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Nature mercury emission from Earth Crust in Arctic and subarctic marine environments

A.S.Astakhov (1), G.I.Koruykin (2), M.V.Ivanov (1)

(1) Pacific Oceanological Institute, Vladivostok, Russia, (2) PANGEA Inc., Moskow, Russia

The nature mercury emission from Earth Crust is impotent factor controlling mercury distribution in marine water and atmosphere along with anthropogenic pollution. Main sources of mercury to seas are submarine volcanoes, mud volcanoes and cold gas vents. The correlation of hydrocarbon gases and mercury fluxes from different sources is well known.

The more influence on mercury contents in water column and air revealed the gas vents. The gas bubbles containing Hg may penetrate from bottom vents to surface water and atmosphere. This event we studied on the Piip Submarine Volcano in the Bering Sea. Acoustic data revealed clearly that a gas flares rises from the hydrothermal vents of crests of the volcano which lies at a depth of 360 and 420 m to or near the sea surface. The mercury content in subsurface cold water mass near the flare increase up to 4.8 ng/l compare to $<$1.1 ng/l background content. Gas flayers and Hg-rich waters form in air two high Hg local points with concentrations in excess of 2.2 ng/m^3 (average contents in Bering Sea air is 1.6 ng/m^3) situated just to the north west of the two submarine hydrothermal vents. Wind velocity and direction information are superimposed and illustrate that the source of the Hg anomaly is most likely from degassing of the volcano below and then blown to the northwest.

The fact of quasi-stationary gas-thermal “heat windows” formation above the bottom discharge sites of gaseous fluids was established in different fractures zones of Arctic Seas (Novaya Zemlya dislocation arrangement and Varangerfiord regional abyssal fracture, Barents Sea; Ust-Lensky rift trough, Laptev Sea; joints of tectonic intersections, Kara Sea, etc.). Its form local dispersion flares traced at depth level of 250 and more meters above fault zones and degassing hydrocarbon deposits. According our data it characterizes horizon-oriented increase of seawater temperature and hydrocar-

bon gases content in water.

It is known that the bottom sediments in region of submarine hydrothermal and gas vents are reached in mercury. Our data on mercury distribution in sediments of Arctic Seas suggest that the recent Hg emission from Earth Crust of Arctic Seas is small compare North Pacific Seas, for example. It may be depend on permafrost and gashydrate presence, which prevented the degassing of mercury out zones of a deep fracture. The Hg fluxes from Earth Crust to water and atmosphere of Arctic Seas may increase during possible global climatic changes accompanying by permafrost and gashydrate degradation.