



## **Fluorescence Characterization of Dissolved Organic Matter Isolates from Sediments and the Association with Phenanthrene Binding Affinity**

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In this study, selected spectroscopic characteristics of sediment organic matter (SOM) were compared and discussed with respect to their different isolation methods, the source discrimination capabilities, and the association with the extent of phenanthrene binding. A total of 16 sediments were collected from three categorized locations including a costal lake, industrial areas, and the upper streams, each of which is likely influenced by the organic sources of algal production, industrial effluent, and terrestrial input, respectively. The spectroscopic properties related to aromatic structures and terrestrial humic acids were more pronounced for alkaline extractable organic matter (AEOM) isolates than for the SOM isolates based on water soluble extracts and porewater. The three categorized sampling locations were the most differentiated in the AEOM isolates, suggesting AEOM may be the most representative SOM isolates in describing the chemical properties and the organic sources of SOM. Parallel factor analysis (PARAFAC) based on fluorescence excitation-emission matrix (EEM) showed that a combination of four fluorescent groups could represent all the fluorescence features of SOM. The three categorized sampling locations were well discriminated by the percent distributions of terrestrial and microbial humic-like fluorescent groups of the AEOM isolates. The relative distribution of terrestrial humic-like fluorophores was highly correlated with the extent of phenanthrene binding ( $r=0.676$ ;  $p<0.01$ ), suggesting that the presence of terrestrial humic acids in SOM may contribute to the enhancement of binding with hydrophobic organic contaminants in sediments. Principal component analysis (PCA) further demonstrated that the extent of SOM's binding affinity might be affected by the degree of biological transformation in SOM as well as the abundance of aromatic carbon structures.