

Dimethylmercury Stability in Natural Waters

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Dimethylmercury (DMHg) is a volatile organomercury compound, found in the oceans at concentrations similar to monomethylmercury (MMHg), the main form of Hg that bioaccumulates in aquatic food webs. Although DMHg formation and decomposition are linked to MMHg, few have studied DMHg stability and decomposition rates, and little is known about the processes controlling aqueous DMHg concentrations. For example, previous works on DMHg stability in surface seawater have reported contrasting results on whether or not DMHg in marine waters is subjected to photochemical degradation. It is also not known why DMHg is abundant in marine systems, but typically not observed in freshwater systems.

Here, we will present data from on-going laboratory studies where the stability of DMHg in aqueous solutions, including natural waters, is investigated. Briefly, photochemical degradation of DMHg is studied by exposing aqueous solutions containing DMHg to radiation from UV-lamps with wavelength spectra comparable to solar radiation. The stability of DMHg in various natural waters under dark conditions is investigated in long-term (weeks to months) incubation experiments at temperatures of 4, 20, and 60°C. Our first data supports photochemical degradation of DMHg in MQ-water, with MMHg as an intermediate and divalent inorganic Hg as the final decomposition product. Rates of DMHg degradation are comparable to those of MMHg in parallel incubations. Additionally, significant losses of DMHg from the dissolved phase are observed in all dark incubations, although underlying mechanisms remain to be elucidated. Furthermore, we intend to present data from additional experiments where e.g. photochemical degradation of DMHg is investigated in contrasting natural waters.

