

# Results of monitoring studies of the processes of intergeospheric interaction in the tectonic nodes of the north of the Russian Plate

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To summarize the data of long-term monitoring observations, the authors created models of intergeospheric interaction at the level: mantle-lithosphere; basement-sedimentary cover-modern relief; lithosphere-atmosphere and, partially, ionosphere.

In general, the authors conducted studies of 18 first-order tectonic nodes on the area of the Arkhangelsk region. The research included:

- analysis of geological and geophysical materials,
- digital modeling of the relief of the roof of the basement and the surface of the modern relief,
- monitoring observations of the quantitative characteristics of abiogenic (electromagnetic emission, atmospheric pressure, inflow of deep gases, the rate of precipitation of solid and liquid precipitation, etc.) and biogenic processes (structure and composition of vegetation cover, the content of chemical elements in soils and vegetation cover) in tectonic nodes.

Seismotomography data from the Canadian Diamond Province were also used to clarify the deep structure of the nodes.

Analysis of the results obtained allows us to assert that the depth of tectonic nodes have 400 km or more. They are reflected in reduced temperature values in the lithosphere, from a depth of at least 200 km and asthenosphere and almost to the surface of relief; in terms of heat flux; in the structure of potential fields; in the structure of the Moho surface and the crystalline basement; in the power of the layers of the earth's crust; in the modern geodynamic mode, in the macroseismic field, degassing and ionization of the atmosphere (up to the ionosphere). The structure of tectonic nodes has a fractal-like (tree-like) structure, similar to the structure of advective uplifts and diapirs of mantle asthenoliths.

In the area of tectonic nodes, there is a correspondence of the structure of the deep layers of the earth's crust in the basement, sedimentary cover and modern relief, as well as in the structure and properties of the vegetation cover. These processes are explained by geodynamic processes, deep degassing and the occurrence of induced magneto-telluric currents in the earth's crust.

Intergeospheric interaction in the areas of tectonic nodes is reflected in the structure of the atmosphere and, partially, the ionosphere. As a result of measurements of atmospheric pressure over tectonic nodes, the fact of a constant "deficit" of atmospheric pressure was established. We recorded an increased density of thunderstorms in the areas of tectonic nodes, as well as distortion of GPS signals.

This scientific direction has a prognostic value in geoecological research. The results obtained are important to take into account when developing and analyzing geoecological studies of various scales and monitoring modern geoecological risks.

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