Dissolved Organic Matter Composition and Processing in the Altamaha River and Estuary: The Influence of Hydrology

M. L. LETOURNEAU, V. R. PANNILL, L. C. BABCOCK-ADAMS AND P. M. MEDEIROS*

Department of Marine Sciences, University of Georgia, Athens, GA 30602, USA (*correspondence: medeiros@uga.edu), [maria.letourneau25@uga.edu; vruthp@uga.edu; lcba92@uga.edu]

Although the transfer of organic matter from land to sea is one of the most important pathways for preservation of terrigenous production in modern environments, the amount and composition of the dissolved organic matter (DOM) linking terrestrial to ocean carbon cycles through rivers and estuaries is uncertain. The quality and quantity of DOM exported by rivers is known to vary with hydrology and this exported material plays a fundamental role in the biogeochemical cycling of carbon in the ocean.

The Altamaha River, off Georgia (USA), is the third largest contributor of freshwater to the Atlantic Ocean from North America. The peak in the historical average discharge occurs in mid-March to early April, and the Altamaha discharge is characterized by strong interannual variability.

We have been collecting monthly samples from the Altamaha River and Estuary since summer 2015, and conducting short and long term dark incubations. Ongoing chemical analyses include dissolved organic carbon (DOC), chromophoric DOM (CDOM), and ultrahigh resolution mass spectrometry (FTICRMS). Our preliminary results show an increase in terrigenous DOM and DOC loads with increasing river discharge. Increased river discharge leads to a decrease in residence time for terrigenous DOM in the estuary, with implications for the reactivity and export of this material to the Atlantic Ocean.