Neotectonics of the Tsimlyansk reservoir

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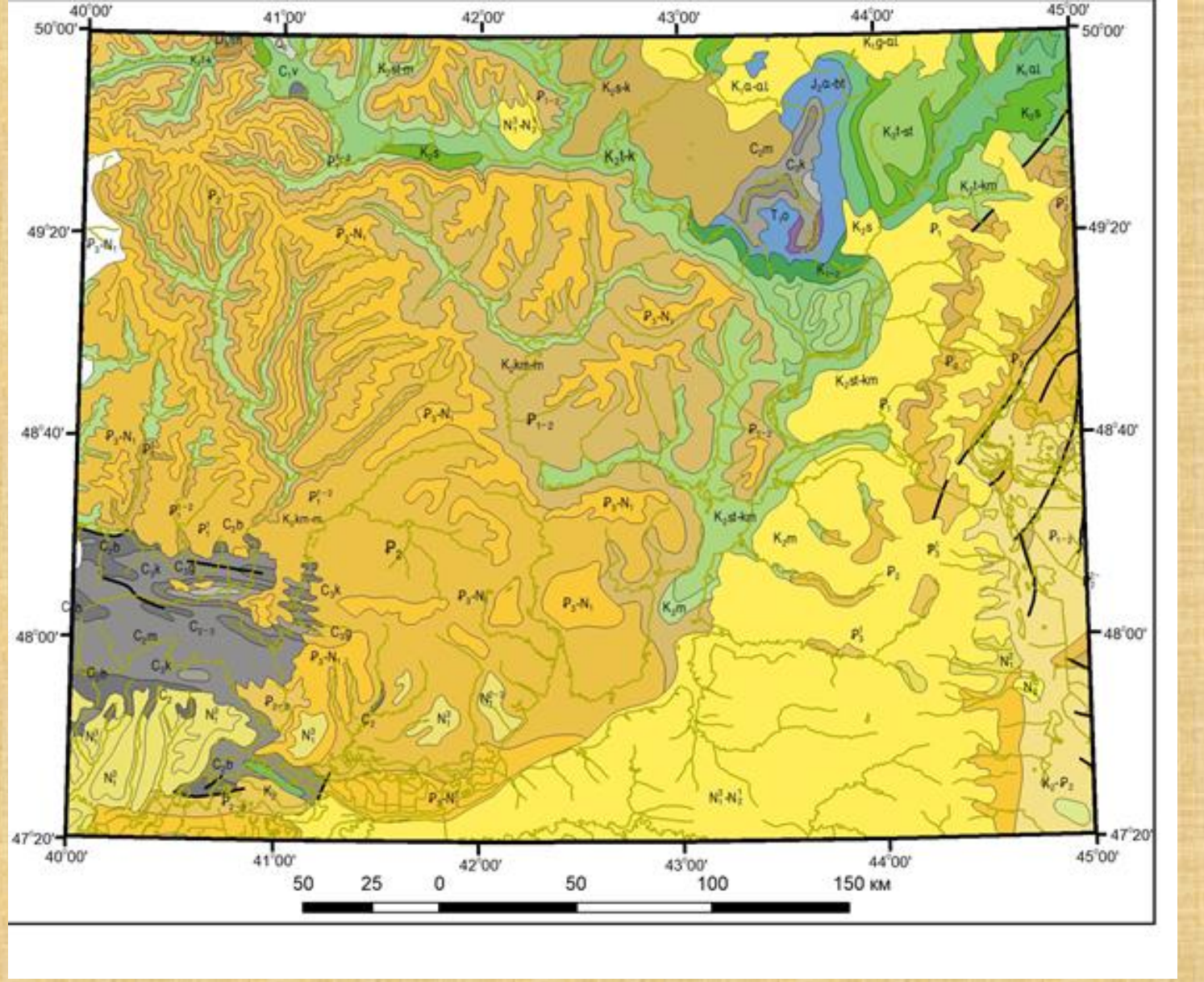
1-the Central Russian Upland
2-the Oka-Don Plain
3-the Medvedev Uplift
4- theVolga Upland
5-the Don-Donetsk Upland
6-the Ergeninsk Upland
7-the Caspian Lowland
8-the Donetsk Ridge



Geological map of the area

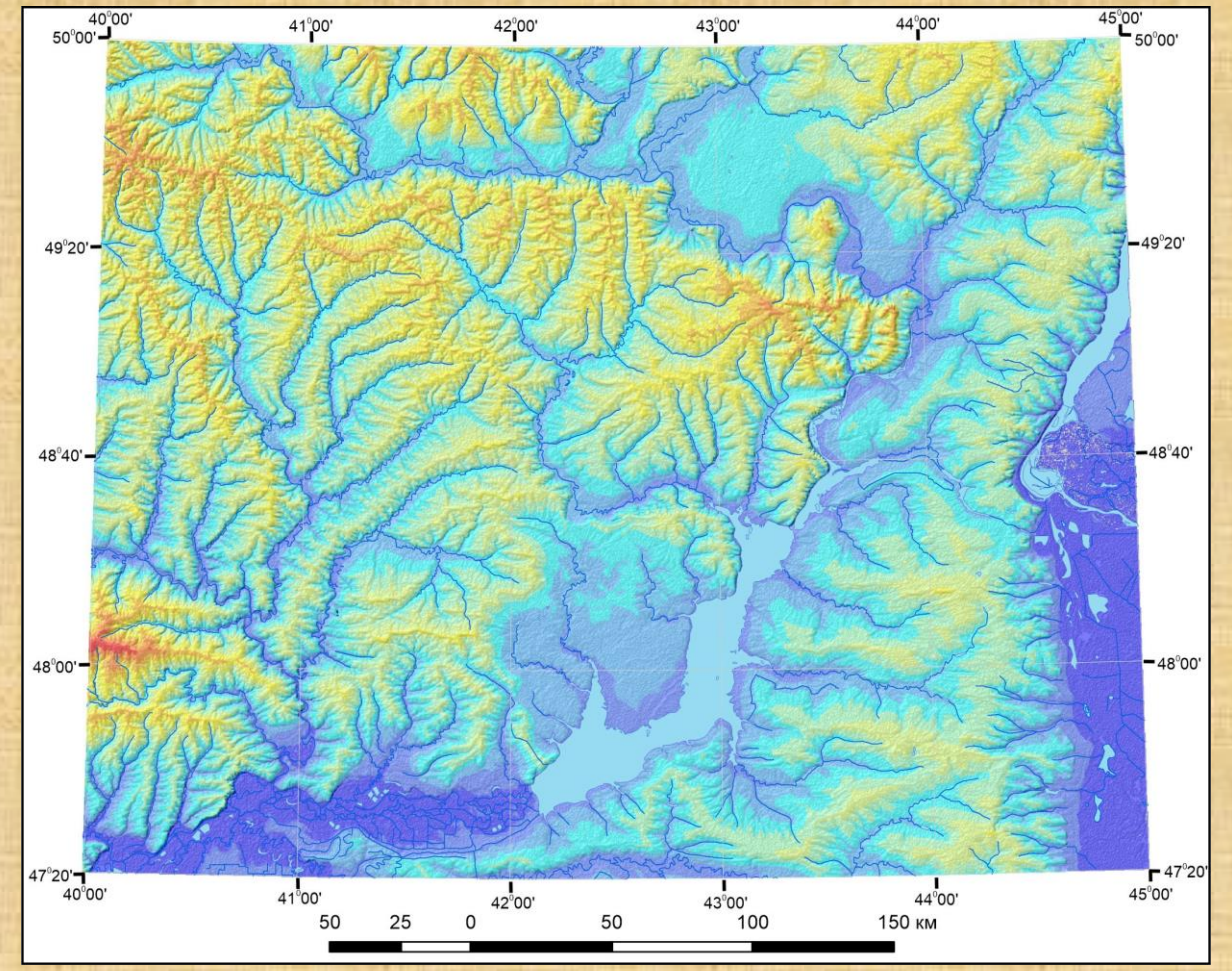
The connection between the relief, tectonic structure and the latest movements makes it possible to distinguish active and passive structures, which must be taken into account when conducting intensive economic development of territories.

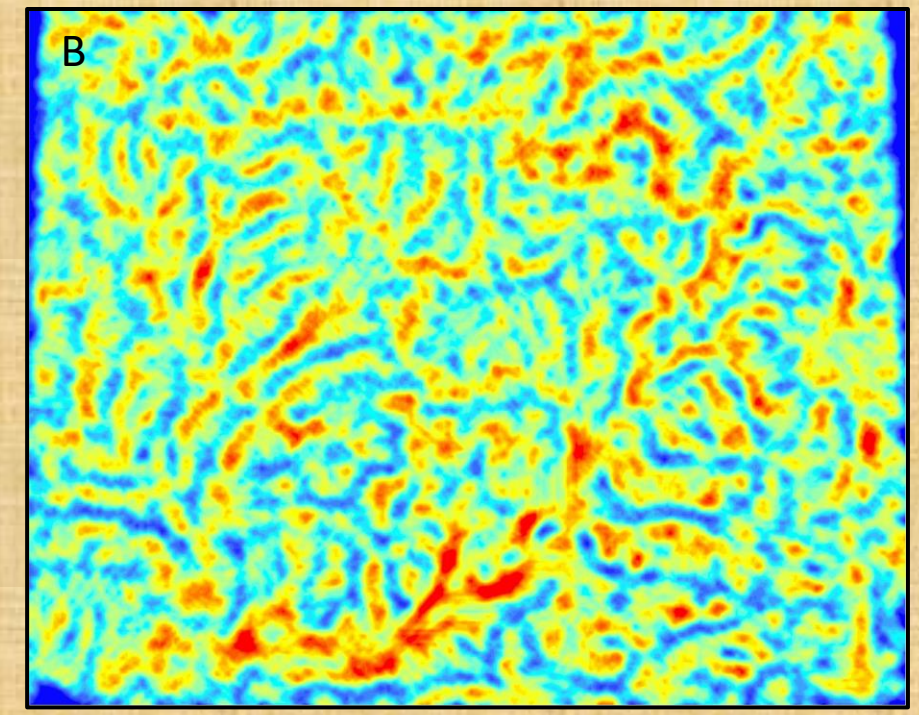
Ignoring geomorphological studies of territories with increasing anthropogenic activity leads to disasters of various levels.

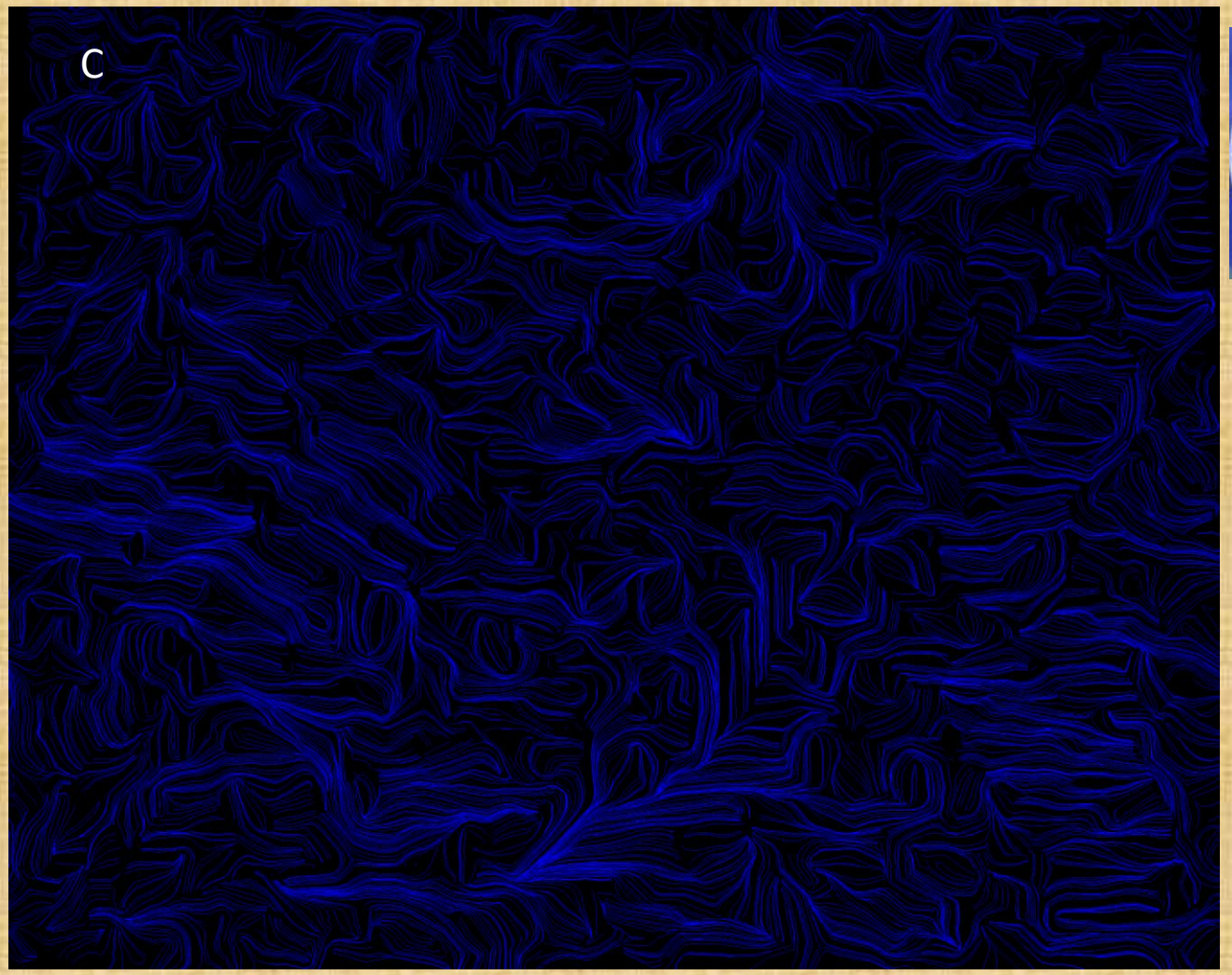
The aim of the work was to study the latest structural plan, to determine the inheritance of tectonic development, to identify the active structures of the Tsimlyansk reservoir area.

To achieve it a set of methods was used, including structural-geomorphological analysis, visual and automated interpretation and statistical processing of remote sensing materials using a specialized computer program LESSA.

The elevation data is medium resolution GMTED2010 (Global Multi-resolution Terrain Elevation Data 2010) with a resolution of 7.5 arc seconds.
Topographic maps of scales 1: 1 000 000 - 1: 50 000
Landsad 7ETM + satellite imagery
Geological maps

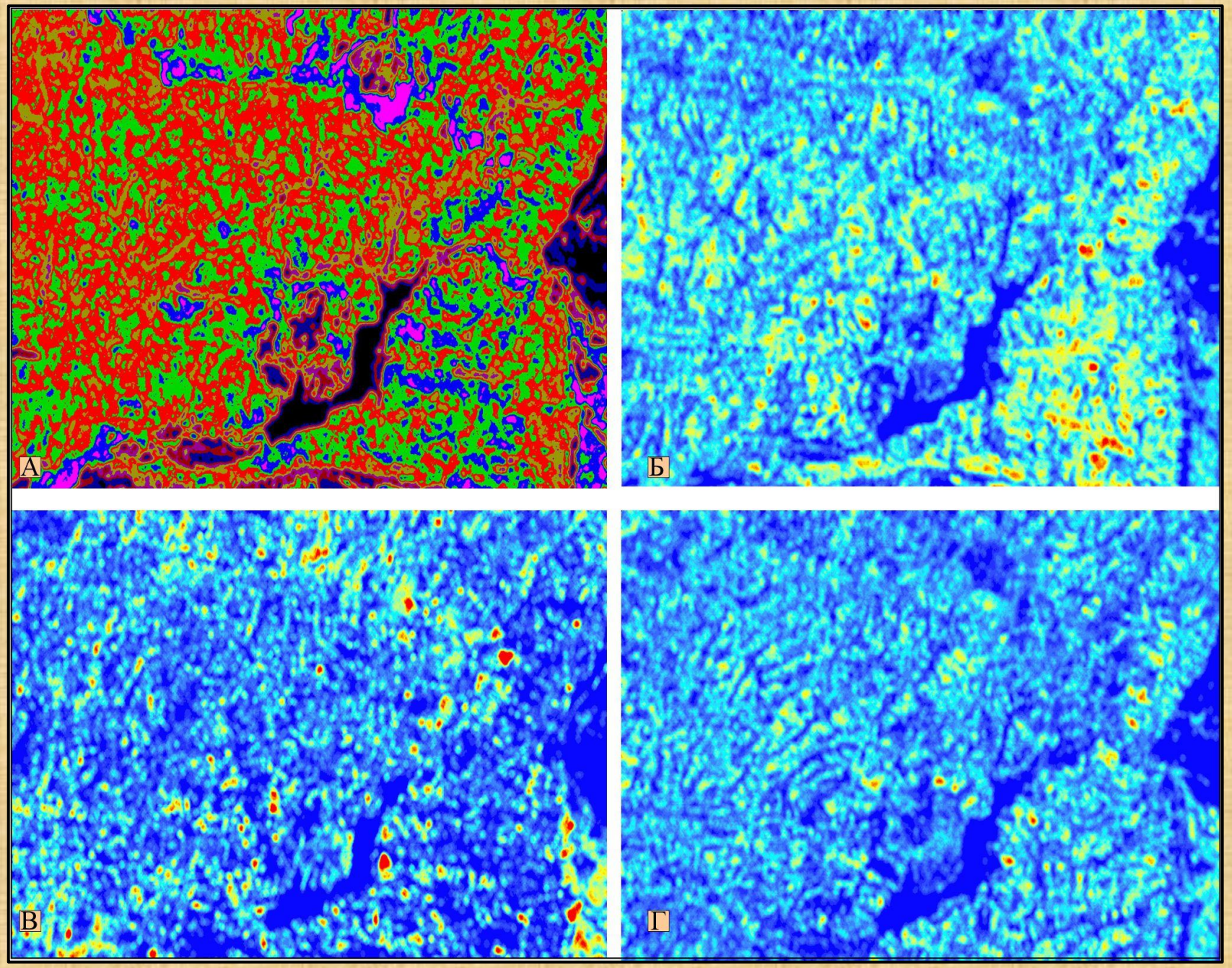






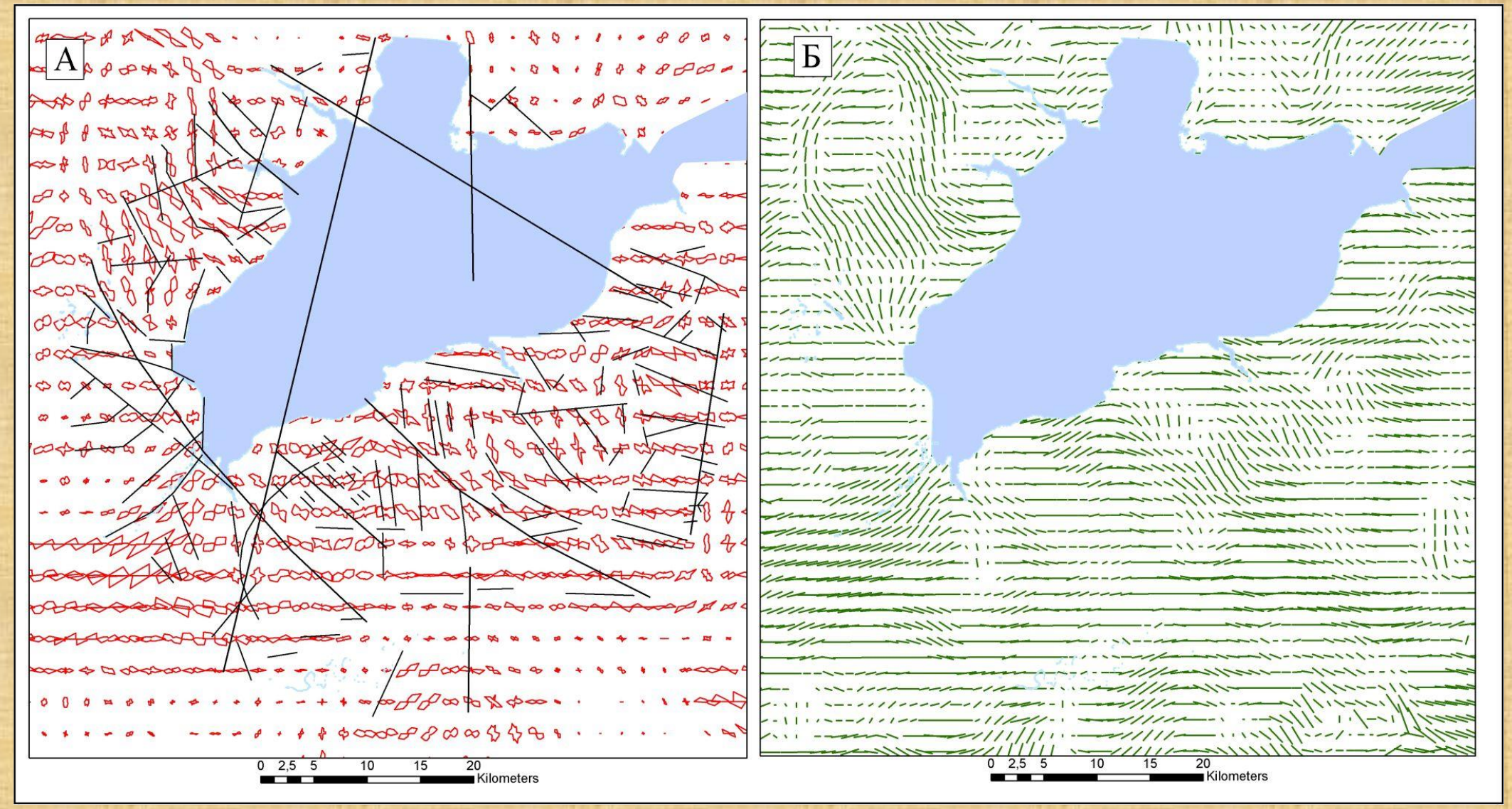
A - map of linear elements (strokes)
B - line density map
C - maximum direction map.

Along the streams

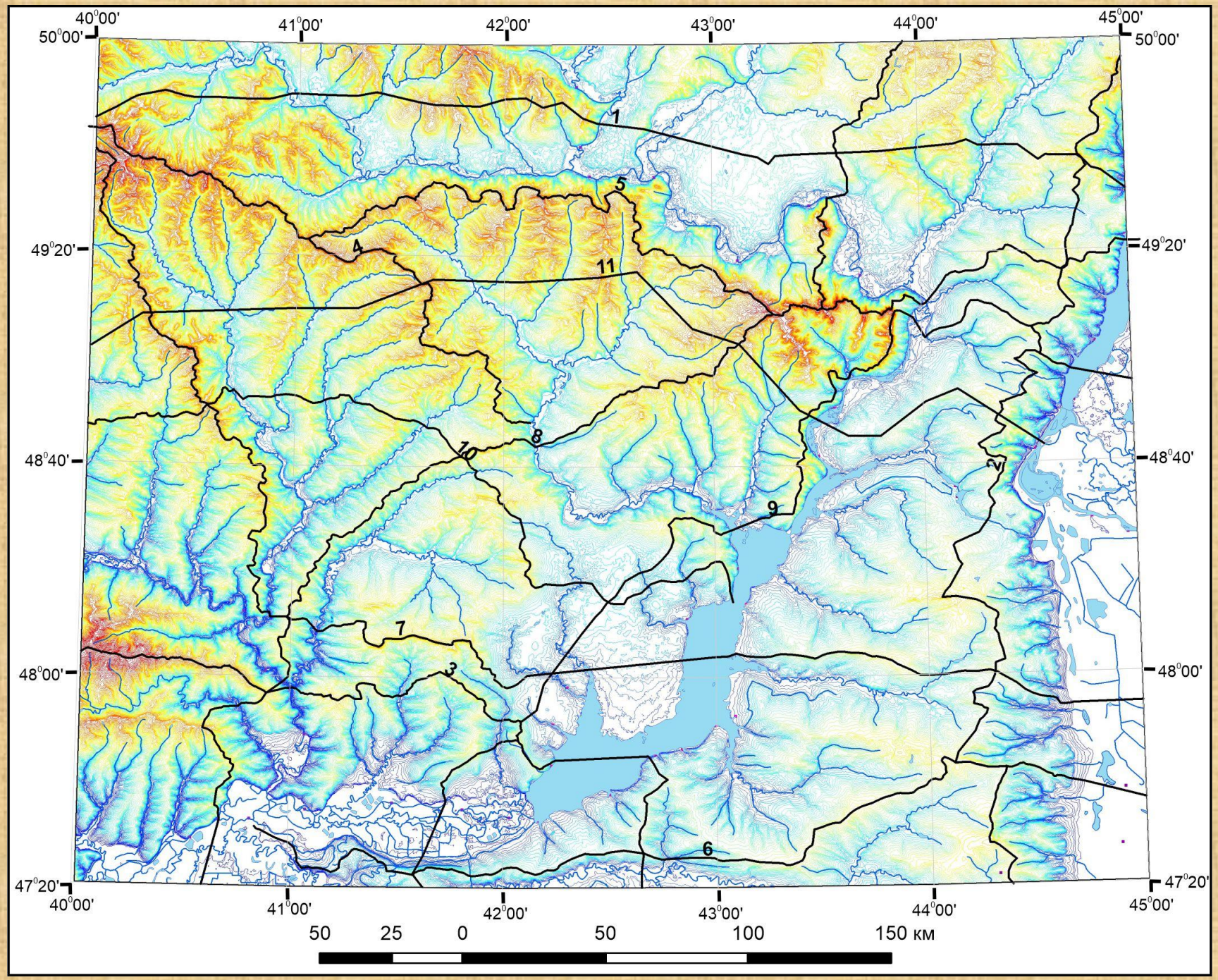


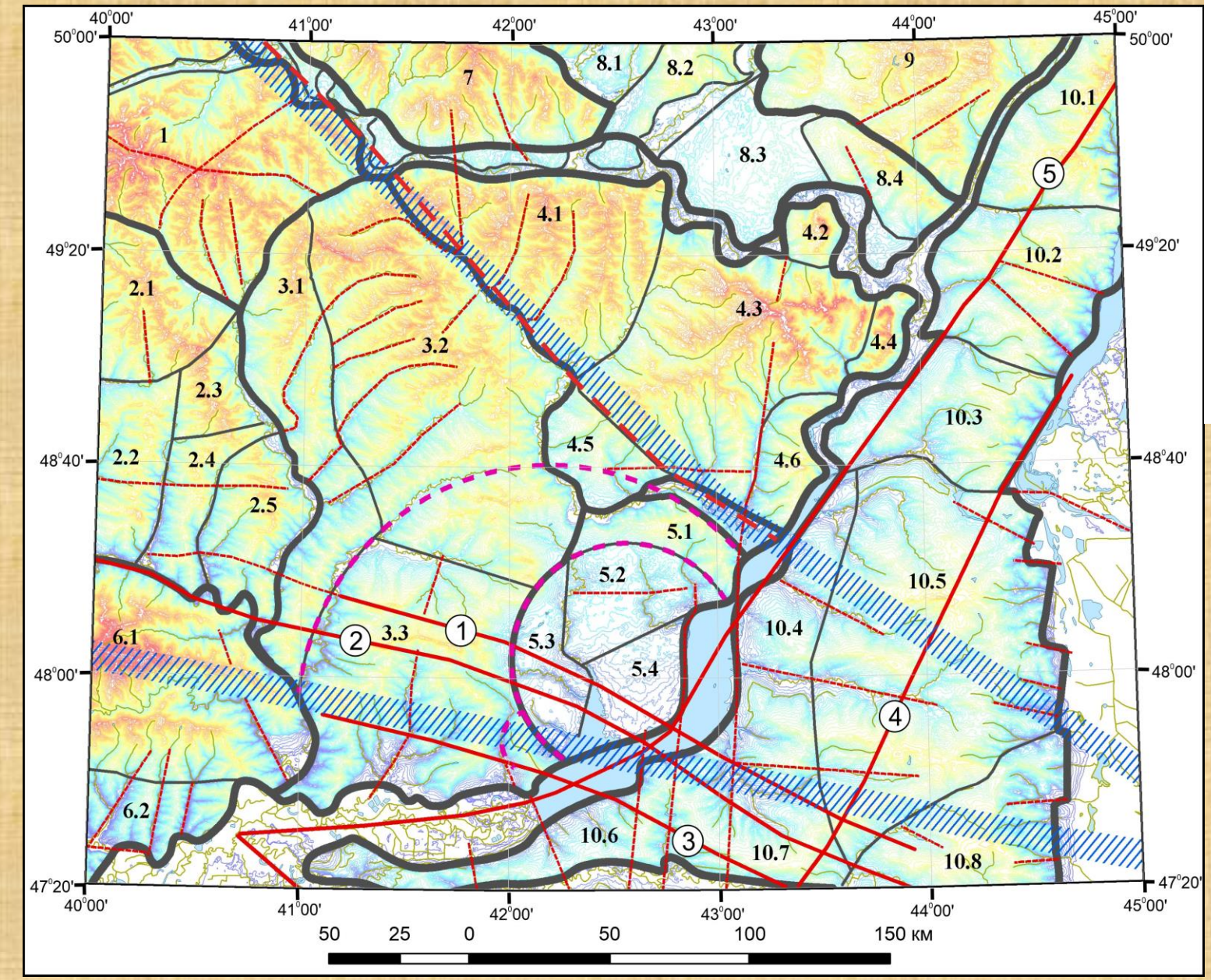
А -all directions;
Б - sector 1 with a direction in the range - 0 11.25 degrees (sublatitudinal)
В - sector 4 with a direction in the range of 56.25 to 78.75 degrees (north-north-east)
Г - sector 8 in the direction in the range of 146.25 168.75 degrees (west-northwest).

The brighter the color, the higher the strokes density



А - map of rose diagrams by DEM strokes with established lineaments; Б - maximum direction map


40°00'
41°00'
42°00'
43°00'
44°00'
45°00'
50°00'
49°20'
48°40'
48°00'
47°20'
1
5
4
11
8
10
9
7
3
6
50 25 0 50 100 150 км



Legend

- boundaries of the main lowlands and uplifts
- boundaries of mega blocks
- boundaries of blocks
- regional faults
- faults and zones of high fracture density and exposed to erosion
- ring structures and its elements
- global lineaments
- 15
- Elevation lines
- 280

The numbers in the circles are the numbers of the faults

1 - North Donetsk
2 - Donbass-Astrakhan (or Kamensky)
3 - Yuzhno-Voroshilovgradsky
4 – Volgogradsky
5 - the estimated zone of the Ilovlinsko-Tsimlyansky fault (shear)

Conclusions

1. According to the results of structural and morphological studies of the Tsimlyansk reservoir area, the fragmentary manifestation of regional faults is confirmed. The nearest South Voroshilovgrad fault is clearly established by lineament analysis.
2. The boundary of large modern orographic structures of the Severo-Erginskaya uplifts system (in the south) and the erosion-tectonic depression of the Don valley (section of the Tsimlyansk reservoir) runs along the left bank of the reservoir. According to Galaganov O.N., the coastal part of the area for the period from 2006 to 2010 experienced subsidence up to 6 mm per year, while the southern part (Severo-Erginskaya system) is characterized by uplift.
3. A group of local lineaments has been established that determine the modern relief in the southern part of the Tsimlyansk reservoir. Most of them have a NW "rose", that is, they have directions from west to north. This direction coincides with the general direction of regional faults.
4. Regional lineaments, mainly of submeridional and W-NW directions, have been identified. They determine the structure of the main orographic forms of the study area.

Thank you for your attention!