

Normalized Wet Deposition of Total Mercury Reflects Concentration Gradient in Surface Seawater

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Wet deposition is the main source of mercury (Hg) from the atmosphere to the Earth's surface. Hg deposited to sea and ocean surfaces can be easily methylated and incorporated into marine food webs. However, the processes that govern the dispersion of deposited Hg in seawater are currently not well understood. To address this issue, total mercury (THg) concentrations in surface seawaters and precipitations were determined on a monthly basis in the Bay of Kaštela (Central Adriatic Sea). Under the assumption that deposited THg is diluted in the seawater bulk due to mixing processes, an exponential decay-like model was developed and the wet deposition of THg was normalized based on periods between precipitation events and seawater sampling. Normalized wet deposition of THg showed significant correlation with the THg gradient in surface seawater, after removal of an outlier. To explain the observed outlier, further data normalization included wind data to account for enhanced seawater mixing due to strong winds. Wind-normalized THg deposition of all datapoints showed significant correlation with the THg gradient in surface seawater. The correlation showed that the THg gradient in surface seawater of $0.378 \text{ pg L}^{-1} \text{ m}^{-1}$ corresponds to THg wet deposition of 1 ng m^{-2} after including the influence of wind speed on seawater mixing.