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REQUESTED SESSION: Integrated Understanding of Biogeochemical Cycling of Mercury around Ocean Environmen... [Noriyuki Suzuki]
REVIEWER COMMENTS:
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Kohji Marumoto: [No Comments]
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Noriyuki Suzuki: [No Recommendation]
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REQUESTED PRESENTATION TYPE: Poster
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TITLE: Redox transformation of mercury in coastal seawater: a case study in the Gwangyang Bay, Korea
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AGREE TO BE RECORDED: TRUE
ABSTRACT BODY: Mercury (Hg) in coastal seawater, transported from point and non-point sources, undergoes microbial and photochemical oxidation and reduction processes that are critical for fate and bioavailability of Hg. To understand how dissolved organic matter composition affects Hg redox transformation, we monitored total Hg, dissolved gaseous Hg (DGM), dissolved organic matter components, as well as typical water quality parameters in coastal seawaters. The surface seawater samplings for salinity, pH, chlorophyll-a, and Hg speciation have been performed at six to eight sites in the Gwangyang Bay located on the southwestern coast of Korea in 2015 and 2016. The Hg(II) and Hg(0) incubation experiments were also carried out to measure photoreduction (k_r) and photooxidation (k_o) rate constants of Hg. The results showed that concentrations of DGM, ranging from 12 to 690 fM, were higher at the higher chlorophyll-a sites, in general. The k_r and k_o ranged from 0.057 to 0.56 m^2 $MJ^{-1}$and from 0.18 to 0.40 m^2 MJ^{-1}, respectively, and there was a positive linear relationship between k_r and autochthonous dissolved organic component revealed by Excitation Emission Matrix-parallel factor analysis (EEM-PARAFAC). Overall, we demonstrated that the EEM PARAFAC is a useful tool to elucidate how dissolved organic matter composition affects Hg transformation processes in coastal seawater.
KEYWORDS: Metals, Monitoring, Surface water