fig. 509. «*Metadata*» menu item

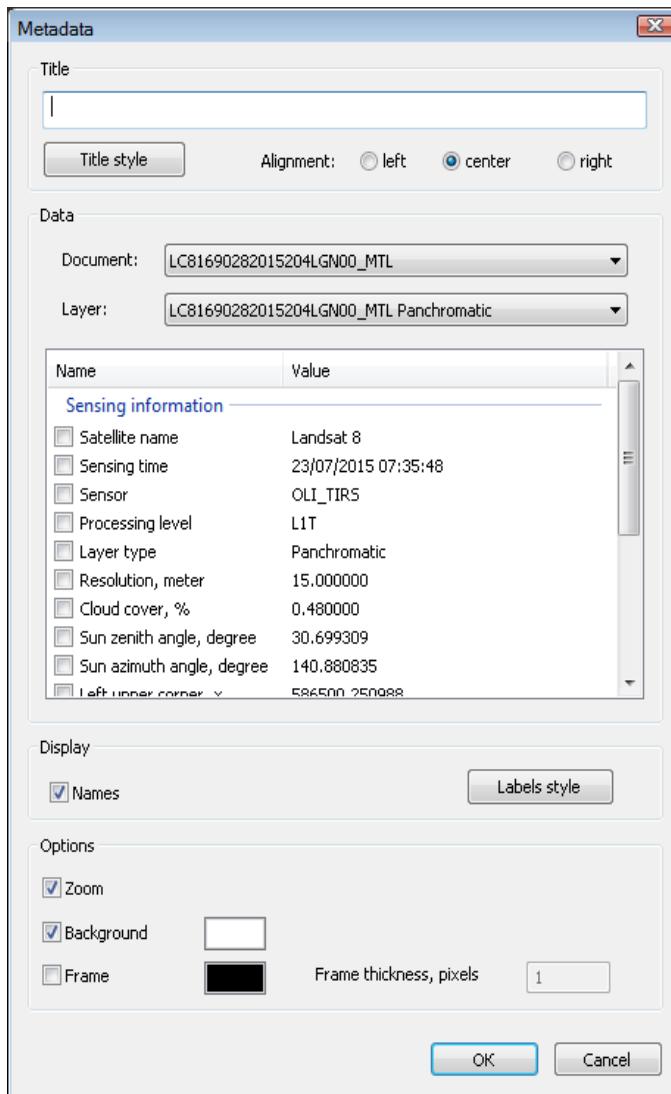


Fig. 510. «*Metadata*» dialog box.

In «*Metadata*» dialog box user can select the information to be visualized on the report:

- Satellite name;
- Shooting time;
- Equipment type;
- Processing level;
- Layer type;
- resolution (meters).

Satellite name	Landsat 8
Sensing time	23/07/2015 07:35:48
Sensor	OLI_TIRS
Processing level	L1T
Layer type	Panchromatic
Resolution, meter	15.000000

Fig. 511. «*Metadata*» design element

5.10.9.1 Attribute table

«*Attribute table*» item is used as a design element for resulting reports. It visualizes the information from attribute table of vector objects. Select «View» - «Design elements» - «Attribute table» menu item (Fig. 512) to open «*Attribute table*» dialog box

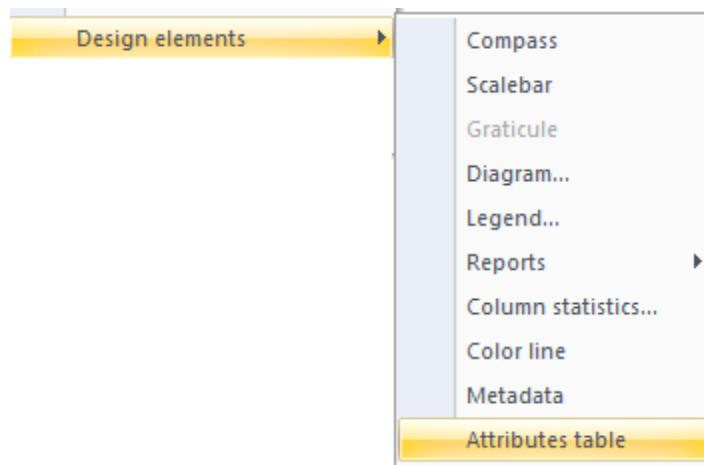


Fig. 512. «*Attribute table*» menu item

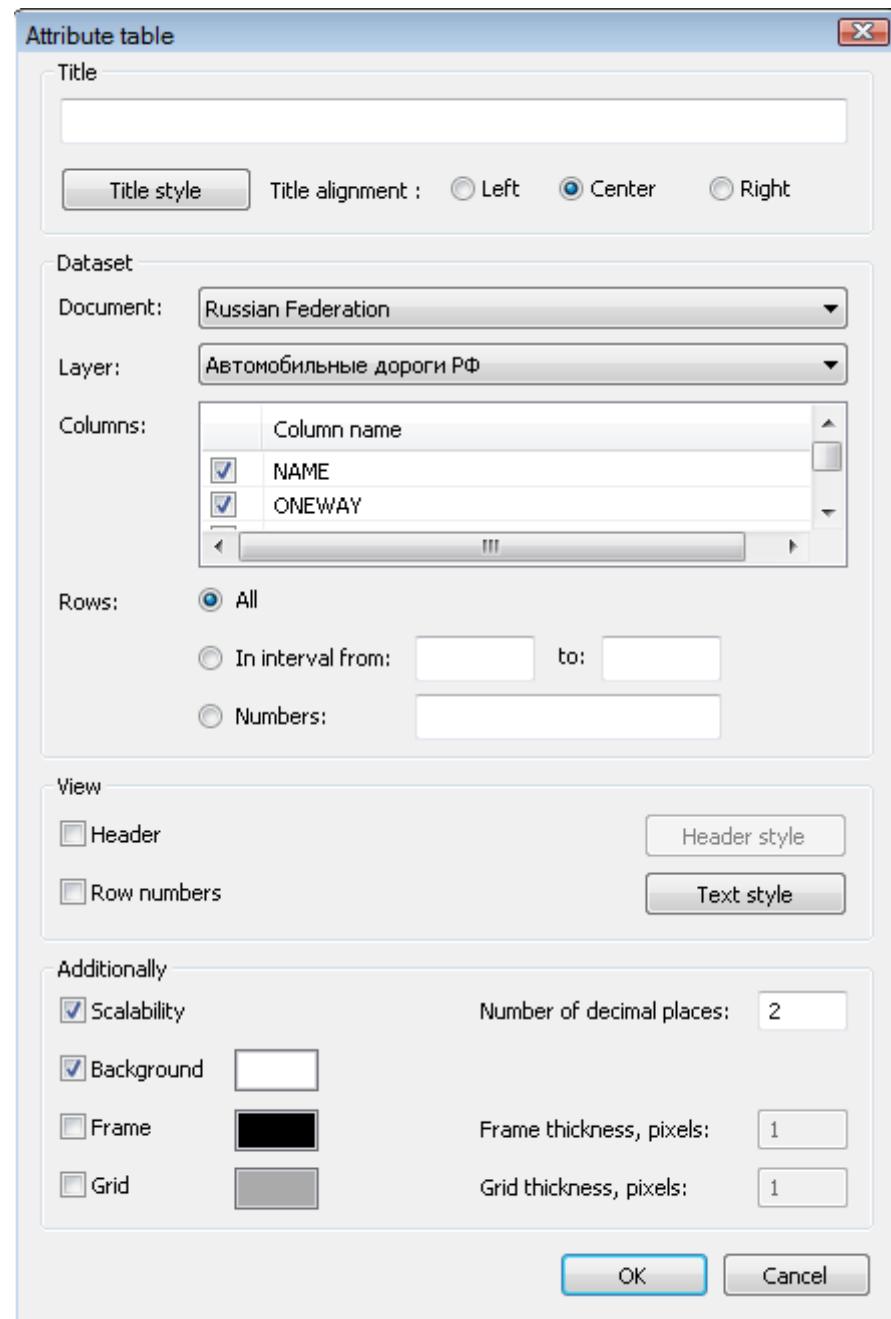


Fig. 513. «Attribute table» dialog box \

Вода	11609.	0.0116	1.1609
Вода	10008.	0.0100	1.0008
Вода	3202.5	0.0032	0.3202
Вода	4203.3	0.0042	0.4203
Вода	5904.7	0.0059	0.5904
Вода	3903.1	0.0039	0.3903
Вода	4203.3	0.0042	0.4203

Fig. 514. «Attribute table» design element

5.10.10. Scale

«Scale» section contains tools for image scaling, such as zoom in, zoom out, actual size and fit into screen. To scale the image while using any other tools, use mouse wheel.

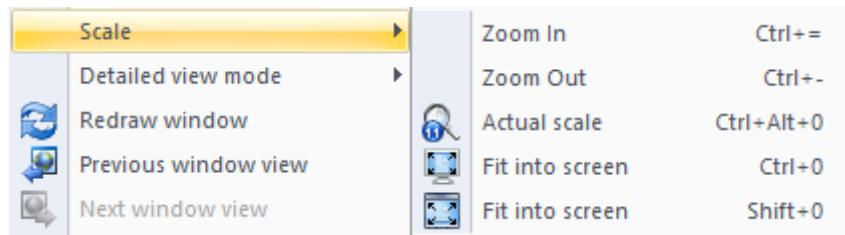
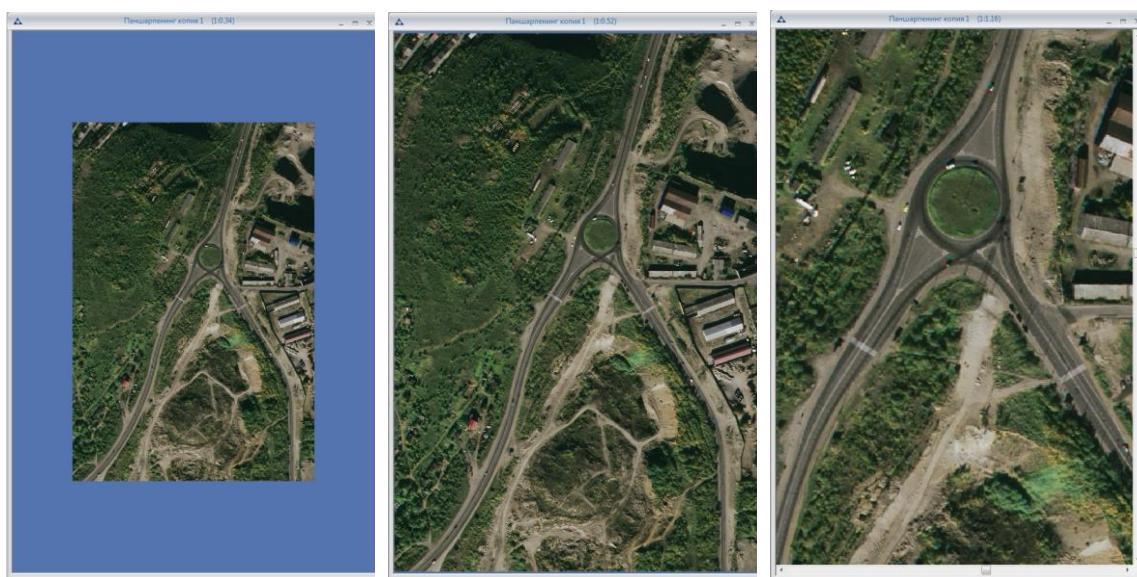


Fig. 515. «Scale» section



a) Zoomed out image

b) Actual size

c) Zoomed in image

Fig. 516. *Changing image size*

To fit the image into the screen, select «Fit into screen» menu item.



Fig. 517. *Fit into screen image*

To fit the active layer into screen, select «Fit layer into screen» menu item.

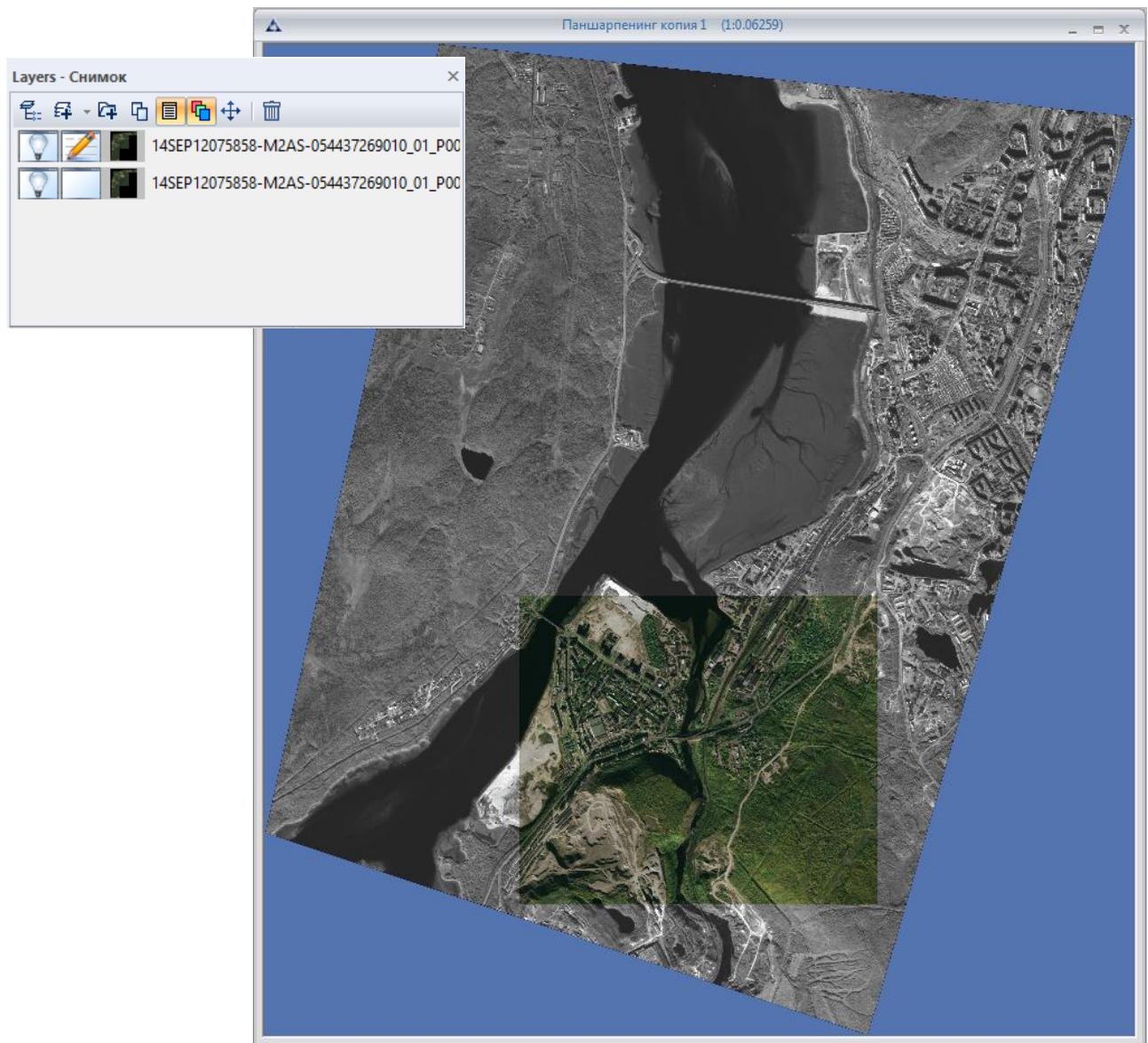


Fig. 518. *Fit into screen layer*

«Magnifying glass» menu item opens the window that follows the cursor and enlarges the area under it.

The size of «Magnifying glass» and its scale can be adjusted in the «Settings» panel.

Select this menu item once again to close the magnifying glass window.

5.10.11. Detailed view

«Detailed view» section contains tools for detailed view windows management.

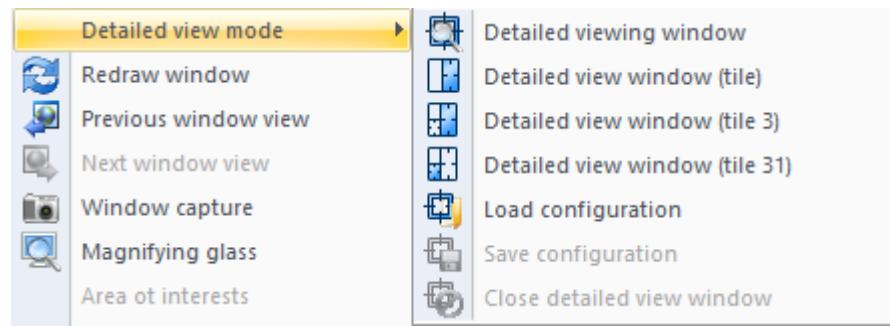


Fig. 519. «Detailed view» section

To enter detailed view mode, select «Detailed view window» menu item. Move the frame of the detailed view window to zoom in different areas of the image.

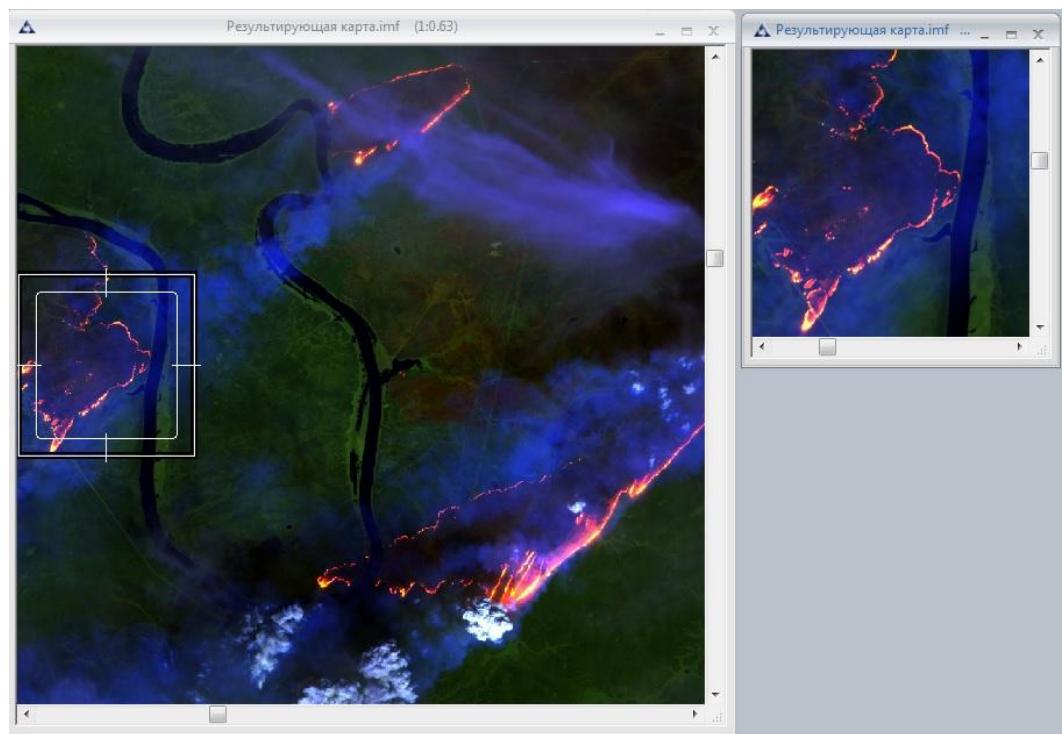


Fig. 520. Detailed view window

Pull the frame of the detailed view window with the mouse cursor to change its size.

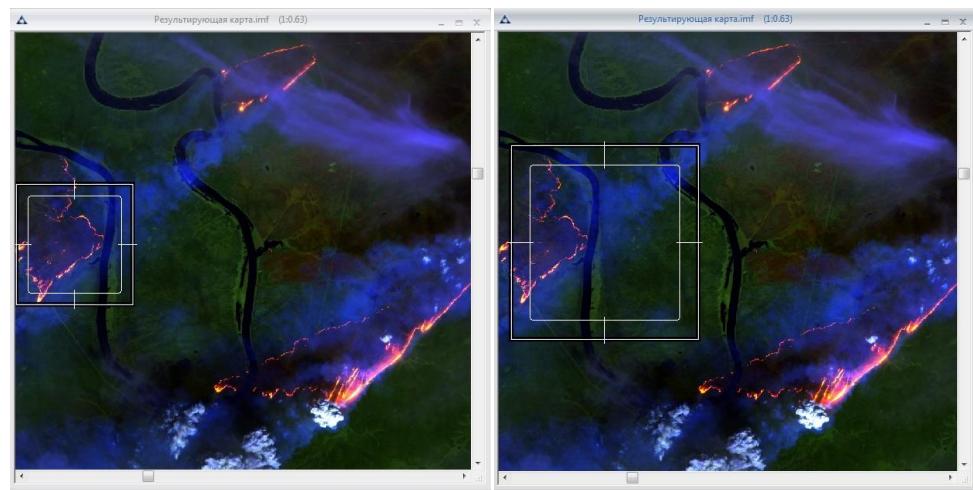


Fig. 521. *Changing the size of the detailed view window*

To arrange the detailed view window alongside the image select «Detailed view window (tile)» menu item.

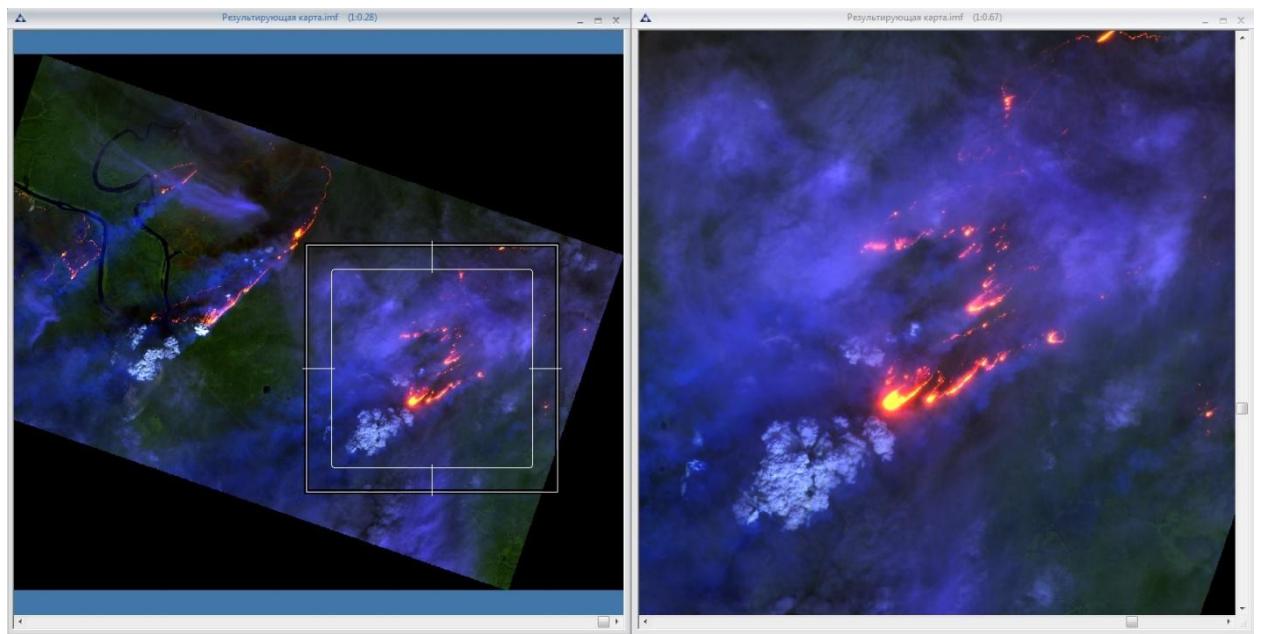


Fig. 522. *«Detailed view window (tile)»*

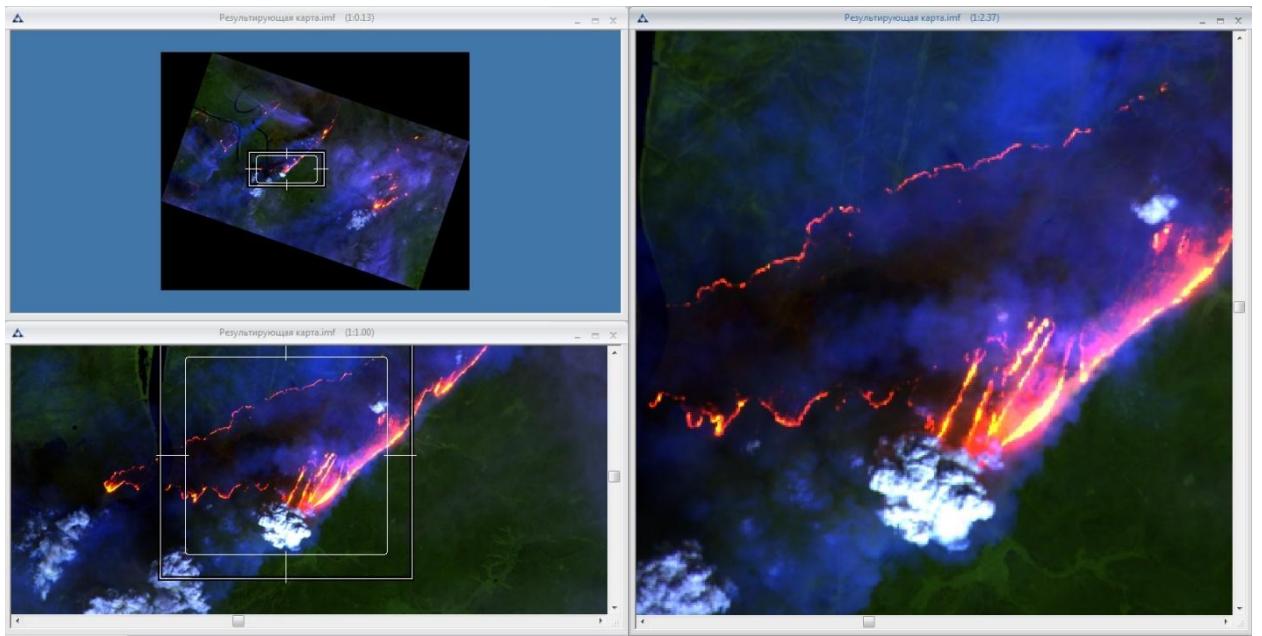


Fig. 523. «Detailed view window (tile 3)»

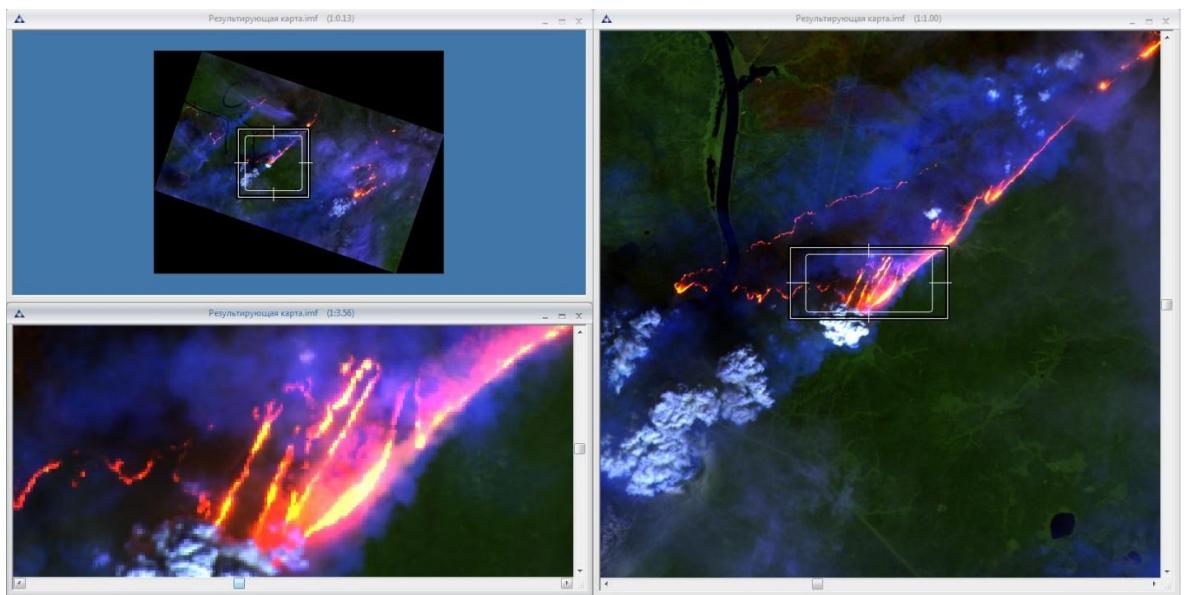


Fig. 524. «Detailed view window (tile 31)»

User can arrange detailed view windows according to their liking. Custom windows arrangement can be saved; to save the configuration, select «Save configuration» menu item.

To apply custom configuration, select «Load configuration» menu item.

5.10.12. «Blind» tool

«Blind» tool makes the part of the current layer transparent to view the background layer (Fig. 525).



Fig. 525. «*Blind*» tool

5.11. «Window» menu

«Window» menu is designed for windows arrangement and user interface adjustment. (Fig. 526).

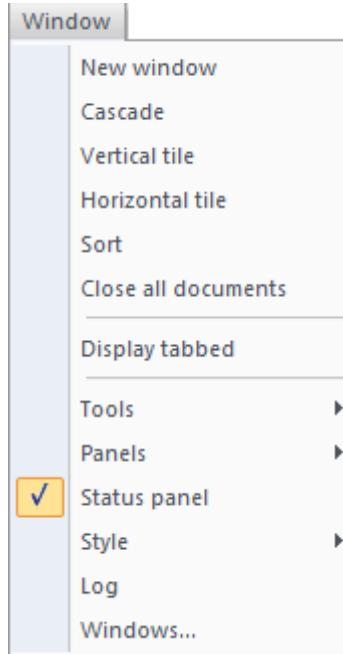


Fig. 526. «Window» menu

«New window» menu item opens a document in a new window. .

«Cascade» menu item will arrange open windows in a “cascade,” allowing user to see all their title bars at once. (Fig. 527).

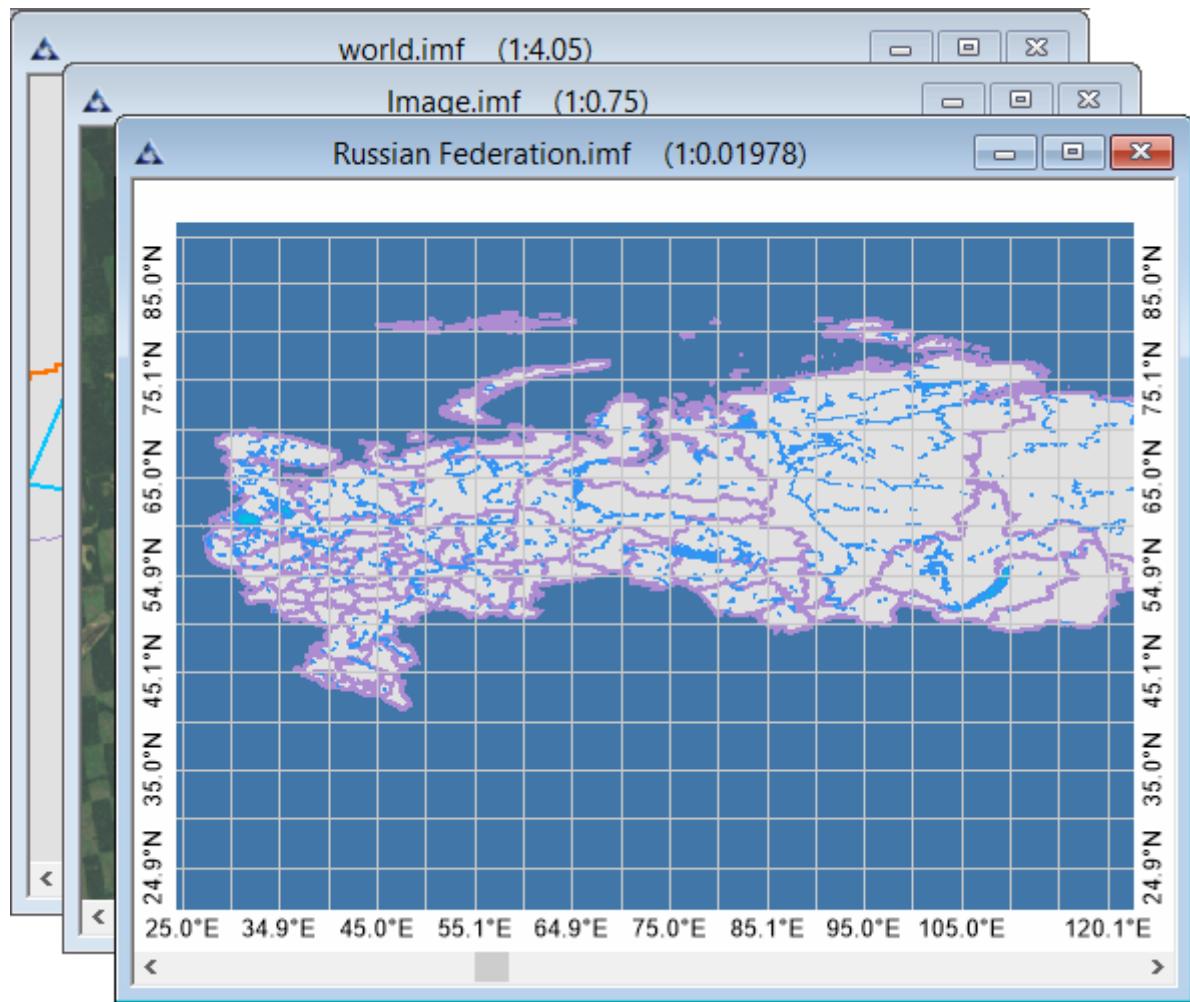


Fig. 527. «Cascade» windows arrangement

«Horizontal tile» and «Vertical tile» menu items allow user to place windows side-by-side horizontally or vertically. All the windows sizes will be equalized (Fig. 528, 529).

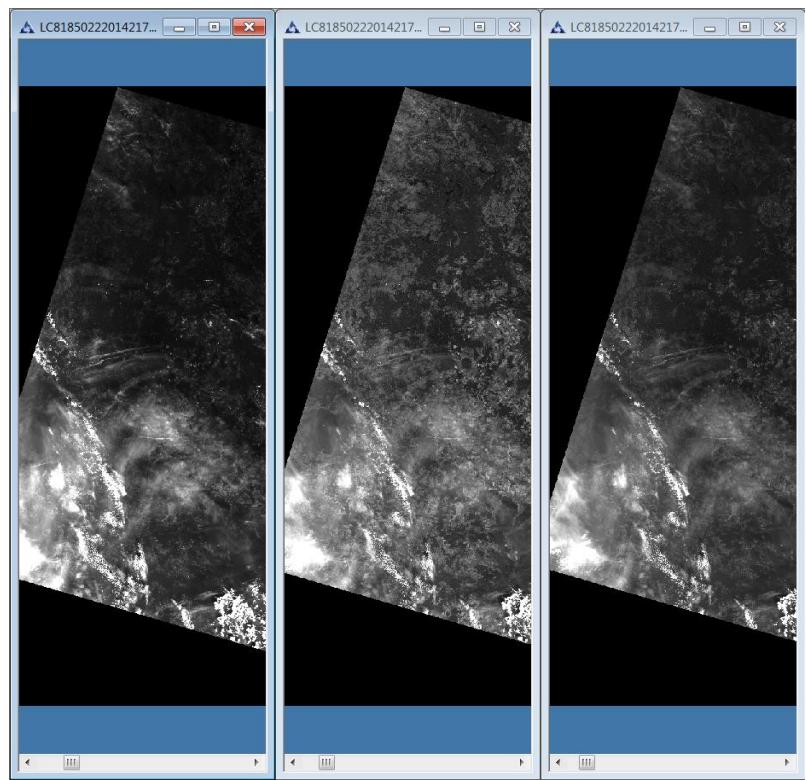


Fig. 528. *Vertical tile windows arrangement*

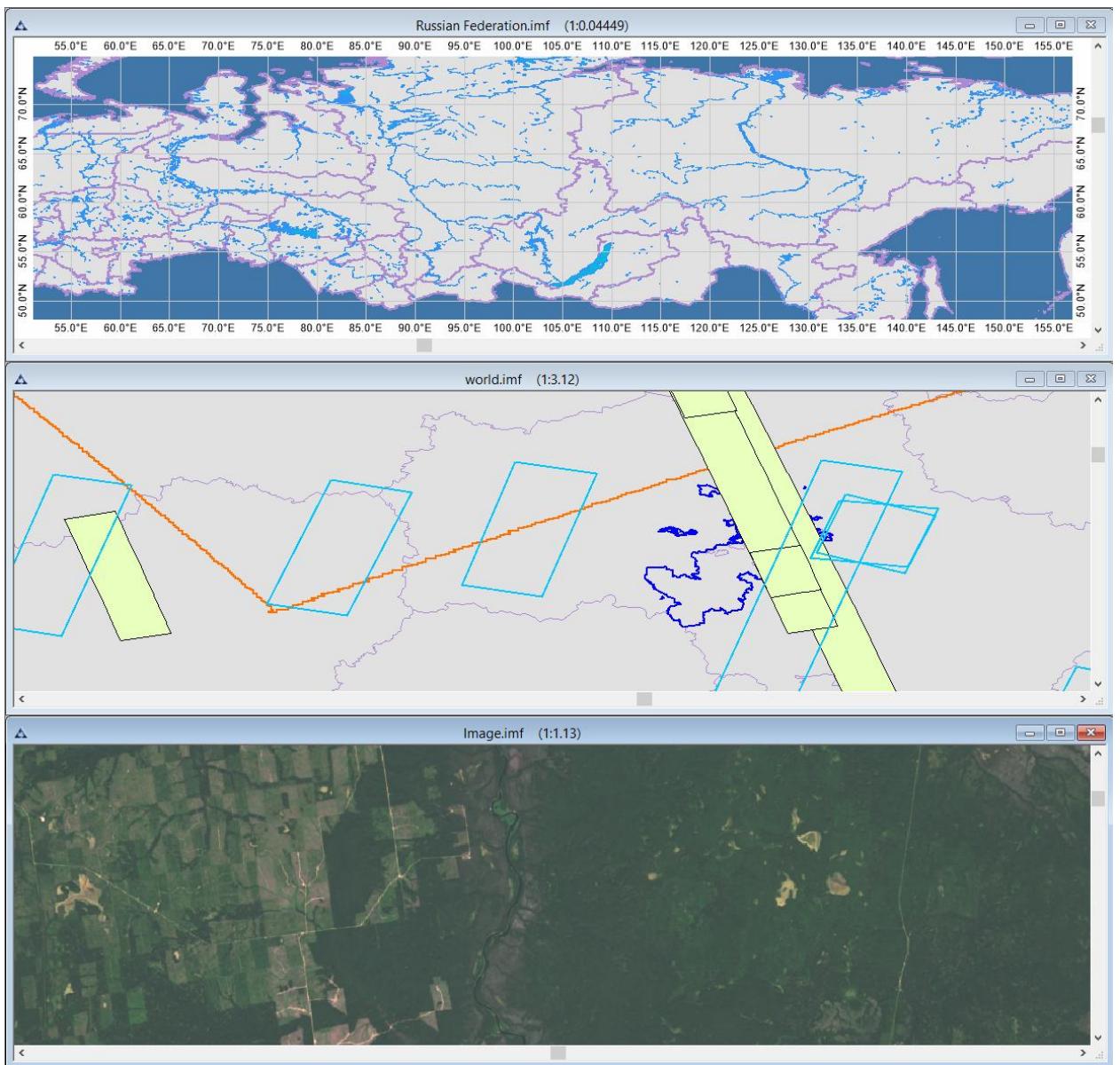


Fig. 529. *Horizontal tile windows arrangement*

«Sort» menu item allows user to sort all the icons of the images.

«Close all documents» menu item closes all the documents opened in the workspace.

«Display tabbed» allows user to arrange all the documents in different tabs (Fig. 530).

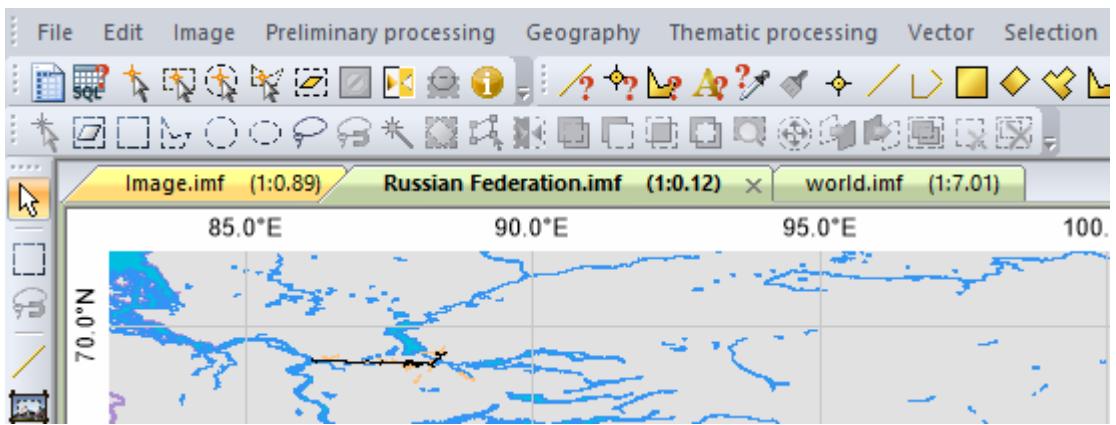


Fig. 530. *Tabbed documents*

«Tools» menu item allows user to select tool bars that will be displayed in the user interface (Fig. 531).

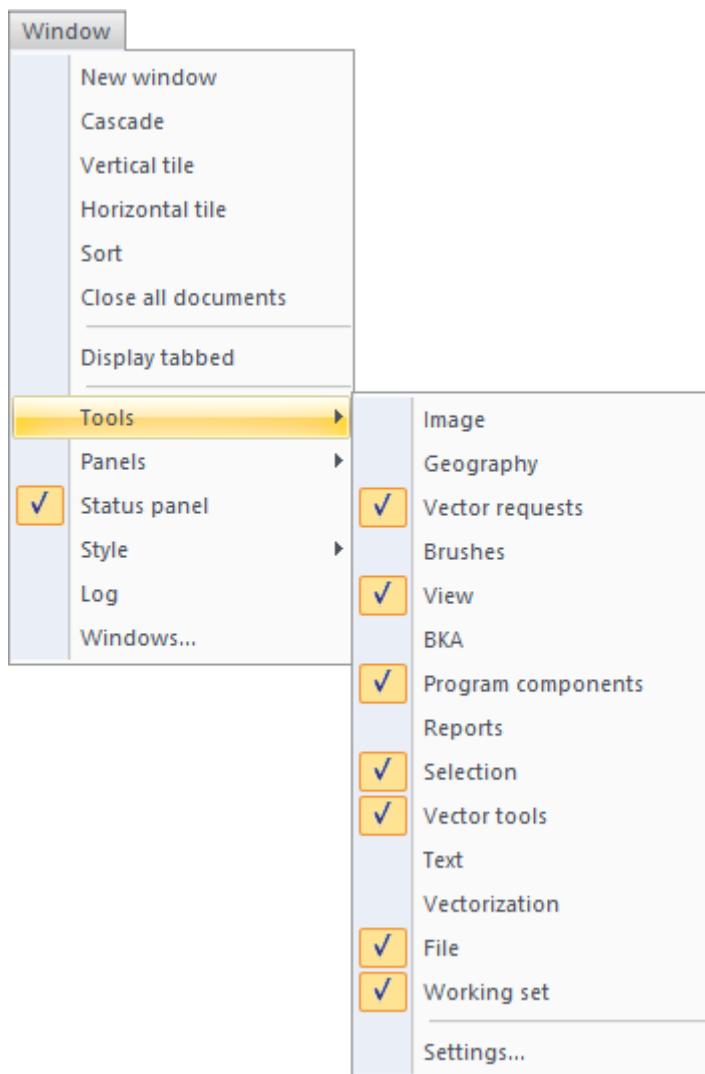


Fig. 531. «Tools» menu item

«Panels» menu item allows user to select tool bars that will be displayed in the user interface (Fig. 532).

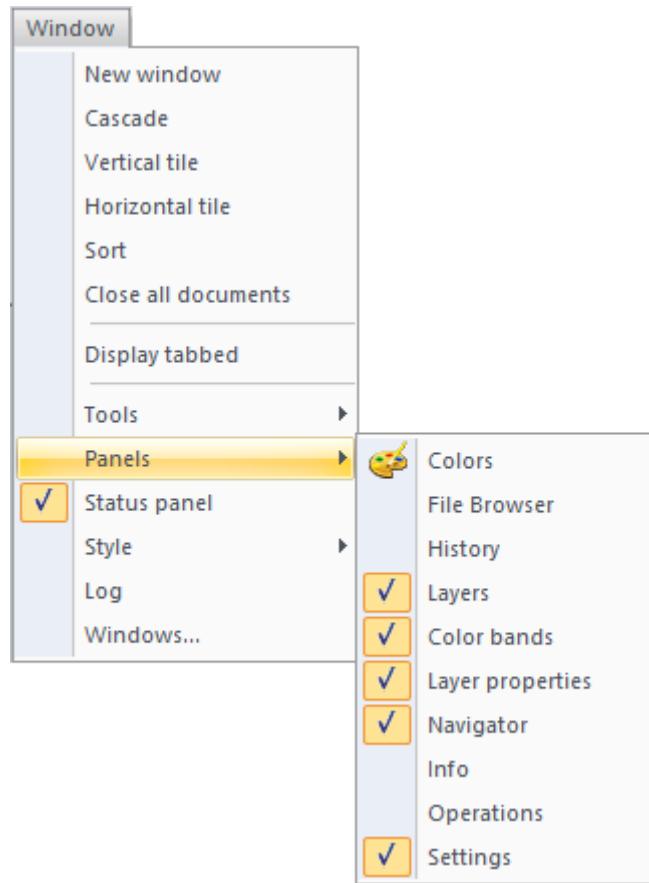


Fig. 532. «Panels» menu item

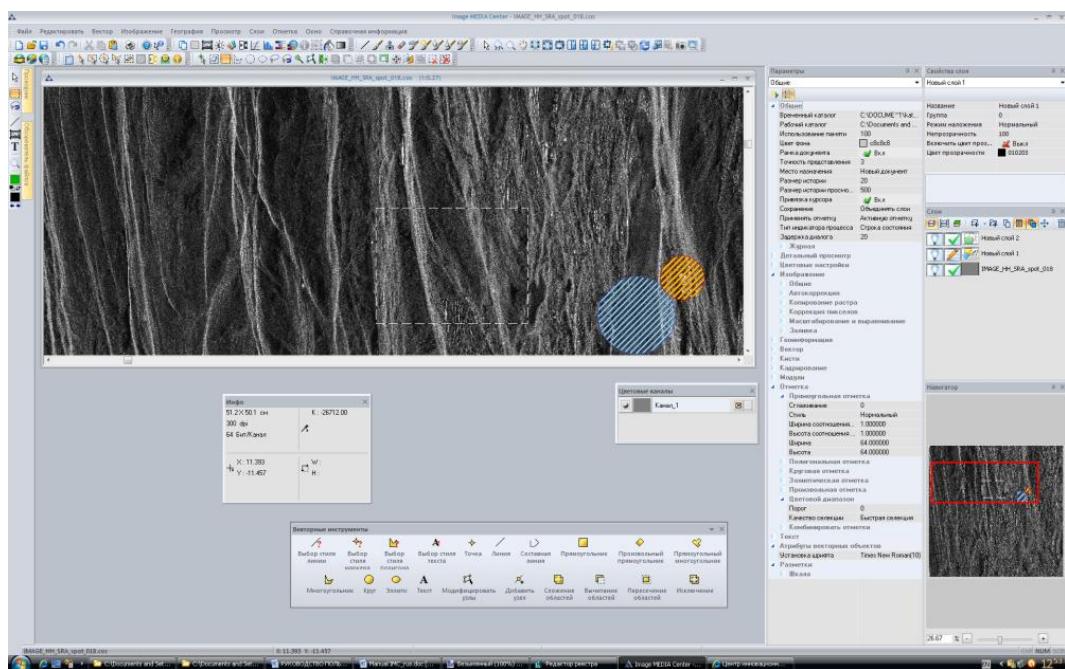


Fig. 533. Arbitrary panels arrangement

When user moves the panel, indicators to determine the required position of the selected panel appear on the perimeter and in the center of the screen

The panels can be positioned relative to each other. To do this, move a panel on top of another panel and select the desired position (left, right, top, bottom, as a tab) (Fig. 534, 535).

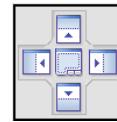


Fig. 534. Indicators for determining the position of the panel

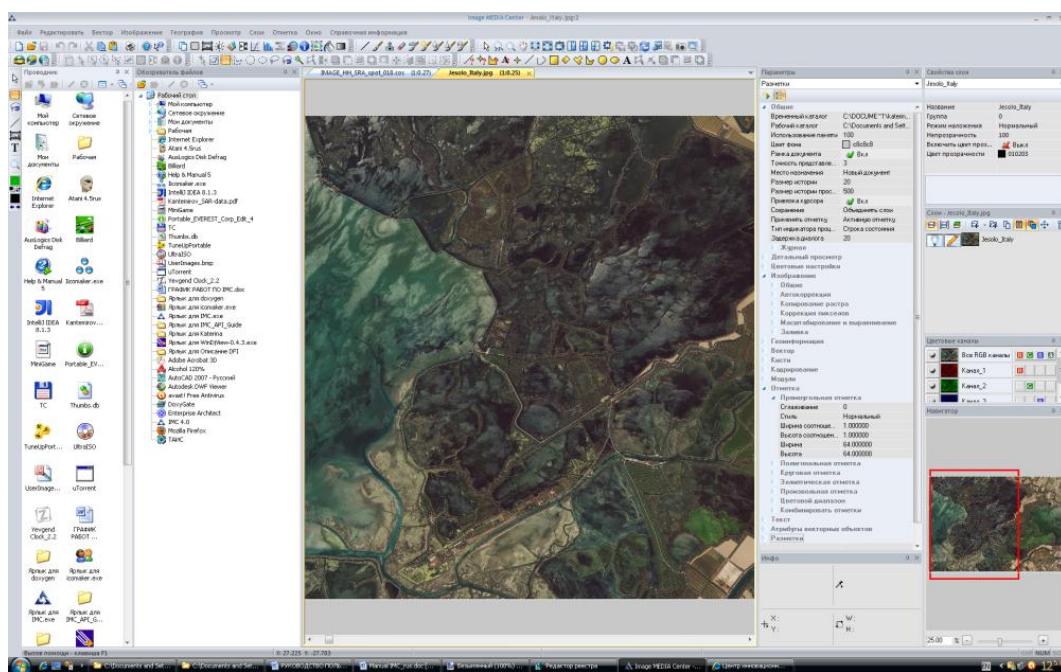


Fig. 535. Custom placement of the panels

To hide the panel, press «Auto hide» button (Fig. 536).



Fig. 536. Hiding panels

Place the cursor over the hidden panel to open it.

Press the button  one again to fixate the panel on the screen

«Status panel» menu item allows user to display or hide the progress bar (Fig. 537).

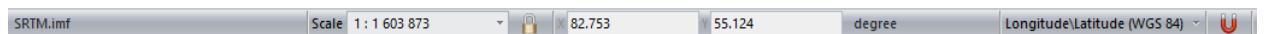


Fig. 537. *Status panel*

«Style» panel allows user to select the style of the user interface (Fig. 538).

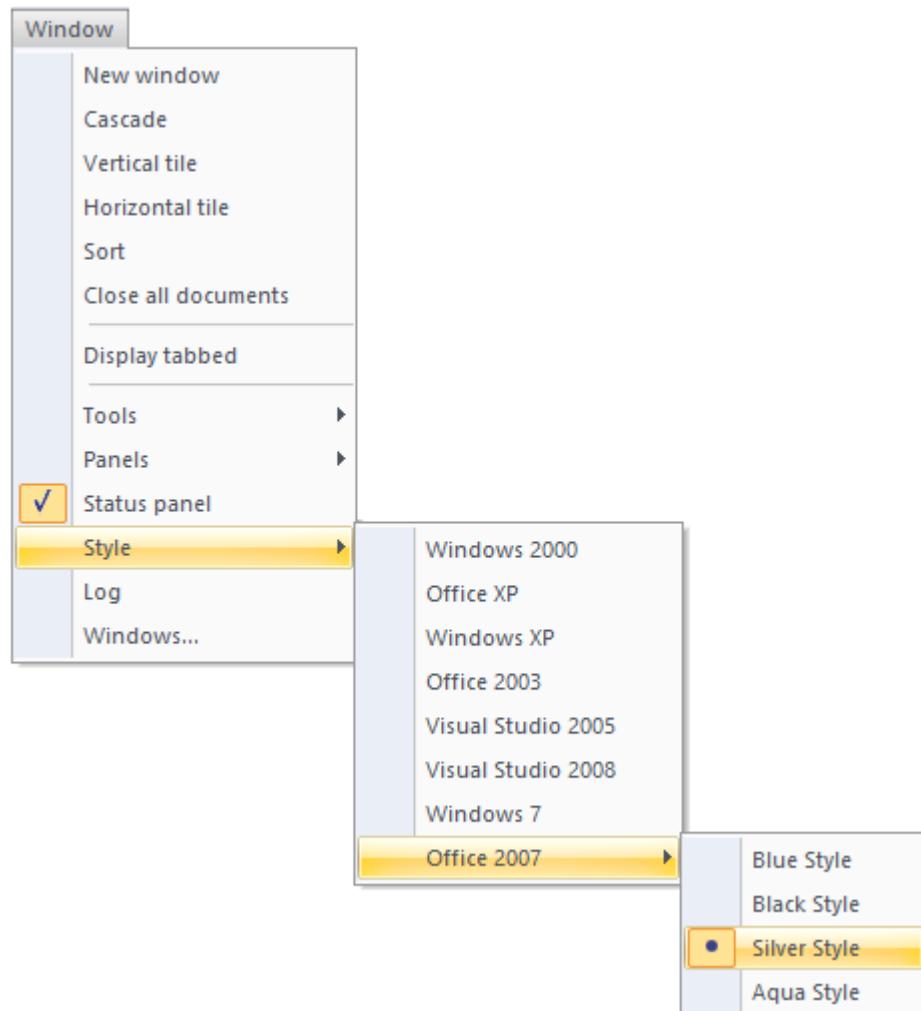


Fig. 538. *«Style» section*

«Log» menu item allows user to display or hide the log panel (Fig. 539).

Журнал			
	Время	Сообщение	Комментарий
2016-02-26_13h:			
2016-02-26_14h:	19:52:50	Выполнена функция: Сохранить Как.., Сохранить файл как G:\Storage3\test\Граница субъекта.imf	
2016-02-26_16h:	19:54:00	Выполнена функция: Прокрутка вручную	
2016-03-01_12h:	19:54:16	Документ закрыт: \\lc23-conference\ic\Вебинар (февраль 2016)\1 Обзорная карта\Приморский кр...	
2016-03-01_17h:	19:54:17	Выполнена функция: Закрыть,	
2016-03-02_12h:	19:54:18	Документ закрыт: G:\Storage3\test\Граница субъекта.imf	
2016-03-02_14h:	19:54:18	Выполнена функция: Закрыть,	
2016-03-03_14h:	19:54:18	Выполнена функция: Закрыть,	
2016-03-03_15h:	19:54:18	Выполнена функция: Закрыть,	
2016-03-03_19h:			

Fig. 539. «Log» panel

«Windows...» parameter allows user to manage the selected windows (Fig. 540).

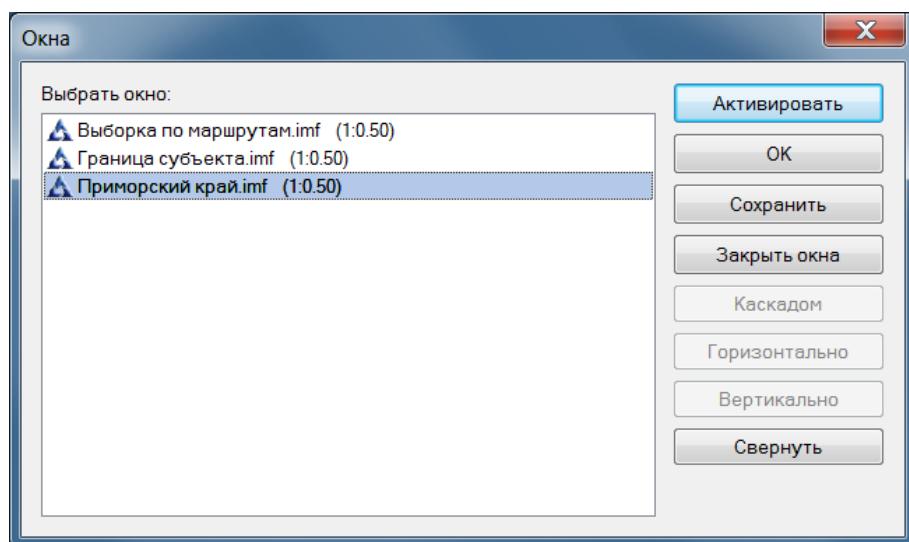


Fig. 540. «Windows» dialog box

Select the window from the list and press «Activate» button to open the selected window. Only one window can be activated at a time.

To close the selected windows, press «Close windows» button. To select multiple windows, press «Shift» or «Ctrl» keys while selecting windows from the list.

5.12. «Help» menu

«Help» menu contains reference information about the software (Fig. 541).

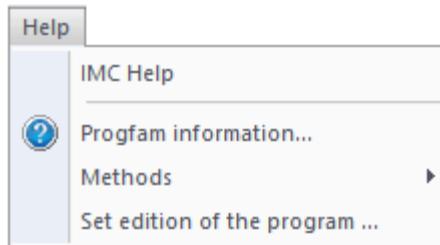


Fig. 541. «*Help*» menu

«*IMC help*» – opens the IMC user manual.

«*Program information*» – opens IMC splash screen (Fig. 542). Perform a left mouse button click on the splash screen to close it.

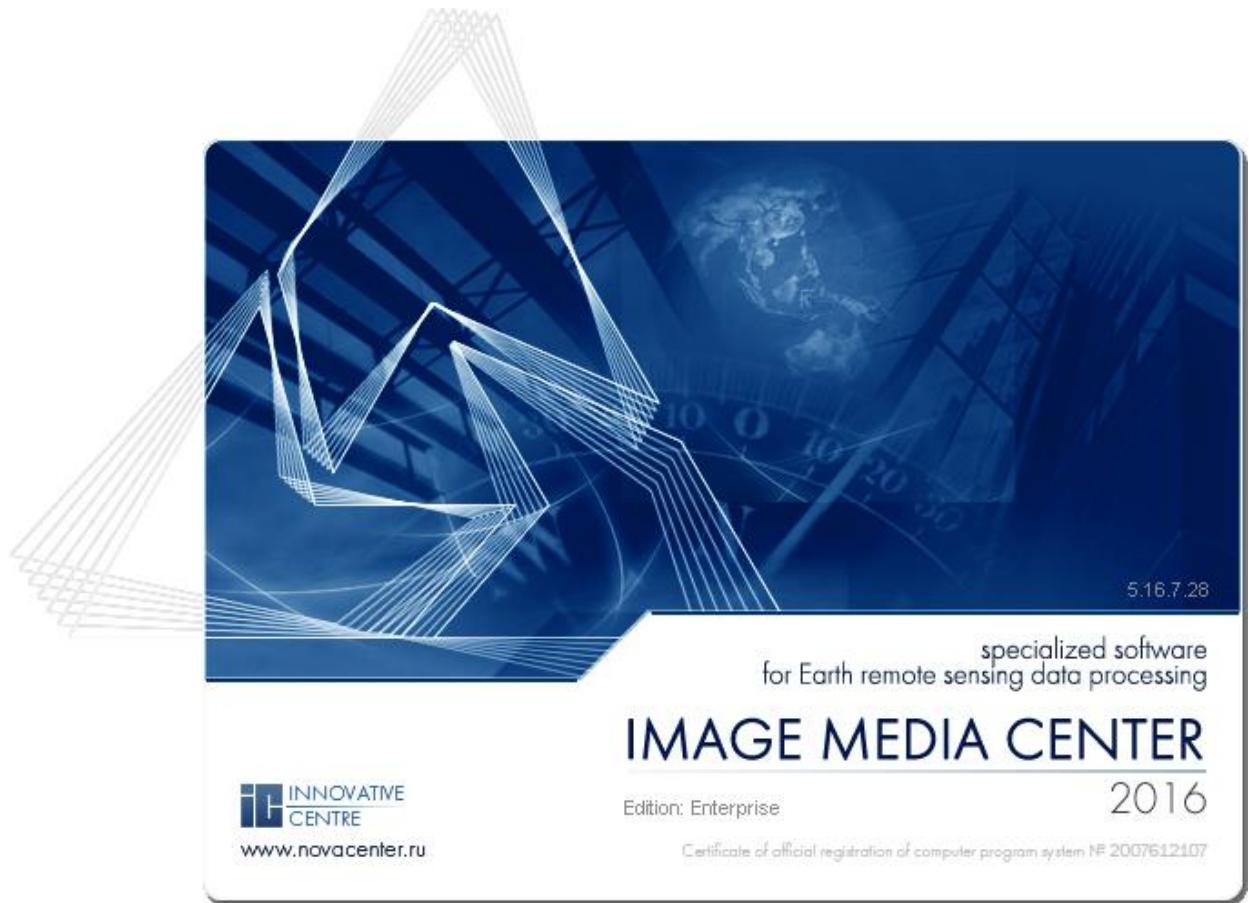


Fig. 542. *Splash screen*

«*Methods*» menu item allows user to load text document and open them in the program workspace.

«*Set edition of the program*» allows user to change edition of the program (for example to upgrade a demo edition to a full edition) by entering a new identification key of the program (Fig. 543).

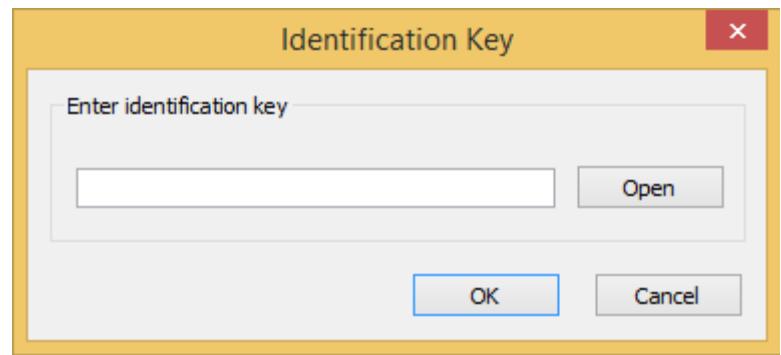


Fig. 543. «*Identification key*» dialog box