Idea397

Geothermal field of Arctic and Antarctic passive transitive zones measuring for terrestrial temperatures and lithosphere thickness research as well oil and gas deposits on a shelf and continental slope evaluation

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The purpose of the project. Research of a geothermal field and lithosphere thermal evolution of Arctic and Antarctic Regions with the purpose of terrestrial temperatures, a phase status of substance, parameters of power balance, thermal conditions for oil-gas deposits evaluation, monitoring and paleoclimalatical reconstruction.

The brief substantiation. Passive continental margins on the border of Arctic and Antarctic continental shelf are a «white spots» on heat flow world map. Studying of a geothermal field in these regions should throw light as on lithosphere structure in transition zones from continent to ocean, and on evolution of these areas caused conductive heat flow reflecting active tectonic events of the geological past. Geological-economic importance of Arctic seas due to huge gas resources existing on shelf sedimentary basins and it will be more in process of development and new deposits discover. In conditions of investment resources limitation for expensive geophysical researches get practical importance rather inexpensive methods of an indirect prospecting through the already available geophysical data interpretation.

Planned result. During the project performance will be designed temperatures and heat flow in Arctic and Antarctic lithosphere, will be constructed geothermal 2D-and 3D-models. With GIS-technology depths of a possible hydrocarbons in a sedimentary basins will be predicted. Planned investigations will estimate deep temperatures and lithosphere thickness in polar areas. The maps and digital database will be prepared according to sedimentary basin thermal model that will estimate consequences technical influences on environment at oil-gas deposits exploitation and underwater communications lining.

The basic kinds of researches. Project should include the expedition researches in polar regions with heat flow measurements and other geothermal parameters by oceanic thermal probe. The research should conduct with the big measurements density on the limited area of waters. It will demand manufacturing of several updatings of probes with various penetrating tubes length for different sedimentary types. The basic kinds of lab researches are thermal tomography imaging by 3D-geothermal modelling. Construction of 3D-models of temperature and heat flow distribution allows to receive maps-slices of a geothermal field on any depth and to determine a level for hydrocarbons cathagenetic transformations. Thermal modelling uses to estimate solidus temperature depth.

Time, places and resources. Expedition researches onshore and on islands (Queen Maud land, Svalbard, Franc-Josef land), and on a research vessel (Barenz, Kara Seas, Arctic Ocean? Offshore Antarctica) should be spent during summer (winter) period in Arctic (Antarctic). Research duration should be not less than one month within 3-4 years. Establishments - coauthors – Geological institute of the Russian Academy of Science (Moscow), Research Institute VNIIOceanology (St.-Petersburg), Shmidt Institute of the Earth Physics of the Russian Academy of Science (Moscow), Institute of geography of the Russian Academy of Science (Moscow), "PALS” Enterp. Ltd. (Samara), Murmansk Polar Expedition (Murmansk)