

Sources and sinks of total and methylated mercury in seawater of Kongsfjorden, Svalbard

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The major sources and sinks of total mercury (THg) and methylmercury (MeHg) in Kongsfjorden were estimated using spreadsheet-based ecological risk assessment for the fate of mercury (SERAFM). The same model was parameterized and calibrated to fit Kongsfjorden condition using the physical and chemical properties of the fjord, such as runoff coefficients of Hg, transformation rate constants of Hg, partition coefficients of Hg, Hg loadings from freshwater, and solid balance. The modeled Hg concentrations in the seawater matched with the measured concentrations, with a mean bias of 12% and a calibration error of 0.04. The mass budget estimation results showed that the major THg sources were seawater inflow and glacial runoff, while the major MeHg sources were seawater inflow and *in situ* methylation occurring in shallow halocline water. These results well agreed to the distributions of THg and MeHg in seawater, presenting higher concentrations near the glacial calving site and river discharge site, respectively. The coupling of observation and fate modeling in Kongsfjorden provides a basic understanding of Hg cycles in the Arctic fjords.