



## **Geologic and Geophysical Studies of Natural Hazards and Risks in the Gulf of Peter the Great, Japan Sea**

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The area of the Gulf of Peter the Great is socially, economically and culturally one of the most important regions for the Russian Far East. At the same time, there have been reported palpable natural hazards, which pose a real threat to local infrastructure.

Complex field team of the Gramberg VNIIOkeangeologia institute carried out geological and geophysical studies of natural hazards in the water area and coastal zone of the gulf in the summer and autumn of 2012.

The research program included

- geodetic deformation monitoring of the coastal zone by the HDS 3000 Leica tachometer;
- echo sounding of the underwater part of the coastal slope by the LCX-37C depth sounder equipped with active external 12-channel GPS Lowrance antenna LGC-3000;
- high-frequency acoustic profiling by GeoPulse Subbotom Profilier with oscillator frequency of 12.2 kHz for the study of bottom sediments to a depth of 40 m;
- hydromagnetic measurements by SeaSPY Marine Magnetics magnetometer for investigation of deep geological structure;
- sonar measurements by GEO SM C-MAX, 325 kHz frequency emitters for studying seafloor features;
- studies of the water column (sensing and sampling);
- bottom sediment sampling.

Analytic work was performed by mass spectrometry, atomic absorption spectrophotometry, chromatography, gas chromatography-mass spectrometry, gamma spectrometry and included the following. For water – the content of Fe, Mn, Cd, As, Pb, Cu, Co, Ni, Cr, Zn, Hg in solution and in suspension, polycyclic aromatic compounds, organochlorine pesticides, oil, methane.

For sediments – grade analysis, mineralogical analysis of sand, determination of Fe, Mn, Cd, As, Pb, Cu, Co, Ni, Cr, Zn, Hg content; identification of petroleum products, polychlorinated biphenyls, organochlorine pesticides, the specific activity of Cs-137.

As a result, a set of geological maps was composed: maps of pre-Quaternary and Quaternary rocks and deposits, lithological map, geomorphological map, map of engineering geological zoning, map of the major hydro- and lithodynamic processes, hydraulic and geochemical maps and sections, seismotectonic map, map of endogenous geodynamics map exogenous geological processes, map assess the overall geo-ecological situations etc.

As a result of the first stage of these studies we identified the following significant hazards and risks faced by the region:

1. Seismic hazards - along seismoactivity faults in the region.
2. Tsunami hazards in the coasts of Amursky, Ussuriysky and other gulf of the region.
3. Destruction of shore, including landslides, in many littoral zones of the region.
4. Avalanche sedimentation in Amursky, Ussuriysky gulfs.
5. Gas emissions in bottom of the shelf zone.
6. Industrial pollution in aquatories near industrial centres.

Estimation of hazards and risks in the Gulf of Peter the Great will be continued.