Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)


MIS24-10 Room:302 Time:May 24 10:30-10:45

# Relationship between fluorescence characteristics and molecular weight of FDOM produced by bacteria

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Three bacterial strains were isolated from coastal surface seawater. These strains were inoculated into the liquid media amended with organic substrates and incubated in the media for a week. After the incubation, the production of fluorescent dissolved organic matter (FDOM) in the samples was confirmed by using excitation-emission matrix (EEM) spectroscopy. Simultaneously, alterations in molecular weight of the samples were analyzed by high-pressure size-exclusion chromatography (HPSEC) with fluorescence and absorbance detectors. The parallel factor analysis of the EEM spectra revealed that two strains produced the component associated with visible humic-like fluorescence and the rest of one strain made the two components which were related to visible and UV humic-like fluorescence. The fluorescence chromatograms derived from former two strains exhibited a single peak, whereas the chromatogram for the latter strain showed multiple peaks. The peak that attributes to the component associated with UV humic-like fluorescence consisted of lower molecular weight than the peaks derived from visible humic-like fluorescence. This finding suggests that the fluorescence characteristics of the bacterially-derived FDOM were related to its molecular weight. The HPSEC results with absorbance detection at 260 and 280 nm showed that the bacterial strains transformed organic substrates into low molecular weight compounds that included aromatic carbon content. The variation of the ratio of the fluorescence intensity to the absorbance among the peaks was found in their chromatograms, indicating that a content of aromatic carbon affects fluorescence intensity of FDOM. Thus, it is important for the qualitative analysis of FDOM to explore the relationship among aromatic carbon contents, molecular weights and fluorescence characteristics of FDOM

Keywords: Bacteria, Fluorescent dissolved organic matter, Excitation-emission matrix spectroscopy, Molecular weight