Hg behavior in mud volcanic landscape, Kerch Peninsula

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Total mercury (T-Hg), gaseous elemental mercury (G-Hg^0), elemental mercury (Hg^0), methylmercury ($MeHg^+$), sulfide mercury (S-Hg) and sorbed mercury species were determined in the components of specific mud volcanic (MV) landscape in the Kerch Peninsula (Table 1). The background G-Hg^0 content (0-3 ng/m^{-3}) in this region is commensurate with the atmospheric values over Europe, whereas the active Bulganak, Soldat-Sloboda and Korolevsky MVs provide heightened Hg inflow to local environments, and the G-Hg^0 contents in ambient air are 10-170 times higher. These MVs also emit water and mud with T-Hg enrichment reaches 10-600 relative to sea water [1] in fluids and up to 10-32 relative to the pelitic rocks [2] in mud. Cinnabar is the key Hg host in muds from the Bulganak and Korolevsky MVs. Sorbed Hg (with Fe^{3+}-(oxy)hydroxides as chief adsorbents) predominates in the Soldat-Sloboda MV. The Hg bio-accumulation and the presence of $MeHg^+$ were not revealed in soil-forming substrates. Both Hg^0 and highly soluble $HgCl_2$ were also not observed in muds. In MV environment the key halotolerant plants (*Limonium capsicum, Kalidium foliatum* and *Corispermum hyssopifolium*) are not Hg-enriched (0.003-0.027 ppm $MeHg^+$) and only few mushrooms accumulated Hg (20.3-64.0 ppm T-Hg in dried matter). The resistance of HgS and Hg-bearing FeS_2 in alkaline media (pH = 7.5-9.5) of MV water makes these sulfides the reliable Hg hosts thus inhibiting the mercury flux to the environment and reducing the bio-availability of Hg. *The study was supported by the Russian Science Foundation, grant 17-17-01056.*

Mud volcano	Atmosphere	Mud	Water	Plants
Bulganak	2-43	0.27-0.90	0.02-1.24	0.01-0.04
Korolevsky	20-55	0.04-0.92	≤0.10	0.01-0.04
Soldat-Sloboda	20-520	≤0.04	0.08-0.22	0.01-0.03

Table 1: Contents of G-Hg^0 (ng m^{-3}) in atmosphere over the MVs and T-Hg (ppm) in components of MV landscape.

[1] Bruland & Lohan (2003) *Treatise Geochem* **6**, 23-47. [2] Gao *et al*. (1998) *Geochim Cosmochim Acta* **62**, 1959-1975.