

**SEDIMENT AND ORGANIC CARBON FLUXES IN AN IMPACTED ESTUARY,
WINYAH BAY, SC: I. PHYSICAL CONDITIONS**

Kim, Y. H., G. Voulgaris, R. Styles, M. Cathey, M. Goni (University of South Carolina, Columbia, SC)

A multidisciplinary approach in understanding the dynamics of flow-particles-contaminants in estuarine environments was executed in an impacted estuary in South Carolina. As a part of this research project, intensive field measurements were conducted along the upper region of Winyah Bay estuary during October 2001. We focused on this region of the bay in order to specifically investigate the relative importance of advection vs. remobilization of contaminants within the estuarine turbidity maximum (ETM) as processes controlling their overall fate. We carried out concurrent measurements of water mass properties (i.e., salinity, temperature), currents (using ADCP), sediment resuspension (using OBS), and particle size distribution of the sediment in suspension (using Laser Scatterometry, LISST) with the water sampling for chemical analyses.

The tidal and net circulation pattern is established in the estuary for the prevailing conditions using the physical data. Residual circulation along the estuarine channel axis shows inland direction near the bottom and outward direction at the surface in the freshwater-saltwater interface (IFS). The magnitude of inland directed flow is much higher than seaward flow. Resuspension events in the ETM region, which is developed in the IFS, exhibits a tidal asymmetry with higher concentrations during the flood (up to 0.94 g/l). These higher concentration events are also related to the relatively more stratified conditions in the upper estuary region. Fluxes of suspended sediments in the vicinity of the ETM are directed inland during low discharge condition.