Vertical profile of mono-methyl mercury concentrations in seawater of the Genkai Sea, Japan

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To obtain the knowledge on the production and the decomposition of mono-methyl mercury (MMHg) in seawater, we investigated the distribution of dissolved and particulate Hg and dissolved and particulate MMHg in the seawater of the Genkai Sea,which is located between the Korean peninsula and the Kyushu islands of Japan. The seawater sampling was carried out in fall 2014 and summer 2015. MMHg in the seawater were measured by cold vapor atomic fluorescence spectorometry (CVAFS) after the solvent extraction using dithizone-toluene and derivatization using sodium tetra ethyl borate and GC separation [1]. In addition, dissolved and particulate Hg were measured by CVAFS according to the EPA method 1631 and mercury analysis manual of Ministry of the Environment, Japan.

In fall 2014, total Hg (dissolved Hg + particulate Hg) concentrations were 0.14 ± 0.06 ng/L and 69±10% of total was in dissolved phase. Dissolved MMHg concentrations were averaged at 0.004 ± 0.002 ng/L, corresponding with 4.6±3.9% of dissolved Hg, ranging from 0.3 to 19.6%. The dissolved MMHg concentration was higher at the bottom layer (Water depth is almost 100 m) than the other upper layers. In summer 2015, total Hg concentrations were slightly lower then those in fall 2014. The average concentration of dissolved MMHg was 0.004 ± 0.003 ng/L, corresponding with 7.4±3.9% of dissolved Hg. Although the dissolved MMHg cocentrations in the surface layer were not more than the detection limit (3σ, 0.001 ng/L), around 0.010 ng/L of dissolved MMHg were observed in the layers under the thermocline and the maximum layer of chlorophyll a. These vertical profiles of dissolved MMHg in fall 2014 and summer 2015 were similar with those of PO_4^{3-} concentrations, which is one of the nutrients. Therefore, the production of phytoplankton and remineralization [2] can be ralated to vertical profile of dissolved MMHg in this sea area.

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[1]Logar et al. (2002) *Anal. Bioanal. Chem.* **374**, 1015-1021. [2] Hammerschmidt and Bowman (2012) *Mar. Chem.* **132-133**, 77-82.