

**Instrument Calibrations and
Water Column profile surveys of a
mixed-sediment mound**

Cape Fear, North Carolina

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Introduction

This work is being conducted in support of an ongoing investigation on sediment dispersal and evolution of a mixed-sediment disposal mound by the US Army Corps of Engineers (USACE). Repetitive water column surveys, suspended sediment concentration samples and bottom sediment grabs are being collected for calibration of Acoustic Doppler Current Profilers (ADCP) and Optical Backscatter Sensors (OBS) deployed by Herman Carl Miller of the USACE on the site of the disposal mound and immediate vicinity. The Virginia Institute of Marine Science (VIMS), College of William and Mary, under the direction of Grace M. Battisto, will be performing the work.

Scope of Work

For each of three surveys in the first year of this study, a water column profile will be conducted at each of eight sites identified by the USACE. These sites will correspond to ADCP or OBS long-term deployment stations and will include profile measurements using a minimum of a CTD (conductivity, temperature and depth sensor) and an OBS. A water sample will be pumped from a minimum of three depths at each site and processed for suspended solids. Bottom sediment grabs will be taken to identify bottom sediment type at each of the sites and the material collected will be used for OBS calibrations in the calibration chamber located at VIMS. Acoustic Doppler Velocimeter (ADV) calibrations will also be conducted using the VIMS flume. Sediment “Catch Basins”, provided by VIMS, will be deployed at the long term stations to identify the average suspended grain size distribution for the time of deployment.

For the first Survey, conducted April/May 2001 at sites corresponding with future locations of ADCP or OBS sensors, a profiler equipped with a CTD, an OBS, a Laser *in-situ* Scattering Transmissometer (LISST), an ADV, a compass and a submersible pump was deployed from the R/V Langley. A water column profile of CTD and OBS response, sediment volume concentration and grain-size distribution from 5-500 micron as measured by the LISST, acoustic backscatter response from the ADV and current velocity and direction measurements were collected. Water samples, pumped from a minimum of three depths at each site, were processed for Suspended Solids in two

fractions: greater and less than 60 micron. The fractions were then muffled to identify the organic portion of the fraction. The sample depths correspond to a near-bottom, a mid-depth and a near-surface ADCP bin.

A Smith-Mac bottom sampler was used to collect eight bottom sediment samples, one for each site. Wet sieve and pipette analyses methods were used to determine the percent fractions of silt, clay and sand. Grain size distribution of the sand fraction (greater than 63 microns) was determined with a Rapid Sand Analyzer (RSA) at VIMS.