



UTSA Earth and Planetary Sciences

And

Klesse College of Engineering (KCEID)

And

Institute for Water Research Sustainability and Policy (IWRSP)

Seminar Presentation

By

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On

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“Exploring the Roles of Organic Matter Source and Transformation for Photochemical Characterization of New York Lake Waters”

Abstract

Dissolved organic matter (DOM) is a critical component of aquatic systems that serves many purposes. Among them is the production of reactive intermediates when irradiated. Examples of RIs produced when DOM is irradiated include the excited triplet states of dissolved organic matter ($^3\text{DOM}^*$), singlet oxygen ($^1\text{O}_2$), and hydroxyl radicals ($^{\bullet}\text{OH}$) all of which contribute to the degradation of environmental contaminants and disinfection of pathogens. It is therefore critical to understand how the cycling, transformation, and composition of DOM may affect the production of reactive intermediates in aquatic systems. In this talk, I will present result that elucidate the roles of different biogeochemical and natural processes like acidification, photodegradation, biodegradation, and cyanobacterial harmful algal blooms (cyanoHABs) in shaping the photochemical reactivity of DOM. The DOM's ability to produce RIs was studied using probe compounds that have been well-studied and established as methods for the quantification of RIs. These probe compounds included terephthalic acid (TPA) for $^{\bullet}\text{OH}$, furfuryl alcohol (FFA) for $^1\text{O}_2$, 2,4,6-trimethylphenol (TMP) as an electron transfer probe for $^3\text{DOM}^*$ ($^3\text{DOM}^*_{\text{TMP}}$), and *trans, trans*-2,4-hexadien-1-ol (*t,t*-HDO or sorbic alcohol) as an energy transfer probe for $^3\text{DOM}^*$ ($^3\text{DOM}^*_{\text{HDO}}$). Overall, this talk will contribute to the growing knowledge about the photochemical reactivity of DOM in aquatic systems. It advances our understanding of the roles of several natural and anthropogenically influenced activities toward the photochemical reactivity of DOM.

