

Friday, June 29, Session 2A (29-2A)

(Oral: 15:30-16:35, Room A; Poster: 16:35-17:35, Hall) Chair: KURISU Kiyo

29-2A-15

In Situ Heavy Metal Bioavailability Measurements in River Waters, Northeast China

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Spatial distribution of heavy metal bioavailability was first investigated in the surface water of Daliao River watershed and other three rivers running through Huludao City in the northeast China. Bioavailable heavy metal (Ni, Cu, Zn and Pb) concentrations were measured by a standard device called Diffusive Gradients in Thin-films (DGT) in situ from September to October, 2011. At the same time, Humic Ion-Binding Model VI was used to estimate the concentration of inorganic and free ion metal species. Then the estimated results were compared with bioavailable metal concentrations determined by DGT. The DGT-labile metal concentrations for Ni, Cu, Zn and Pb measured in situ were 0.28 ~ 4.92 µg/L, 0.54 ~ 8.74 µg/L, 1.51 ~ 987.64 µg/L, and 0-4.15 µg/L, respectively. The highest bioavailable heavy metal concentrations were observed in Lianshan River and Cishan River in Huludao City followed by Daliao River in Yingkou City and then by Taizi River in Benxi City which were strongly affected by industrialization. Lower bioavailable metal concentrations were observed for Wuli River in Huludao City, Xi River and Hun River in Shenyang City which were mainly affected by some small pollution sources. These results demonstrated that difference of heavy metal bioavailability was quite large among rivers. Thus, it is time to realize the importance of metal bioavailability in Chinese surface waters and to conduct effective management of metal discharge based on the assessment of risk to aquatic organisms.

29-2A-16

Composition analysis of aluminum-philic organic matters isolated from capsule of *Microcystis aeruginosa*

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Microcystis aeruginosa is a bloom-forming cyanobacterium which causes coagulation inhibition in the drinking water treatment plant. Previous studies on algal organic matters (AOM) of *M. aeruginosa*, especially on its capsule, have suggested that AOM inhibit coagulation with polyaluminum chloride by forming complex with aluminum in coagulant. However, such organic matters have not been well studied. In this study, the capsule of blooming *M. aeruginosa* collected in Miharu dam, Japan, was separated by employing 0.1 mM of sodium hydroxide. Then, organic matters having high affinity with aluminum were isolated from the capsule by affinity chromatography. Molecular size fractionation analysis showed two peaks around 6 kDa and 5 kDa. Absorption of UV light (280 nm) indicated the presence of protein with molecular weight of about 6 kDa. On the other hand, saccharides were fluorometrically detected in the fractionated organic matter of about 5 kDa by employing pyridylamine method. These results suggest that proteins and saccharides in the capsule of *M. aeruginosa* form complexes with aluminum and inhibit coagulation.