



## About necessity of carrying out seismogeodynamic monitoring of the Russian Federation's Arctic zone

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Now seismicity of the Russian Federation's Arctic zone is studied poorly. Existing seismological networks in the Arctic and subarctic territories are not enough for receiving of high-grade seismogeodynamic situation. It is known that the Arctic zone of the Russian Federation represents area where enough of responsible constructions (RC) including the objects having historical and cultural value and also land and sea chisel platforms, oil and gas warehouses, pipelines and other are concentrated. Accidents on the similar objects caused both technogenic and natural factors can lead to rather serious consequences especially taking into account extreme fragility of ecological equilibrium of northern territories.

Opening of eight stationary digital stations of the Arkhangelsk seismological network (the eighth station is opened in settlement Amderma on November, 28th, 2010) and carrying out seasonal reconnaissance field observations have shown that the existing situation is appreciably other than it was represented earlier. From 2005 to 2010 in the Arctic segment only by the Arkhangelsk seismological network it was registered an order of 200 regional earthquakes. Thus feature of the Arkhangelsk region is unique placing of seismic stations in its territory that will allow to cover the considerable part of the Arctic zone almost inaccessible to supervision from other areas. In essence it allows to delineate major geodynamic structure and thereby to define the boundaries of the Arctic zone of Russia. In connection with the further industrial development of the Arctic territories there is a danger of display of the induced earthquakes including the hydrocarbons connected with extraction, including of liquid industrial wastes in layers, work of open-cast mines etc. Not sufficient seismic accounting reduces safety of functioning of objects considerably. It is essential that for a sea shelf the data about seismicity is practically absent that inadmissible at development of deposits of hydrocarbons in Barents and Karsky seas. Carrying out of seismological supervisions, their geologo-geophysical analysis, estimation of seismic danger are actual and paramount directions of works for the Arctic territories.

On the other hand, according to last researches, the Arctic areas possess of variety of the features promoting of development of potentially dangerous changes which can occur on responsible objects owing to influences of specific environment. These include relatively high seismicity of the Arctic, confirmed by the latest data, the activity of platform faults and other visible manifestations of geodynamics of the northern territories, significant wind loads, as well as the glaciological-physical and freezing phenomena, etc. In this case the available experimental data of monitor of such processes and evaluations of potentially high risk are clearly insufficient due to difficulties in the organization of continuous observations in the northern areas and higher requirements to the characteristics of the measuring equipment.

Currently issue on the development of the seismic network in area of the Arkhangelsk region and beyond including cooperation with other observational networks of circumpolar region is actual. An important question is to increase the sensitivity of the network which is associated with increased number of seismic stations and a maloappertnyh groups. In this regard in the nearest future staff of IEPS UB RAS is planning to open new seismic stations on the Franz Josef Land, isl. Novaya Zemlya, Kanin Peninsula, and the Nenets Autonomous District. Creation of dense system of seismic monitoring will allow to study laws of a deep structure and feature of modern geodynamics of earth crust and the top cloak of the Arctic zone of the Russian Federation where the basic stocks of hydrocarbon circumpolar areas are concentrated that in turn will allow to prove external borders of Russia in Arctic region.

Development of a dense seismic network in the Arctic zone will allow to solve also tasks on prevention of natural and technogenic catastrophic crashes. This direction is actual in connection with the planned beginning of operation of huge deposits of hydrocarbons on a shelf of northern seas. It is essential that there are a lot of large industrial targets at considered territory: extended petro- and gas pipelines, cosmodrome "Plesetsk" and nuclear range on New Land island, ship-repair factories, pulp-and-paper and timber industrial complexes, open-cast mines. Carrying out of detailed seismic division into districts for the future constructions is not less important. However, in

accordance with international experience, the cost of these works is immeasurably less than expensive to eliminate critical emergency situations.