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[MPV-05 Volcanic eruptions: Chamber-, conduit-, and depositional processes and their implication for monitoring and hazard assessment](#)

Mercury (Hg) in the near-ground atmosphere of active volcanic edifices in Kamchatka

Nina Ozerova, *Institute of Geology of Ore Deposits, Petrology, Mineralogy and Geochemistry (Russian Federation)*

Alexey Ozerov, *Institute of Volcanology and Seismology (Russian Federation)*

We studied the Klyuchevskoy, Bezymianny, Mutnovsky volcanoes and inside the Uzon caldera. In regional plan Klyuchevskoy and Bezymianny volcanoes are located within the zones of intersection of the NE and NW deep faults and locally ? within the zone of NE faults. We revealed within the last zone the series of Hg anomalies in the near-ground atmosphere (helicopter). We made several flies over the crater zone of Bezymianny volcano and recorded a series of anomalies ($n \cdot 10^{-8} \text{ g/m}^3$) at the research height of 500 m. These anomalies evidence that Hg emits into atmosphere. We made several flies over the summit crater of Klyuchevskoy volcano (4822 m) at the research height of 600 m above the crater rim. We did not reveal Hg emission because the hot ascending air caused by fumaroles did not allow taking measurements lower. In the meantime several on-board observations over the cinder cones (Bilyukay and Bylinkinoy caused by adventive eruptions and inactive now) allowed detecting a distinct Hg emission at a height of 5-10 m above the crater rim ($n \cdot 10^{-8} \text{ g/m}^3$). We provide data on Hg content in the fluids from the bottom fumaroles of Mutnovsky volcano so that to describe the Hg concentration caused by fumaroles and emitting into atmosphere: $7 \cdot 10^{-5} \text{ g/m}^3$ in gas component and $2 \cdot 10^{-3} \text{ g/l}$ in steam condensate. The research in the Mutnovsky block (Mutnovsky and Gorely volcanoes) aimed at revealing the relationship between seismic activity (mantle depth 70-300 km), volcanic activity and the emission intensity of Hg-bearing fluids evidences on mantle level of Hg degassing in this block. We revealed two Hg halos in the near-ground atmosphere inside the Uzon caldera (foot observation), they are 3 and 1.5 km long, their content are $n \cdot 10^{-8} \text{ g/m}^3$. The eastern halo is located within the thermal fields where the content comprises $(1-28) \cdot 10^{-6} \text{ g/m}^3$ Hg in gas phase of hot springs. The western one is out of the present hydrothermal field. It is located within the zones of intersection of NE and NW faults. Such halos were fixed at the height of 10-25 m too (hang-glider). The research of above water Hg halos within the near shore Kamchatkan-Pacific aquatorium resulted in detection of atmochemical Hg anomalous series: $n \cdot 10^{-8} \text{ g/m}^3$ (ship). According to the seismological research they are located in the fault zones that continue from the ocean on the NW continental faults. One of them ? Utholoksky ? controls the Hg emission in Uzon caldera. Besides, other Hg anomalies under above water conditions also continue on the Kamchatkan NW faults: within the Kireunskiye springs zone with and without hydrothermal activity (helicopter, 100 m) and, what is very interesting, in zone of the Pinachevskiye cold springs located within the NW deep fault without any hydrothermal activity (foot observation). Even a brief description evidences that the Hg degassing appear in the Earth crust significantly wider in comparison with the volcanic activity and appear on the deep faults zones of mantle location.

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