



Digital relief 3D model of the Khibiny massive (Kola peninsula)

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On the basis of maps of 1: 50,000 and 1: 200,000 3D model Khibiny massif developed. We used software ARC / INFO v10.2 ESRI. This project will be organised to build background for gas pollution monitoring network. We planned to use the model to estimate local heterogeneities in the composition of the atmosphere at the emanation of greenhouse gases in the area, the construction of models of vertical distribution of the content of trace gases in the rock mass.

In addition to the project GIS digital elevation model contains layers of geological and tectonic map that allows us to estimate the area of the output of certain petrographic rock groups characterized by different ratios of emitted hydrocarbons (CH_4/H_2).

The model allows to construct a classification of fault in the array. At first glance, there are two groups of faults - the ancient associated with the formation of the intrusive phases sequence, and the young - due to recent tectonic shifts. Ancient faults form a common semicircular structure of the pluton cause overall asymmetry Khibin heights with the transition to the border area between the Khibiny and Lovoozero. Modern tectonics mainly represented by radial and chord faults which are formed narrow mountain valleys and troughs. It remains an open question as to which system fault (old or young) is more productive to gas emanations? On the one hand the system characterized by a large old depth, on the other hand a young more active faults. Address these issues require further detailed observations.

The essential question is to assess the possibility of maintaining a constant concentration gradient of these impurities in the atmosphere due to gas emanations of fracture zones and areas enriched occluded gases. In the simulation of these processes can be used initially set parameters:

1 the flow rate of the gas impurities

2 the value of wind flows in closed and open valley

3 Assessment of thermal diffusion coefficients determined by the temperature gradient at the bottom and at the edge of the valley.

Changing these parameters for different climatic seasons allows us to estimate the duration of the existence of gas in homogeneities in the aerial under soil and up soil layers. Complex ring structure site and manifestations of recent tectonic movements allow it to allocate more closed areas with different plant-land cover and different geomorphological features. In particular stand out - bogs, forest area on the slopes and riparian forest zone, the zone of mountain tundra and rocky plateau.

Designated areas should be considered together with the full history of the evolution relief Khibin, processes of decrease glaciers and their occurrence. One of the results of the work performed is the allocation within the array of closed cirques, paleo-ice landforms drumlin and moraine ridges. These landforms represent the latest stage of the glacial history of glaciation on the Kola Peninsula and the Arctic coast. Estimated areal characteristics of different forms. In some cases it was possible to separate a sequence of glacial relief forms, which suggests staging a retreat of glaciers in the area.

The project highlighted areas open mining apatite ores in Khibiny massif. Career located in the inner part of the massif form a closed area drain mine water pollution and wind. While the new career located on the border of the array and the forest zone characterized by a single watershed and accordingly included in the ecological life support cycle of residential villages and towns of Kirovsk and Apatity. This fact forces us to view mining activity as a powerful source of contamination.

Designed GIS project thus can be used to solve a number of problems geomorphological orientation. In addition a number of application issues - the environment, paleoclimatology, geotectonic can be successfully addressed on

the basis of the digital 3D model.