RESTORATION OF PARTICLE SIZE DISTRIBUTION FROM IN SITU MEASUREMEMTS OF INHERENT OPTICAL PROPERTIES IN MISSISSIPI BIGHT

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In October, 2001, a field experiment was conducted at the Mississipi Bight to explore the connection between dynamics of the outflowing Mississipi River plume and the optical properties of the inshore environment. A plume of low salinity water periodically flows along the coast, trapped in an inshore zone of several kilometers and extending to more than hundred kilometers alongshore from its source. The plume is clearly distinguished in color satellite images due to its high content of particulates and dissolved organic matter. This plume water is dispersed into the interior of the shelf when winds turn to upwelling favorable. The upwelling process brings bottom waters of the continental shelf, which also contain high levels of inherent optical properties , into the surface inshore, mimicking the plume in color images and creating interpretation problems.

The light attenuation coefficient measured during this experiment was separated into contributions from colored dissolved organic material (CDOM) and particulates. The contribution from particulates were further separated into phytoplankton and detritus contributions with model spectra. It was found that the plume could be distinguished from upwelling by higher contributions from detritus and lower contributions from CDOM. Scattering was higher in the plume than during upwelling.

The values of IOPs separated into CDOM and particulate components allow us to develop and test a numerical algorithm that restores particle size distributions of suspended matter. Taken as an input to the Mie scattering algorithm these distributions are capable to reproduce the experimental values of IOPs in the range of 20% precision.

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