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Changes of sedimentary mercury speciation and bioavailability in the course of estuarine transport (Vistula River-Gdańsk Bay system, Southern Baltic).

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This study investigated the distribution of mercury in coastal marine sediments. Samples of surface sediments were collected from the Gdansk Basin (selected due to proximity to both aerial and point sources). Both total concentration and solid speciation of mercury were measured. Sources, transport routes, transformation of mercury in bottom sediments, and interections with benthic biota (Macoma balthica, Mytilus edulis) were assessed.

Total concentrations varied in the range from 20 to 430 ng/g sediment dw. The dominant forms of mercury were mercury sulphide (50%±10%), and mercury bound to both humins and mineral matrix (30%±20%). In the study area, diversified sources seem to control the distribution of mercury. They include point pollution sources in the western part of the bay; the Vistula River—the main source of mercury in the central Gdansk Bay, its influence extending to the Gdansk Deep area. Sediments of the Gdansk Deep western slope receive mercury from the suspended matter of both the Vistula River and the currents from other coastal regions as well as aerial long-range transport.

Mercury species undergo transformation in the course of transport to depositional basins—which leads to partial remobilization of mercury from the sediments. The transformation comprises production of both labile and mobile species, and conversion to stable species, bound to sediment mineral matrix. The former are likely to be remobilized from surface sediments to overlaying water, while the latter are responsible for the sink term in mercury cycling.

Potential mercury bioavailability factor (PMBF), calculated from mercury lablie

species concentration and organic matter content in sediments, agreed resonably well with mercury distribution in soft tissue of mussels. Thus it was proven that mercury transformation in the course of the metal transport in the coastal zone sediments influences not just geochemistry of the metal, but accumulation rates by biota as well.