S14-03 Tectonic activity as a source of mercury in the environment

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Beside anthropogenic influences, mercury in the environment can also be of natural origin. Among geologic sources, volcanic activity has been of main interest so far. Modern estimations of global natural emissions are between 2000 and 5200 tonnes per year. However, these estimates are very uncertain, thus more detailed and systematic research on natural sources of mercury is necessary. Tectonic activity is connected to certain phenomena such as degassing of Hg and other gases from active faults, geothermal activity, volcanoes, etc. Mercury concentrations in air, soil gases and fluxes, as well as its speciation, in connection to tectonic activity, were studied in different environments such are karst cave (Postojna Cave), active volcano areas (Mt. Etna, Italy and Mt. Puyehue, Chile), and active tectonic areas in the Mediterranean Basin. Postojna Cave is characterized by elevated Hg (up to 150 ng m^{-3}) air concentrations at certain areas in vicinity of active faults; however the concentrations showed also strong seasonal variations. Mt. Etna on Sicily is the largest and most active Mediterranean volcano. Concentrations of mercury in air in the vicinity of the volcano are relatively high (between 4 and 30 ng m-3) and rise towards the summit crater (65 to 130 ng m^{-3}). Concentrations in sulphatare and fumaroles gases on the summit of the volcano can reach very high g m-3). The volcano area Puyehue is one of the most tectonically active in the world with strong volcano, geothermal and seismic activities. The area has naturally elevated Hg levels with absence of anthropogenic activity. Glacial lakes in the vicinity show some similarities with the Mediterranean basin: high Hg and MeHg levels can be found in fish and sediments with low water column and air concentrations. Air Hg concentrations are elevated at active faults and volcano areas. The Mediterranean Basin is characterized by strong tectonic activity as a consequence of subduction of African plate under the Eurasian plate. A possible source of DGM in deeper and bottom waters could be intensive tectonic activity of the seafloor, since higher concentrations and portions of DGM were found near the bottom at locations with strong tectonic activity (Alboran Sea, Strait of Sicily, Tyrrhenian Sea, Ionian Sea).

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