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E-mail: aitimurziev@cge.ru

# THE METHODS AND TECHNOLOGIES OF ESTIMATION OF PERSPECTIVES OF AN OIL-AND-GAS-BEARING CAPACITY OF TERRITORIES ON THE BASIS OF A COMPLEX ANALYSIS OF THE POTENTIAL FIELDS, SEISMIC, TOPOGRAPHIC, GEODETIC AND SPACE SURVEYS

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ArcGIS.

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**Abstract**. For tectonic and oil-and-gas-bearing zoning of the territory of Nerutinsky depression were used data of gravity and magnetic prospecting, seismic, topographic, geodetic and space surveys together with results of seismo-geological modeling. Preparation of data for the analysis and the analysis methods of mathematical classification are executed by means of geoinformation system ArcGIS. Results of tectonic and oil-and-gas-bearing zoning form a ground for a substantiation of the further directions of an exploration and preparing of recommendations for projection of detailed seismic survey and searches for oil and gas fields within learnt territory.

**Keywords:** sedimentary basins of Western Siberia, strike slip fault structures, interpretation of 3D seismic prospecting, remote sensing data processing and interpretation, oil and gas fields, methods and technologies of estimation of perspectives of an oil-and-gas-bearing capacity of territories.

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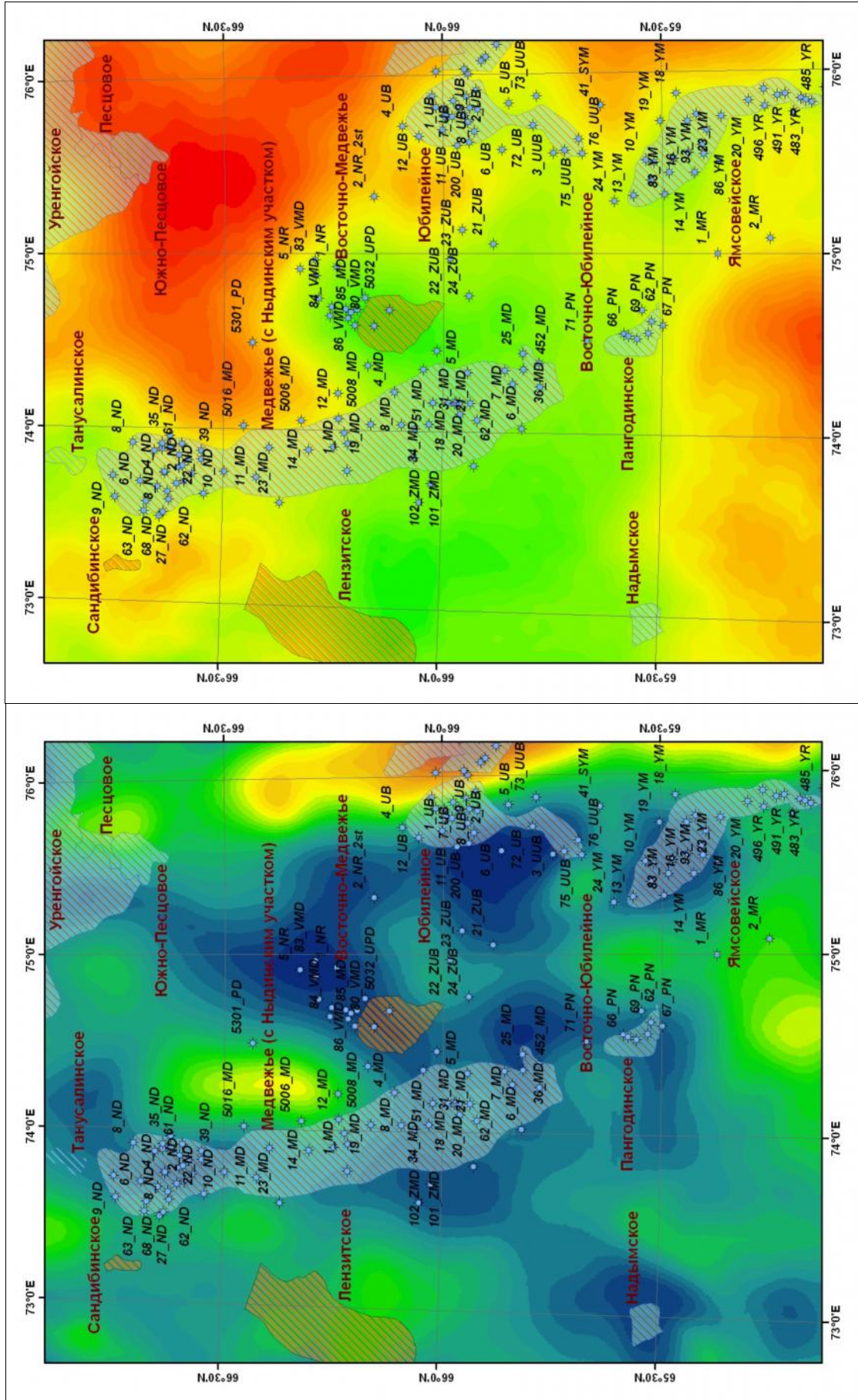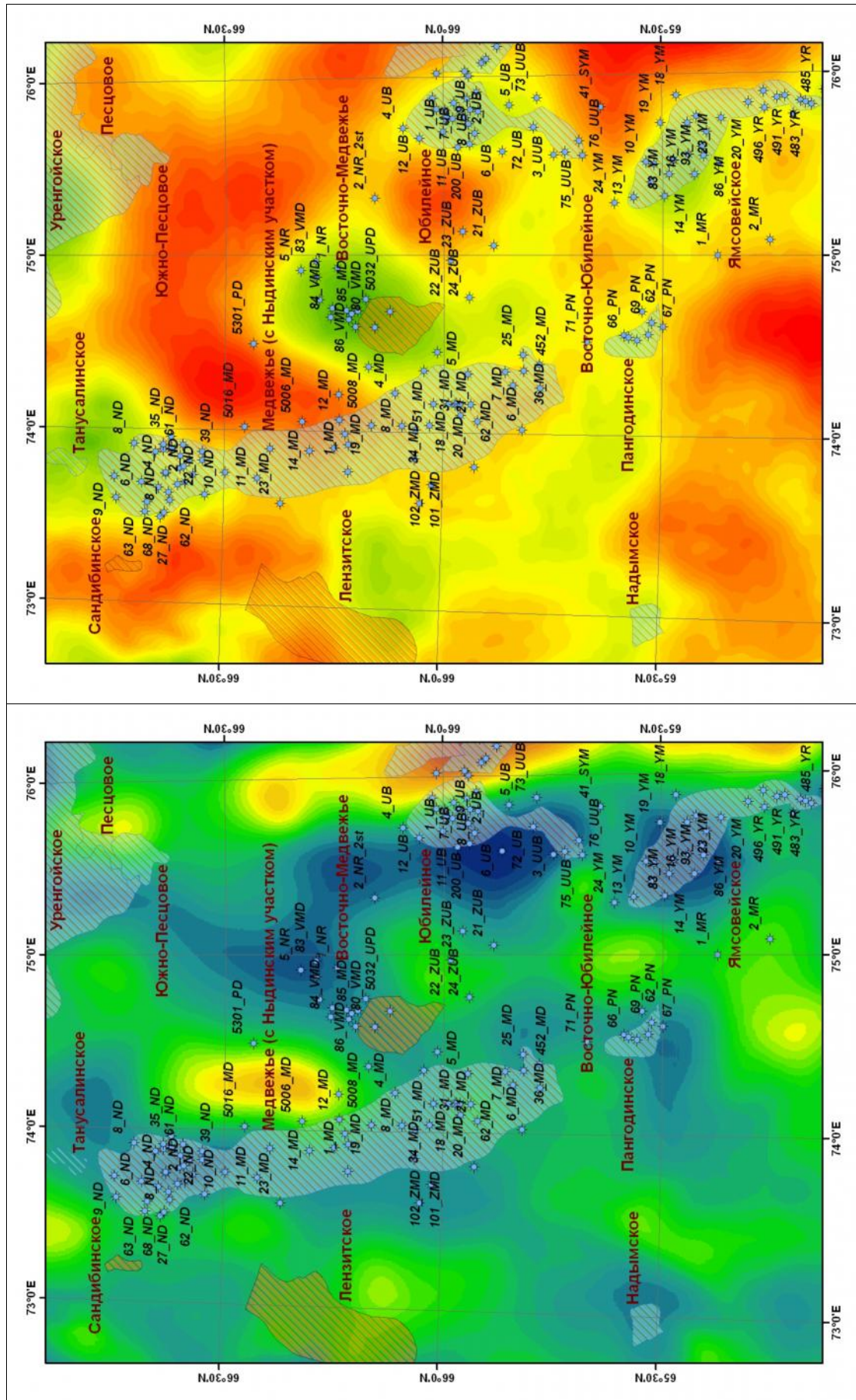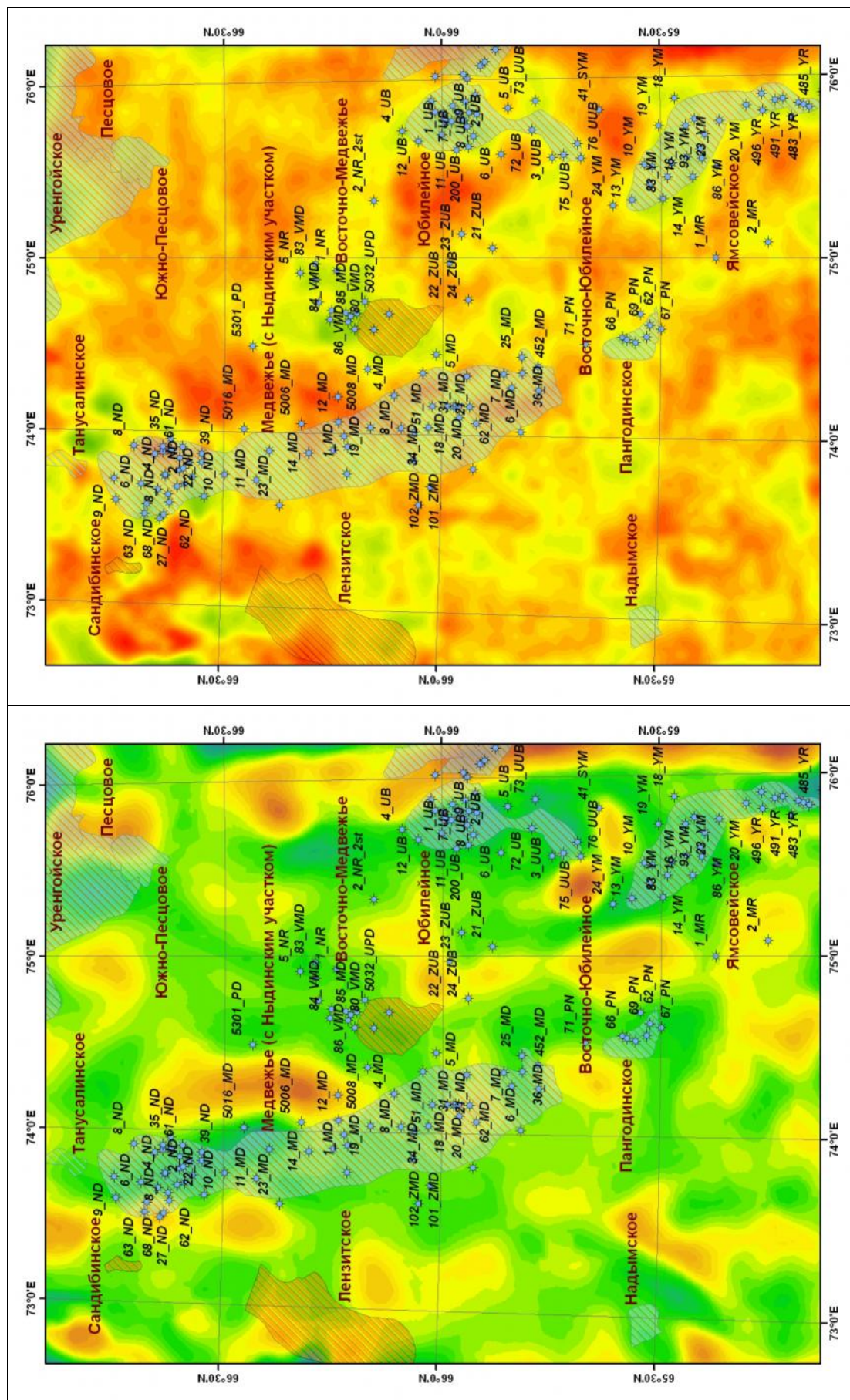          ,                                                                                                              -
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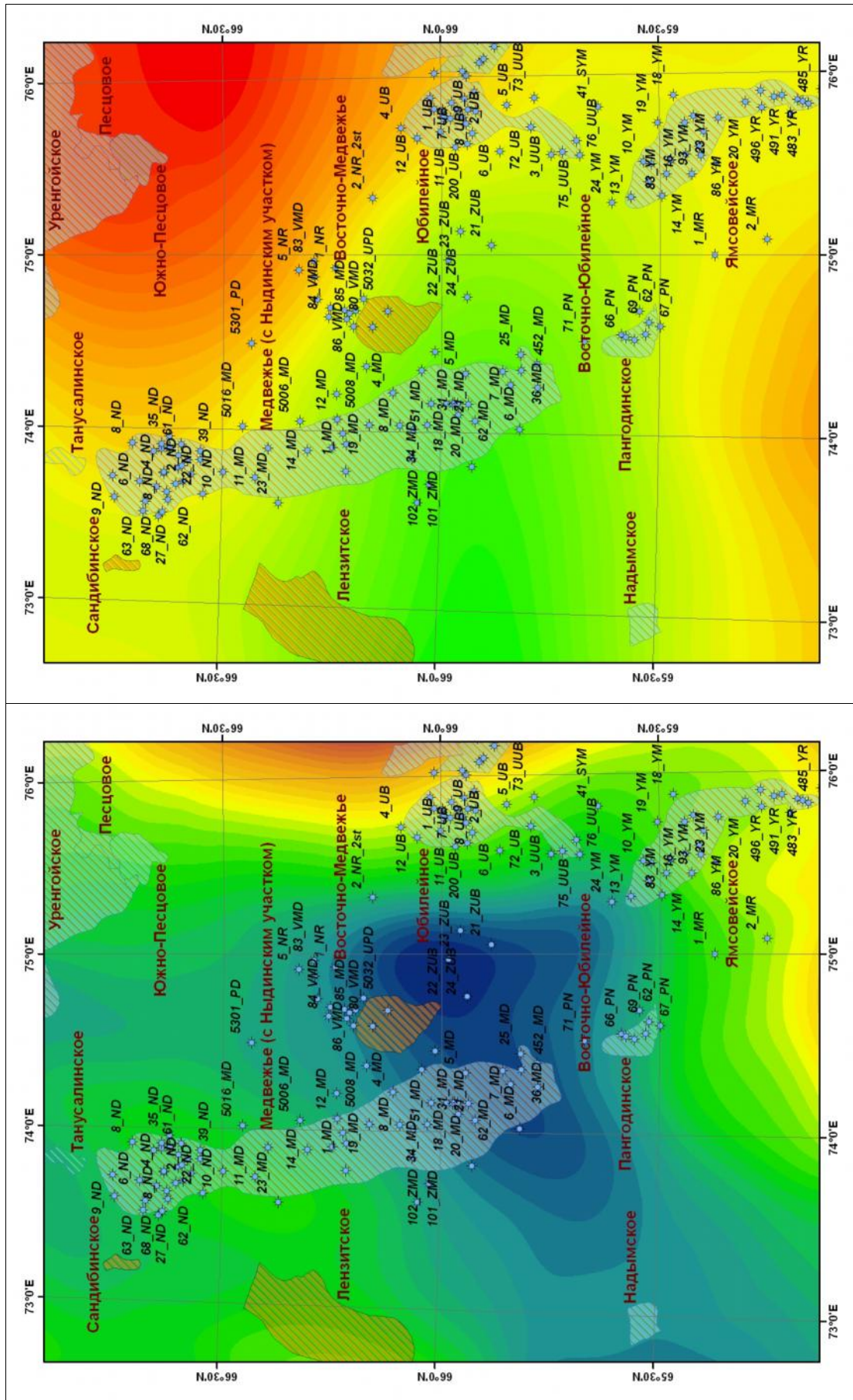1:200 000    0.2         –                                              1:50 000.

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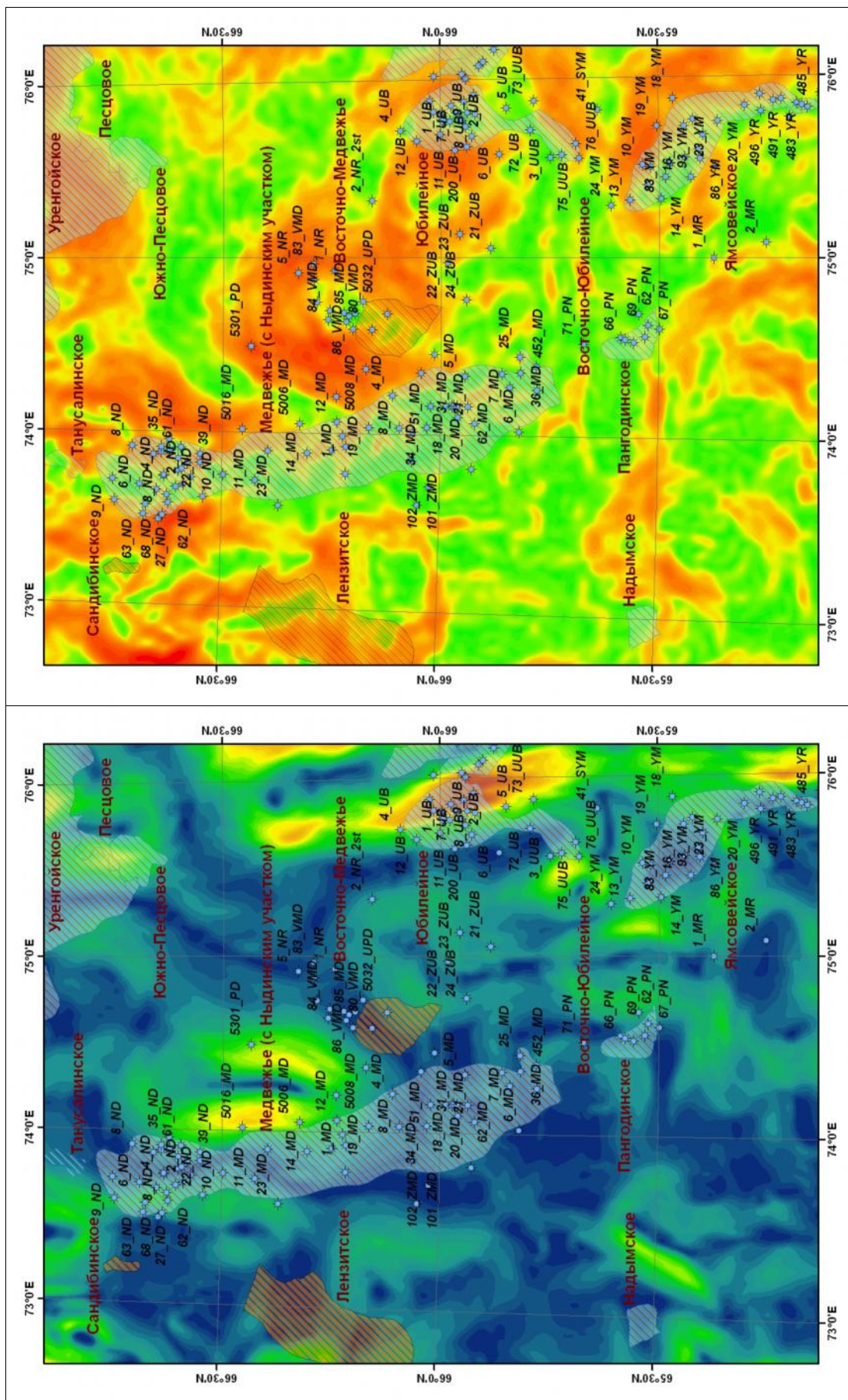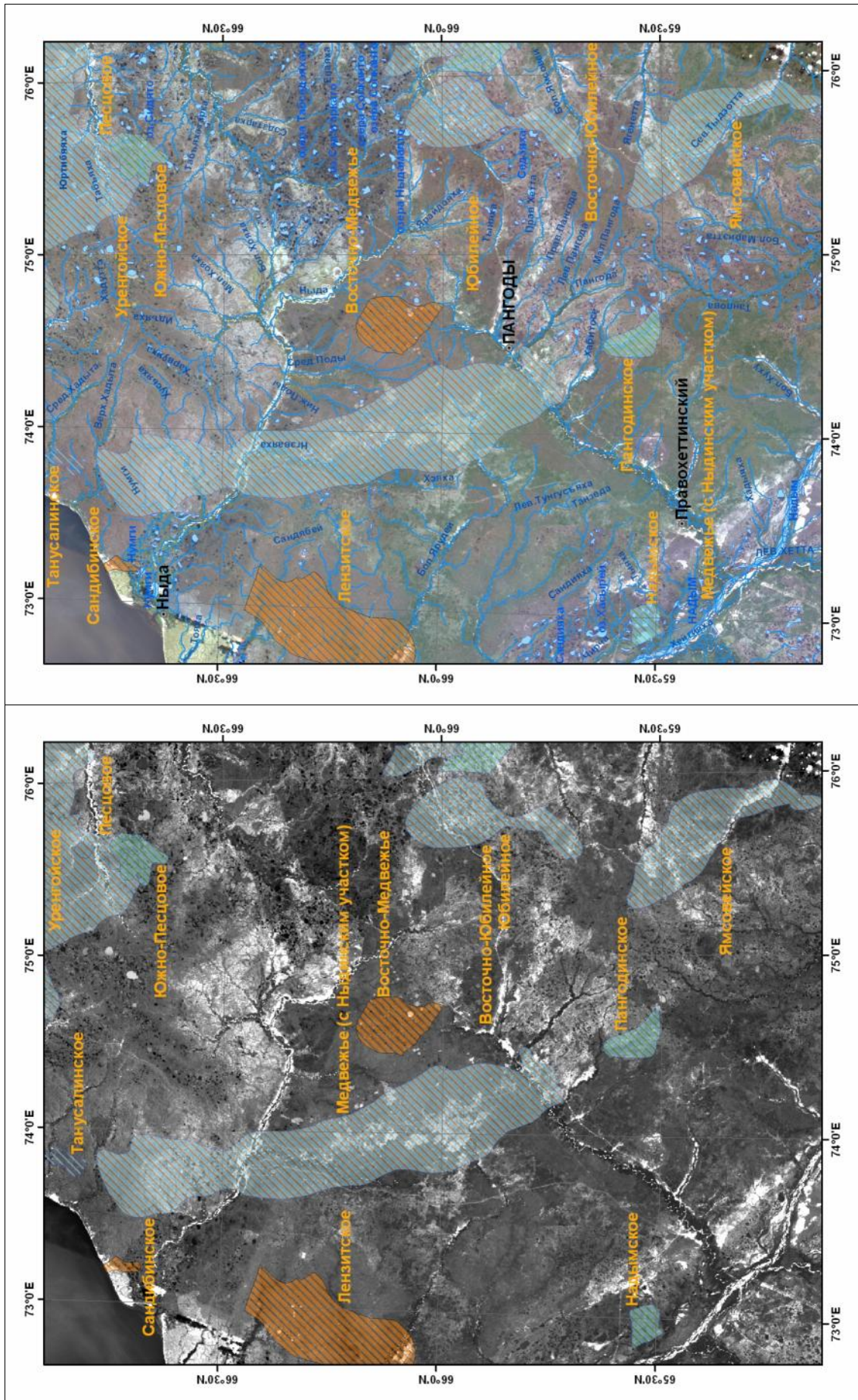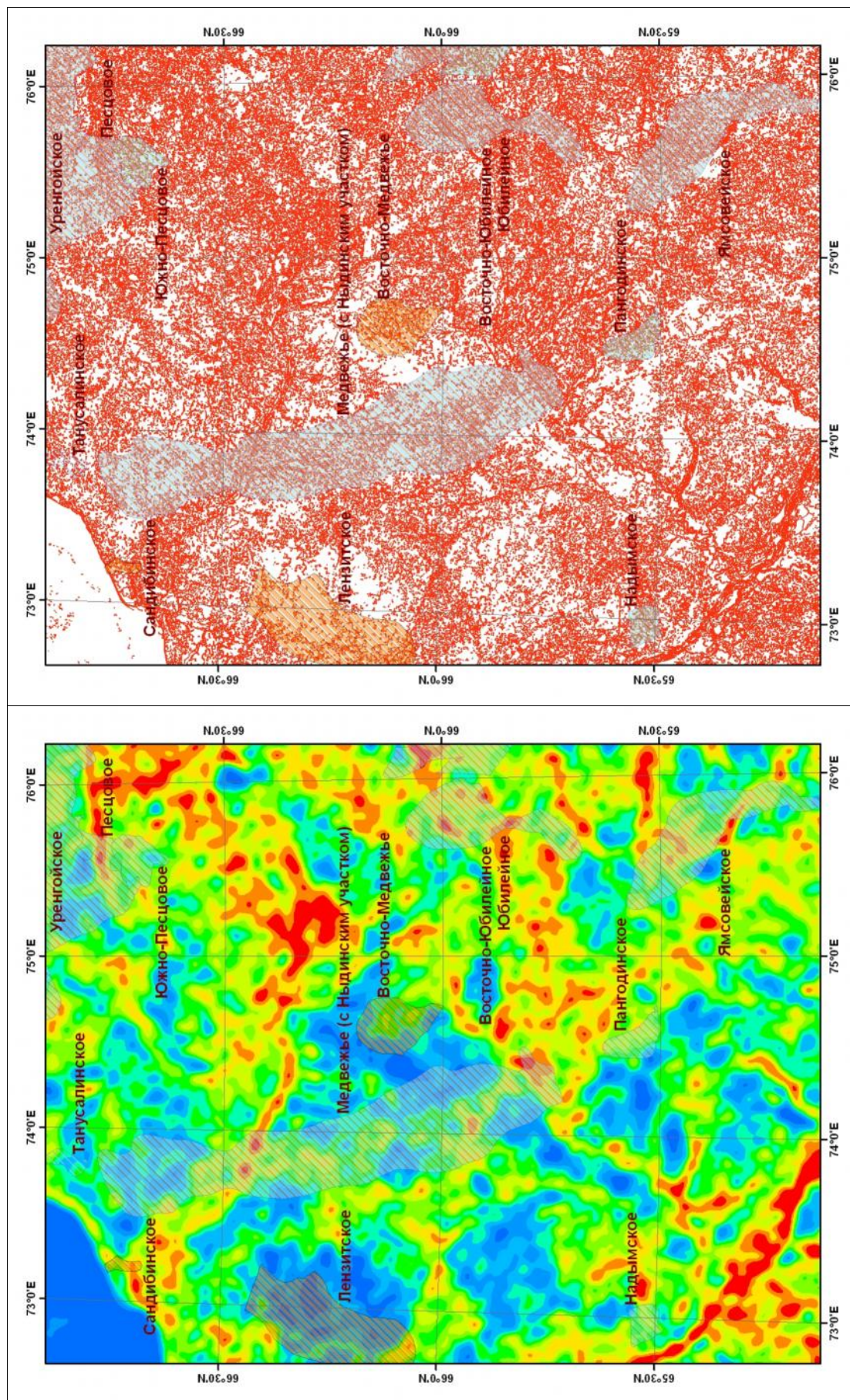
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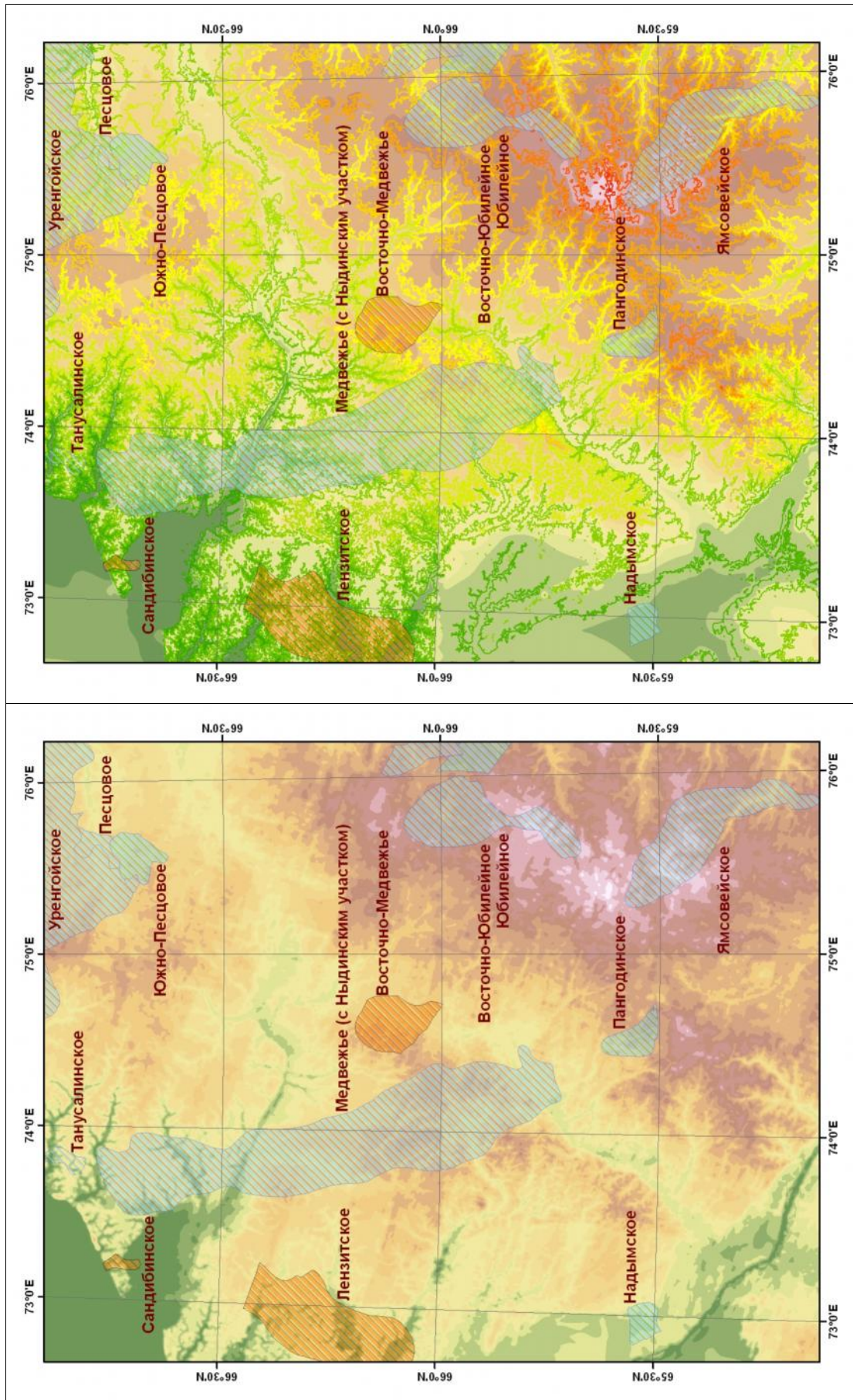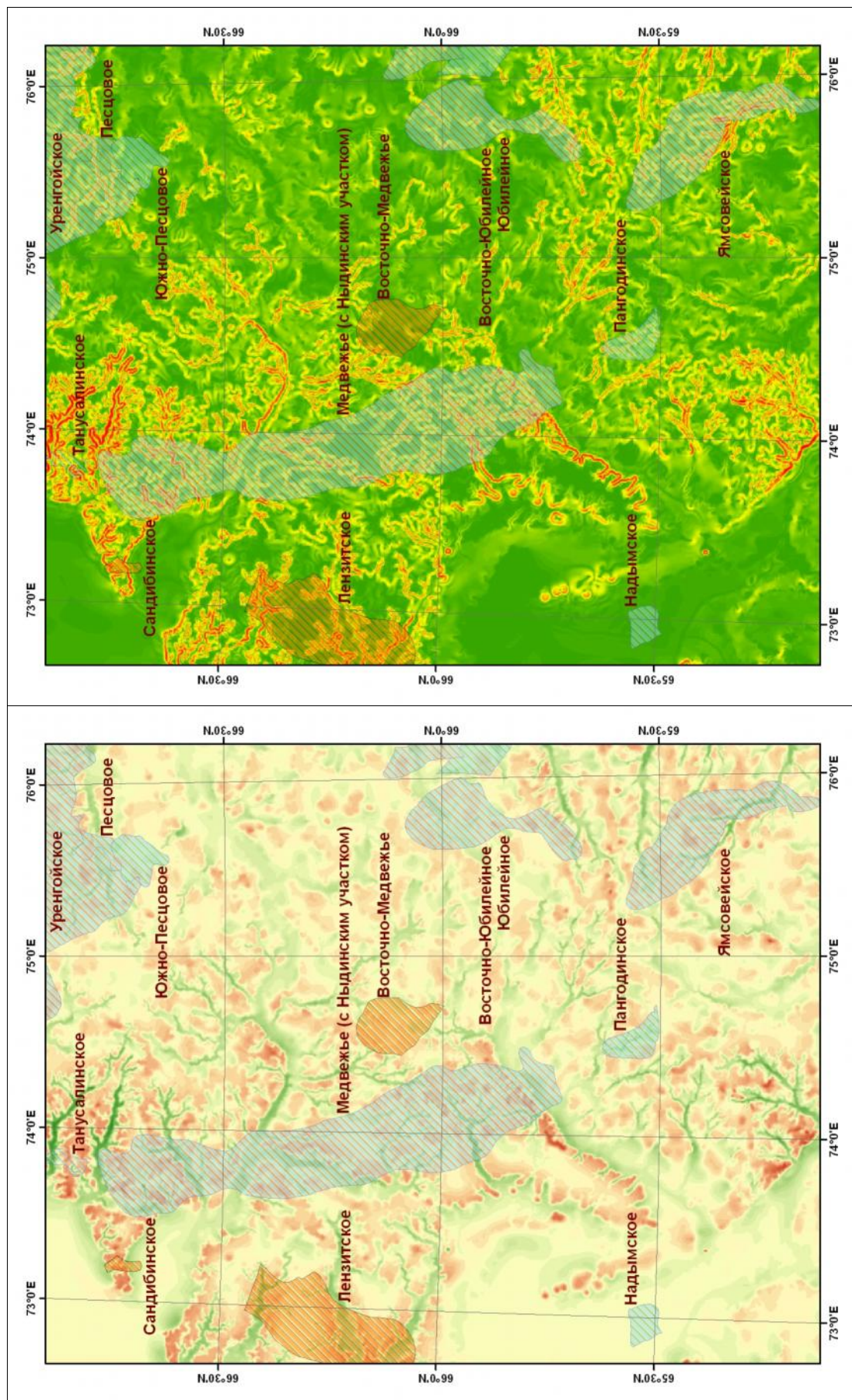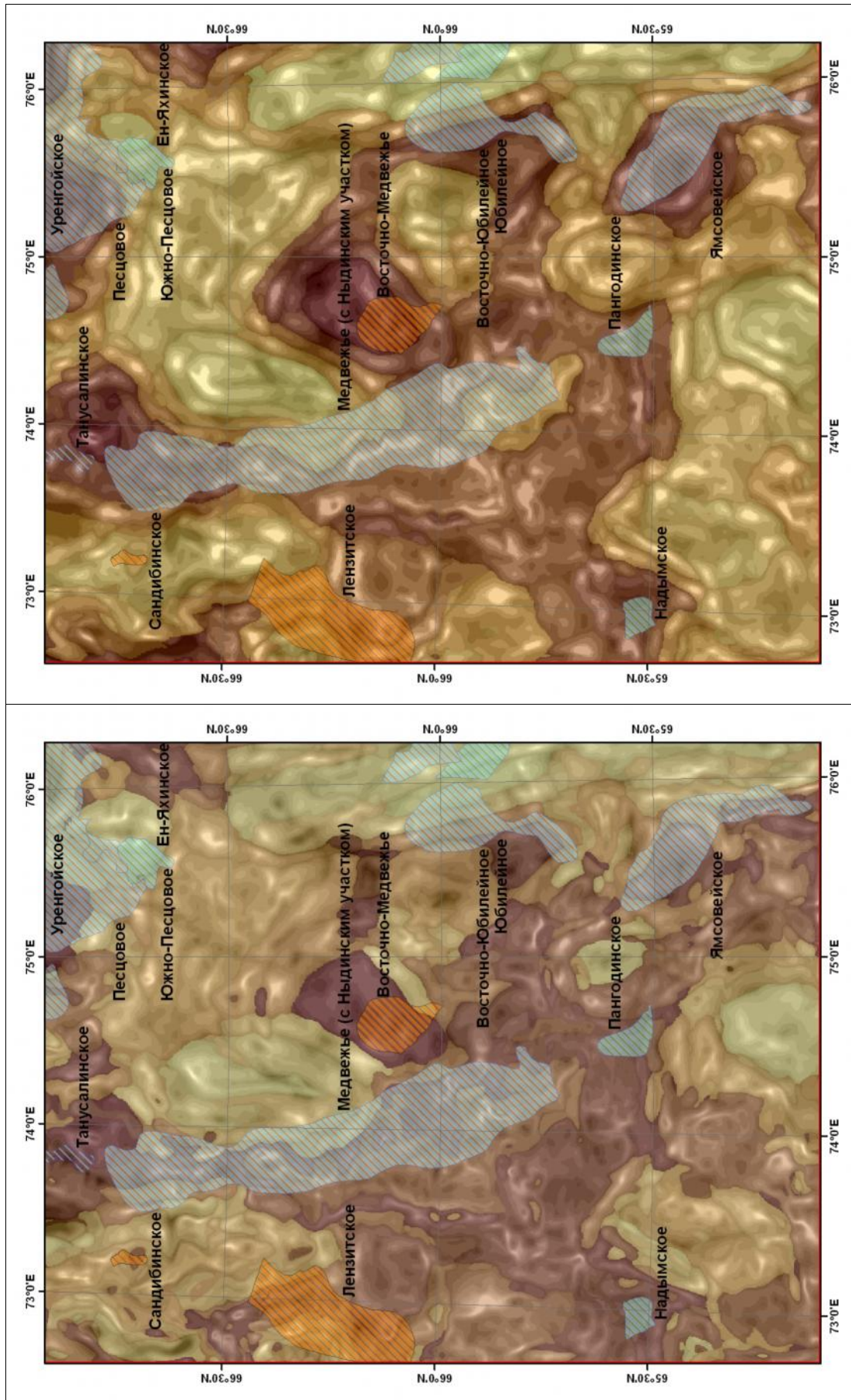,                        3000   .
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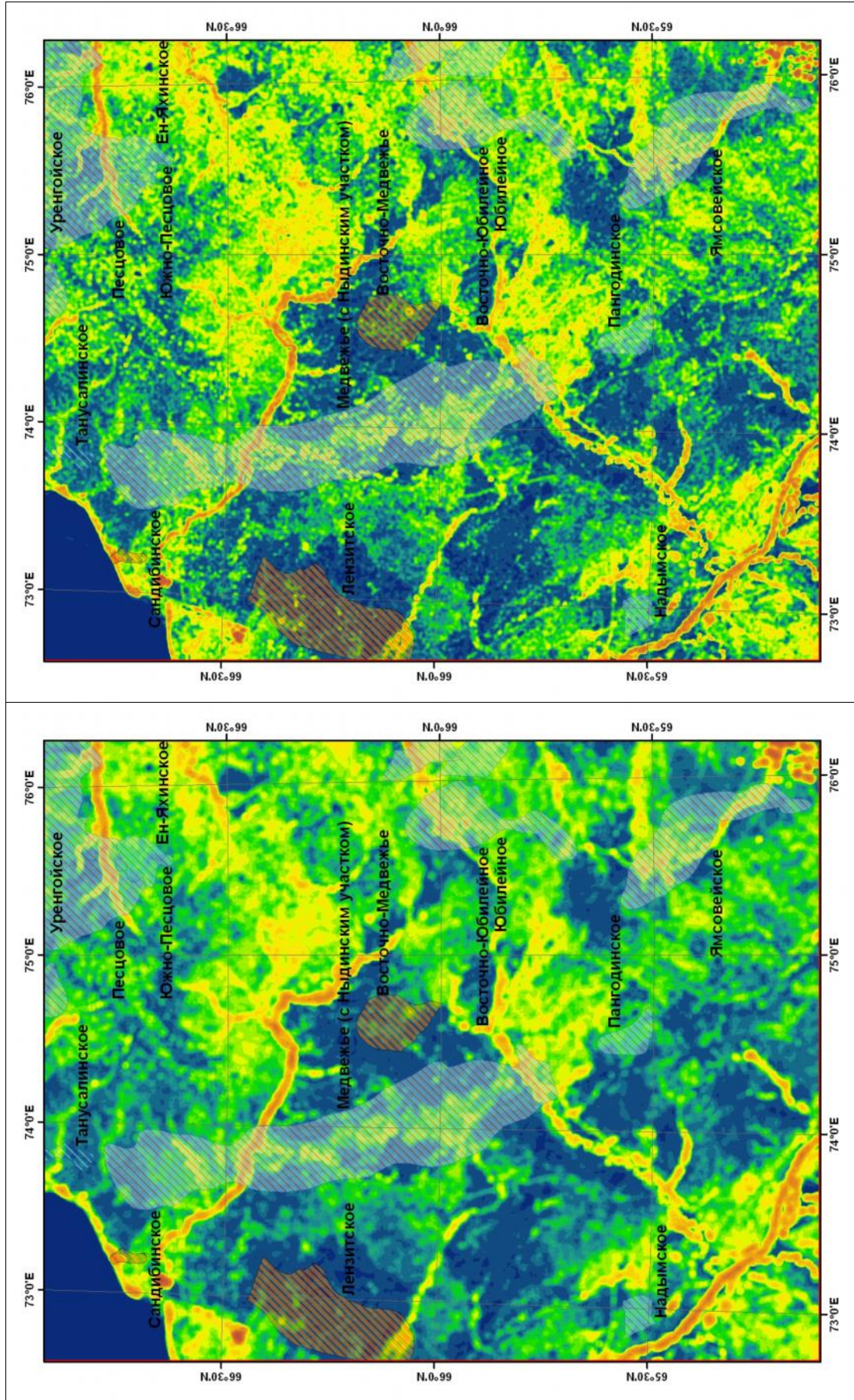
# Глубинная

*Методы и технологии поисков, разведки и освоения глубинной нефти*



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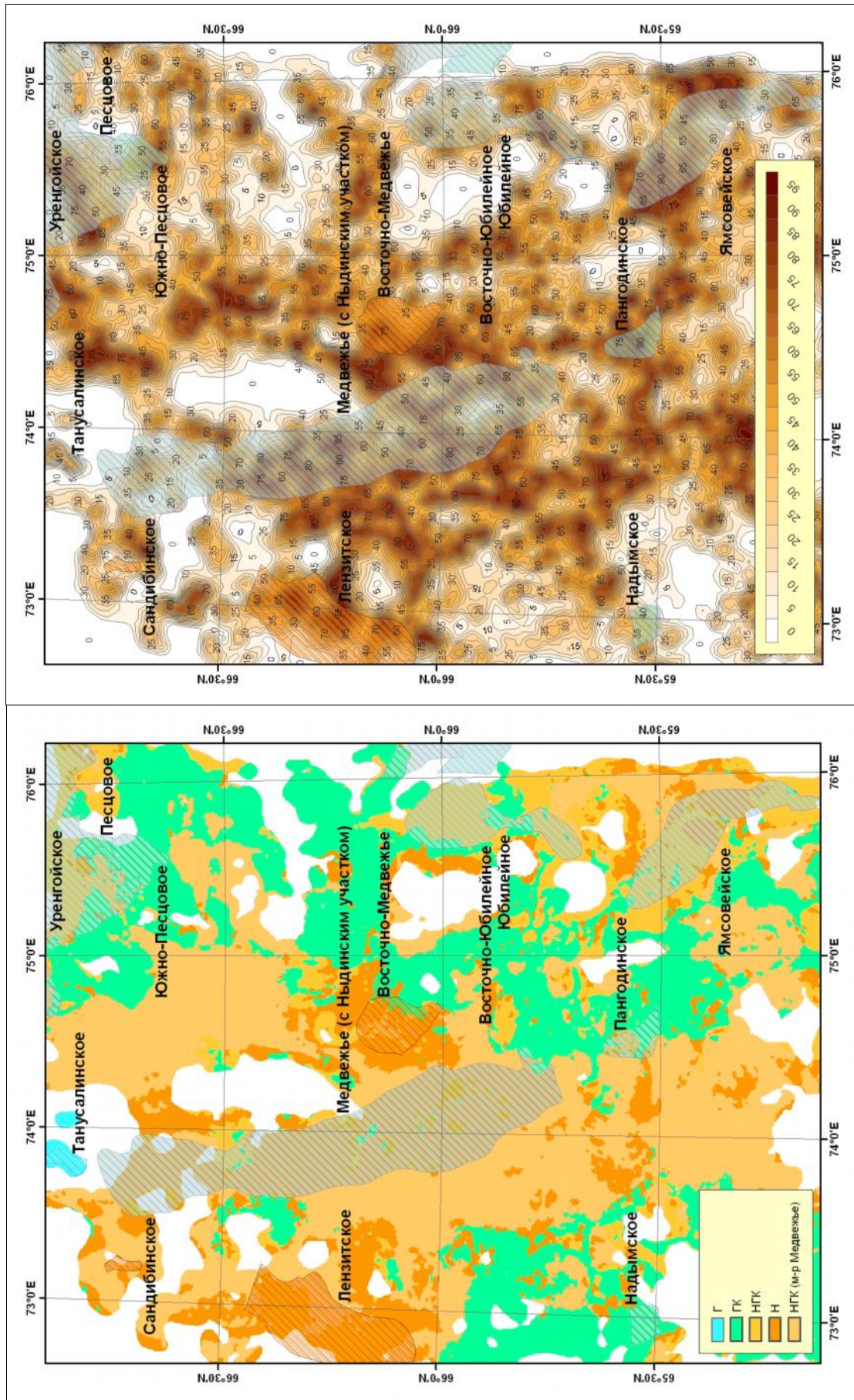.11.                                                                                                      -                              ( )
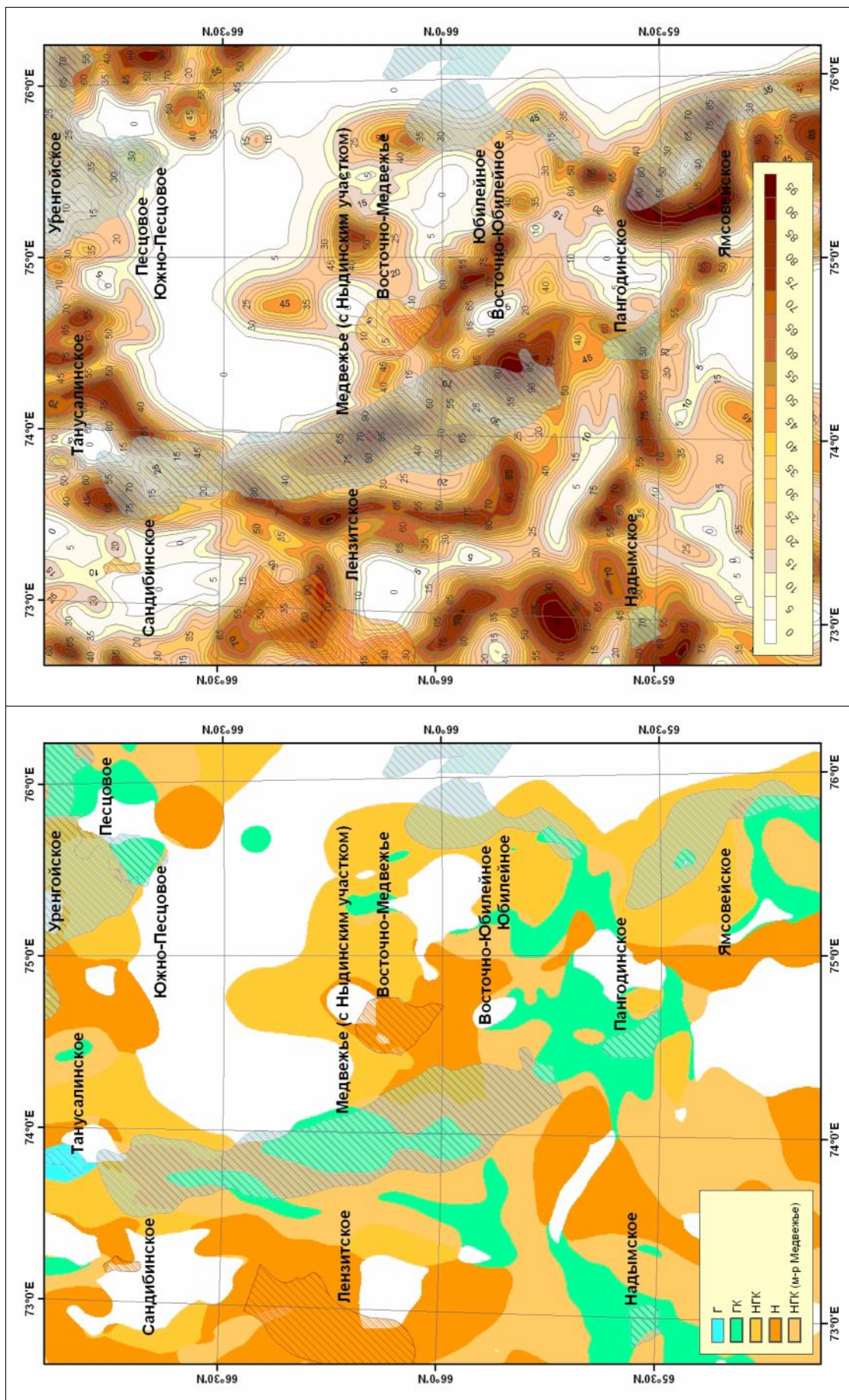( ).

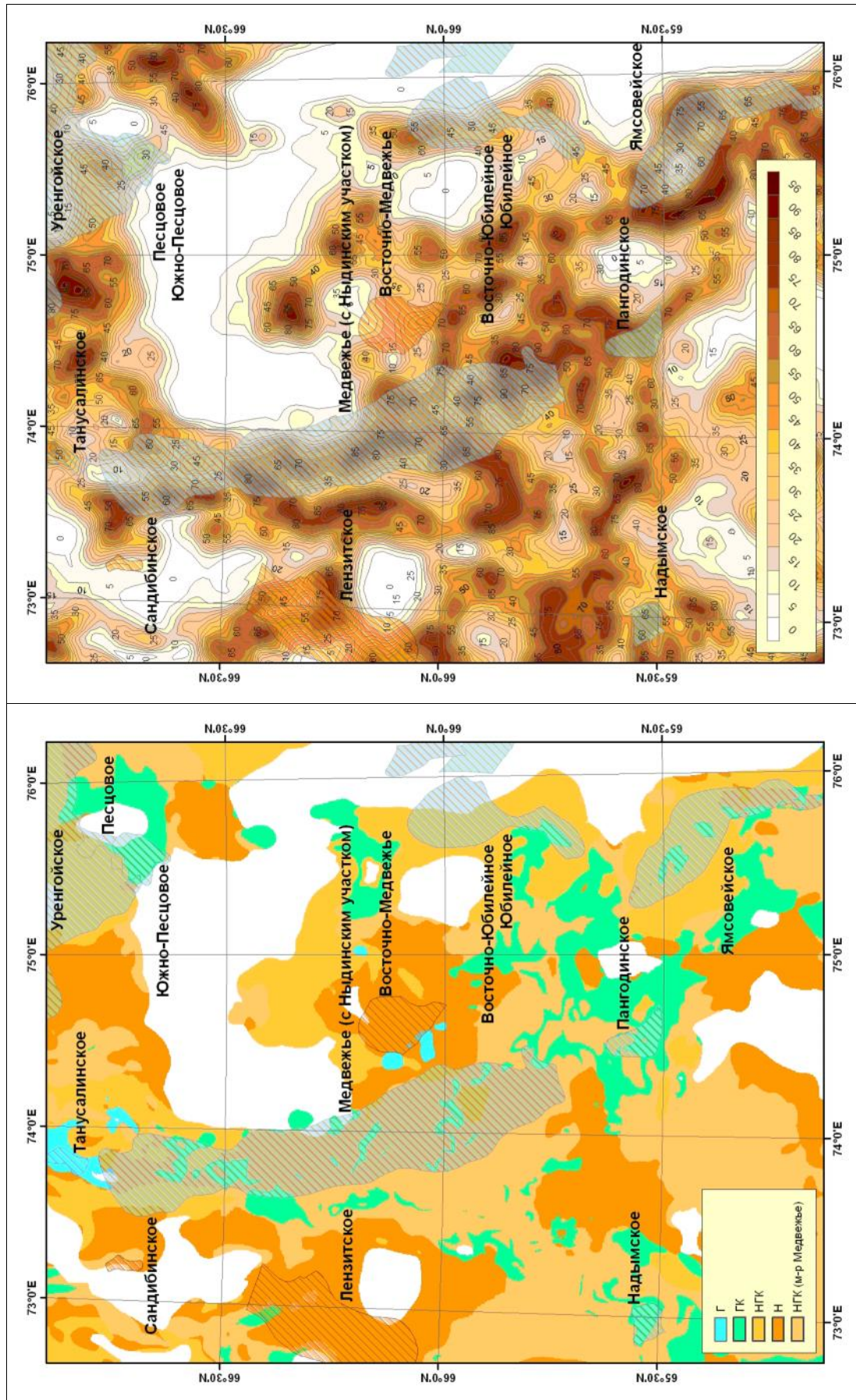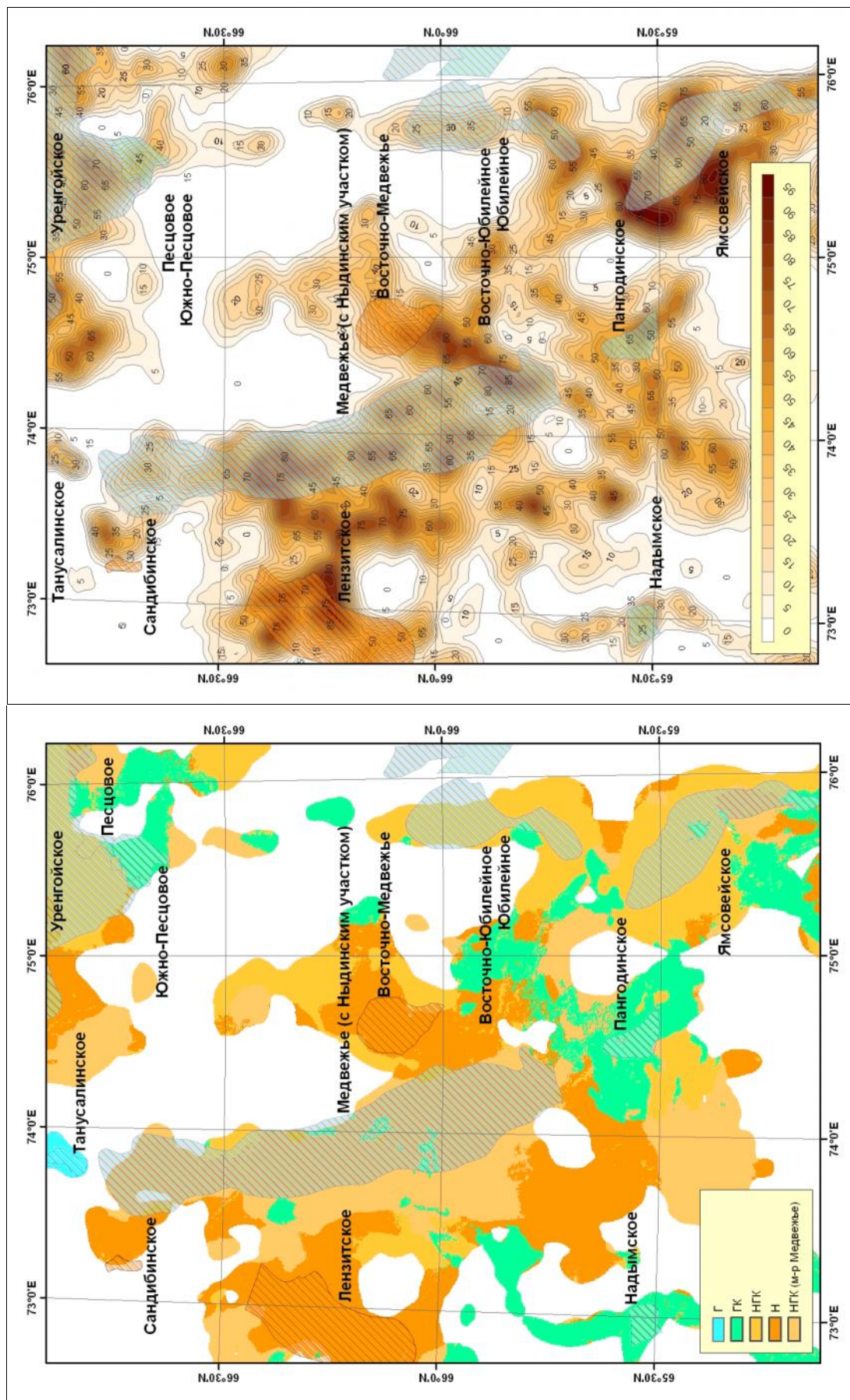. 12.                    ( )            ( )

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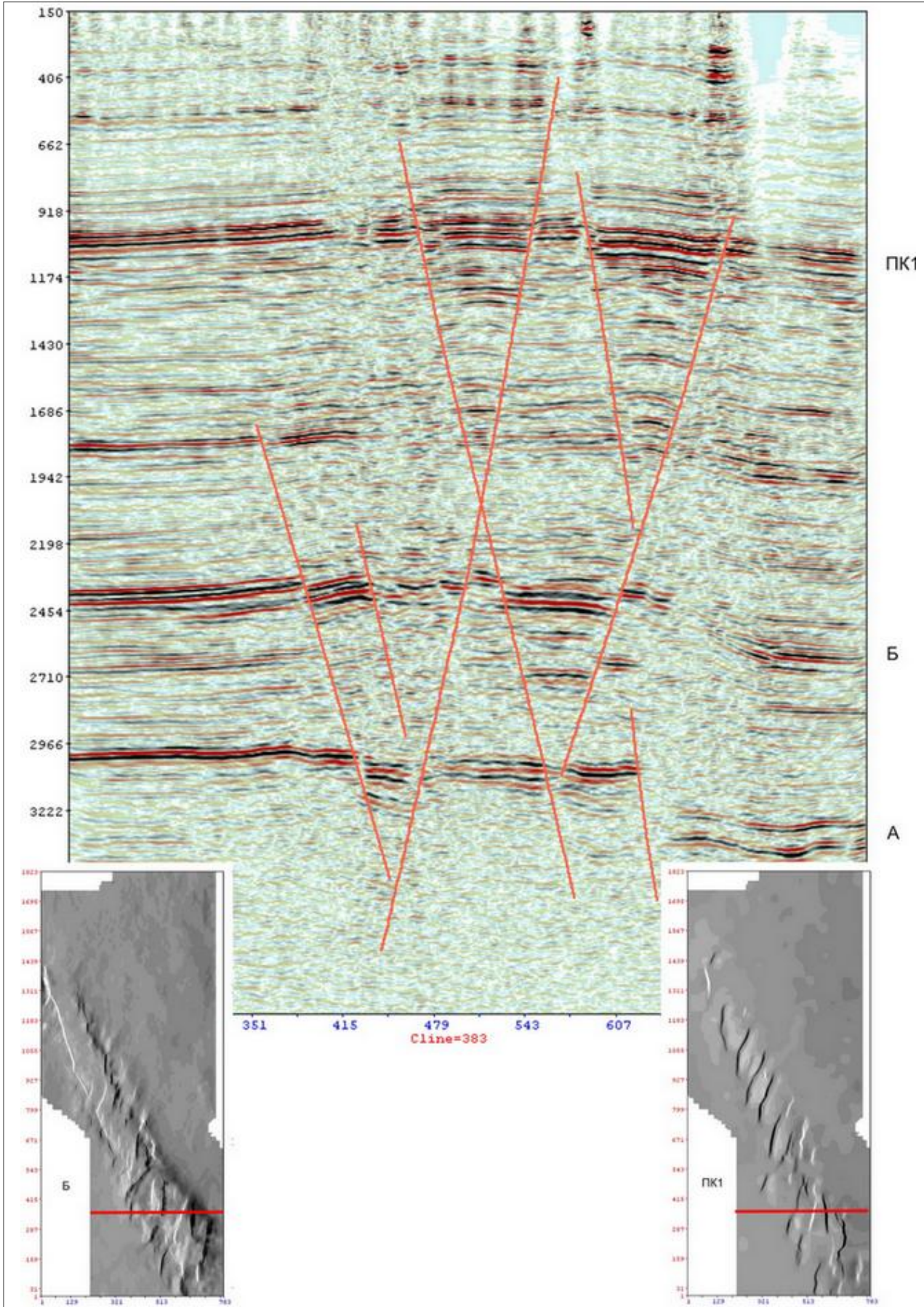
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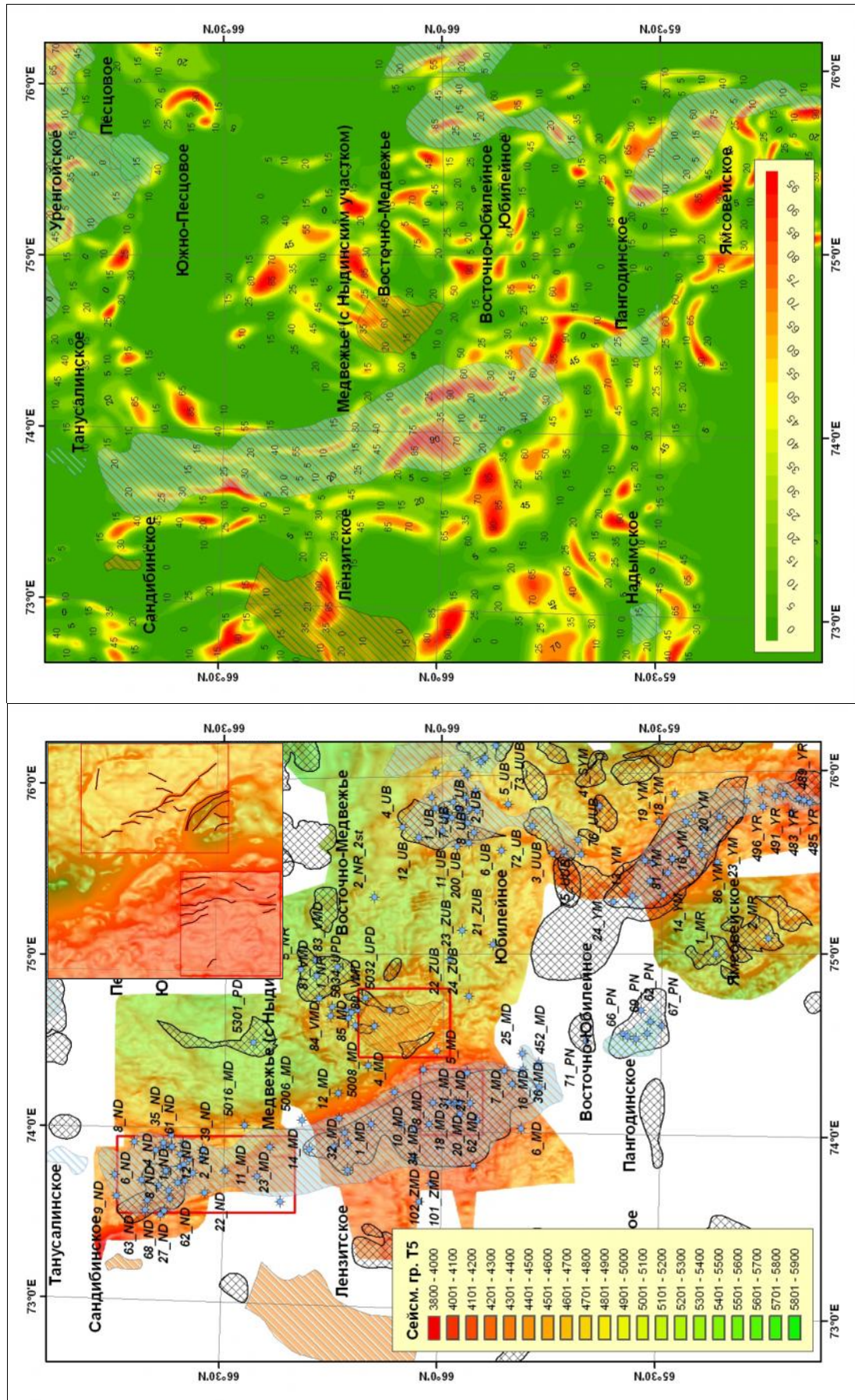2.                        . .                                                                        .     -
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 9.                        . .                                                                     :                     ".
1.    1. 2013. с.18-44. URL: http://journal.deepoil.ru/images/stories/docs/DO-1-1-2013/4_Timurziev_1-1-2013.pdf
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