Wednesday, October 10
Poster Session 3
16:00–18:00

Poster 238

QUANTIFYING DISSOLVED ORGANIC CARBON EXCHANGES ACROSS WETLAND-ESTUARINE INTERFACES USING HIGH RESOLUTION SATELLITE IMAGERY

Quantifying carbon fluxes and exchanges across wetland-estuarine interfaces is critical for assessing the role of tidal wetland ecosystems in estuarine and coastal water quality, biogeochemistry, and ecology. The Operational Land Imager (OLI) onboard Landsat 8 provides a promising tool for monitoring dissolved organic carbon (DOC) dynamics in nearshore aquatic environments because of its high spatial resolution of 30 m and the inclusion of a blue band centered at 443 nm. Its applications, however, to retrievals of biogeochemical exchanges across tidal wetland-estuarine interfaces are limited by its coarse revisit period (every 16 days) relative to the strong (sub-diurnal) variability of water properties in tidally influenced systems. In this study, we developed a Landsat-8/OLI based DOC algorithm by correlating multiple Landsat-8 Rrs bands to field measurements of DOC in the estuarine waters adjacent to the Blackwater National Wildlife Refuge marshes in the Chesapeake Bay. Despite its ecological importance, since 1938, Blackwater's 29,000-acre preserve has lost approximately 5,000 acres of marshland. Algorithm evaluation using satellite data across different seasons over multiple years resulted in relative errors of less than 20%. Implementation of the algorithm demonstrates the potential of using Landsat-8/OLI to assess seasonal variability in wetland-estuarine DOC exchanges and capture the spatial extent of marsh influence on estuarine water quality. Results from the high spatial resolution satellite remote sensing observations were integrated with numerical simulations from an advanced coupled hydrodynamic-photochemical-biogeochemical estuarine model to quantify land-ocean carbon exchanges across spatial and temporal scales.

Maria Tzortziou, CCNY/CUNY & Columbia University, mtzortziou@ccny.cuny.edu
Fang Cao, City University of New York, fcaony@gmail.com
Blake Clark, University of Maryland Center for Environmental Science, bclark@umces.edu
Raleigh Hood, University of Maryland Center for Environmental Science, rhood@umces.edu