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Melting glaciers as a potential source of methylmercury in the first chains of Antarctic pelagic food web (Admiralty Bay)

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Recent studies have found that the Antarctic is a sink for mercury (Hg). The unique atmospheric mercury depletion events stimulate Hg deposition and its incorporation in the marine food web. This metal can also be sequestered in the snowpack along all Antarctica. Therefore, this region should be considered as a giant cold trap of mercury. The ice sheet in West Antarctica is now in a state of dynamical imbalance and the rate of ice loss is five times greater than was thought. Therefore melting ice sheet and glaciers should be considered as an important secondary mercury source for the Antarctic, which can result in an increase of Hg concentration in marine biota. The aim of the research was to identify methylmercury (MeHg) sources in Antarctica and determine their potential for accumulation in the marine trophic chain. Sampling was conducted in the Admiralty Bay in December 2018. As part of the research marine samples (water, suspended particulate matter, phyto- and zooplankton) were collected. Total mercury, methylmercury and labile Hg concentration were determined in the samples.

Mean MeHg concentration in Admiralty Bay was 15 pg/dm³, and the highest values were measured in the vicinity of melting glaciers. MeHg in water occurred mainly in dissolved form (>70%), thus promoting the accumulation of Hg for plankton. Higher values of MeHg concentration were measured in phytoplankton (mean 204 pg/dm³) than in zooplankton (mean 143 pg/dm³). Different factors influence the accumulation of MeHg in both groups of plankton.

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