Title: Natural Organic Matter in Lake Superior

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Abstract: Natural aquatic organic matter (NOM) plays significant roles in regional and global carbon, nitrogen and phosphorus cycles. Because NOM interacts with with trace metals and organic pollutants (e.g., via chelation and absorption), it impacts toxicology as well. It is believed that these roles can be better predicted if we know the chemical structures of NOM constituents and how they vary in different aquatic environments. The major component of NOM in many aquatic systems, including Lake Superior, is dissolved organic matter (DOM). This talk will provide an overview of the ways in which DOM can be characterized. It will then focus upon the application of solid phase extraction and electrospray ionization Fourier transform ion cyclotron resonance mass spectroscopy (FT-MS) to characterize samples from the Lake Superior watershed. Lake Superior’s extractable DOM contains a large number of lignin-like and reduced hydrocarbon formulae. Summer DOM is enriched in higher H/C compounds, lipid-like and protein-like material, and N-containing compounds most likely from in-situ microbial productivity. Spring DOM is enriched in more compact, unsaturated DOM formulae, showing more lignin and heteroatom compounds lower in H/C and O/C. Spring DOM thus appears distinguished by inputs from the surrounding landscape.

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