Sediment Dynamics

Tools of the Trade

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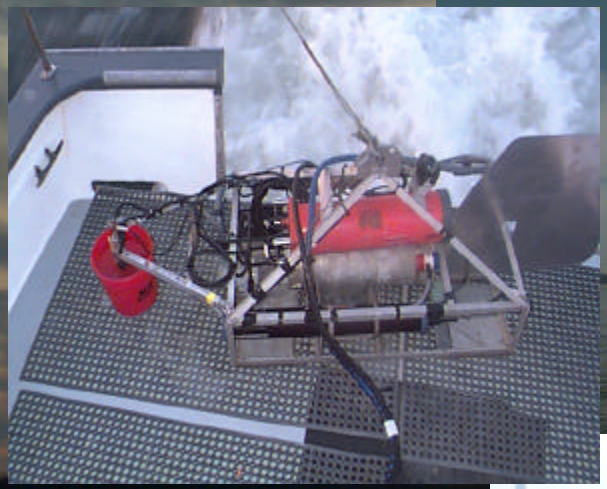
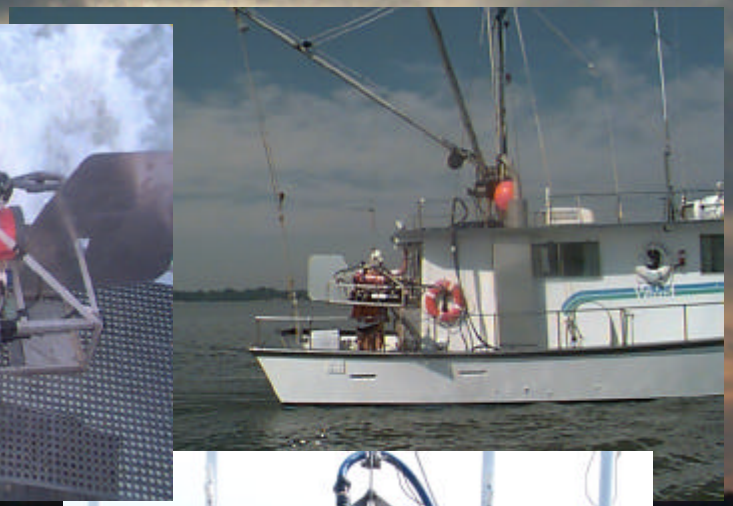
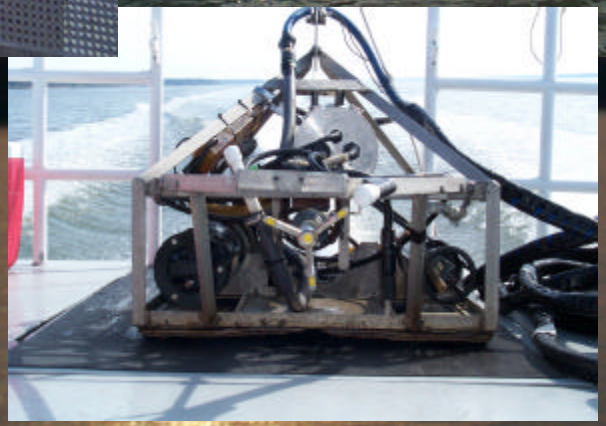
Profiler



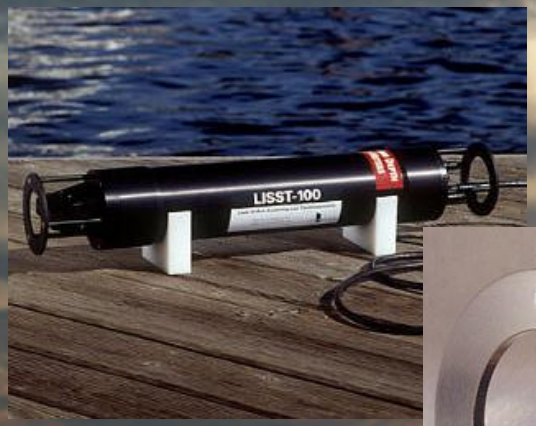


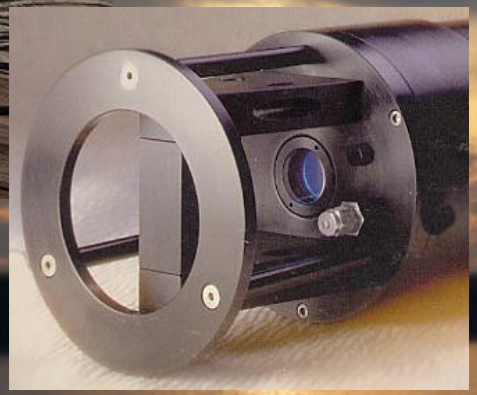


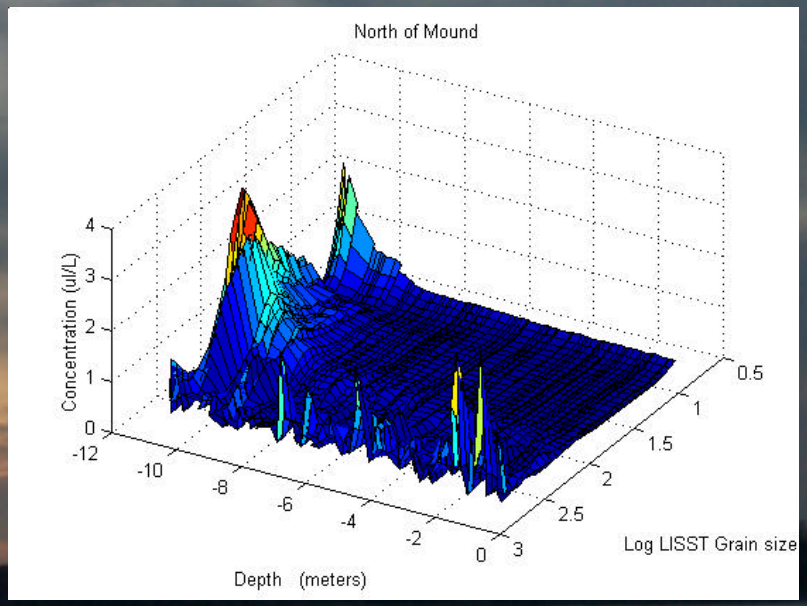
The profiler allows all the instruments (LISST, OBS, ADV, CTD and compass) to be lowered through the water column at the same rate. These instruments used together allow us to characterize the water column dynamics (velocity strength, salinity, temperature etc) and suspended sediment concentration and distribution .

Laser *in-situ* Scattering Transmissometer

LISST

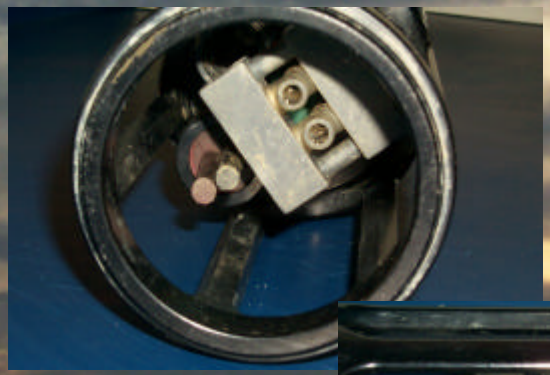


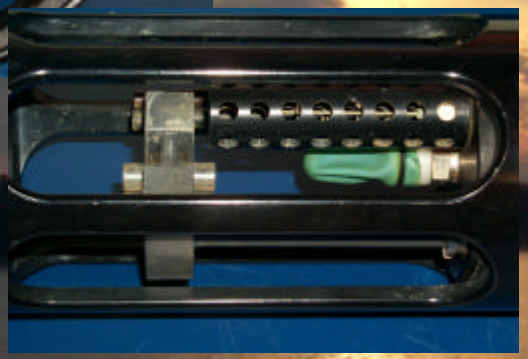


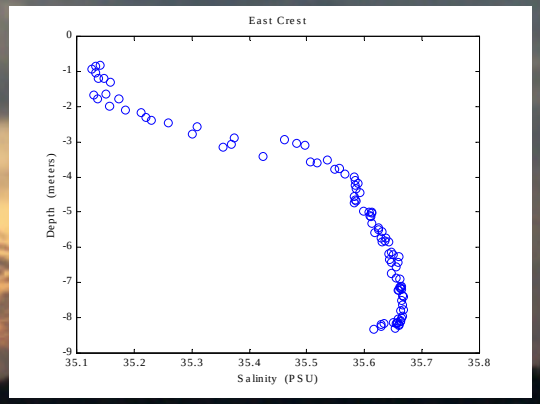


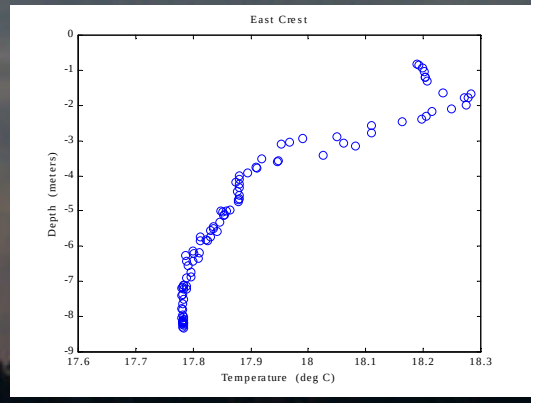
The LISST is used to measure the grain size distribution of suspended sediment from 5 to 500 microns (Silts, Clays and Fine Sands).

CTD





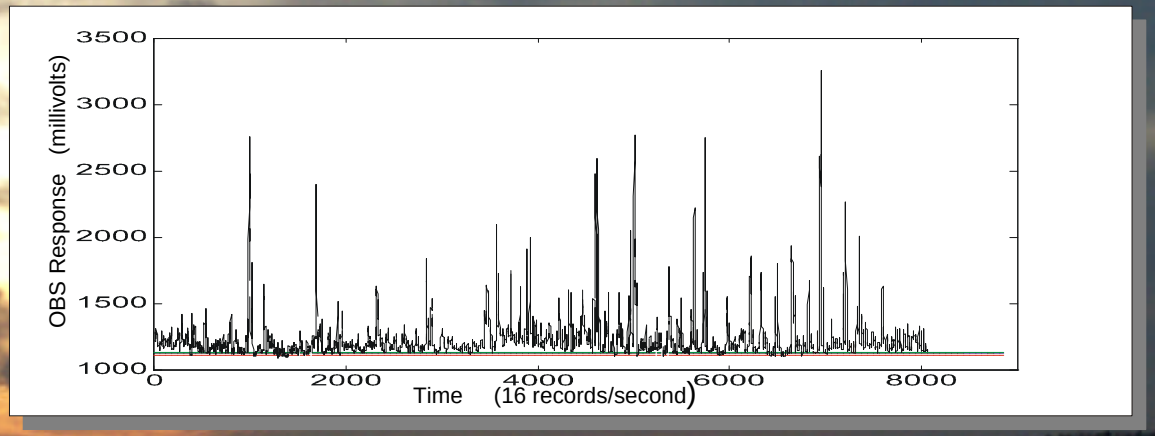




The CTD measures the "C"onductivity, "T"emperature and "D"epth at the sensor height as the profiler is lowered through the water column. The conductivity and temperature are used to determine the salinity at each depth.

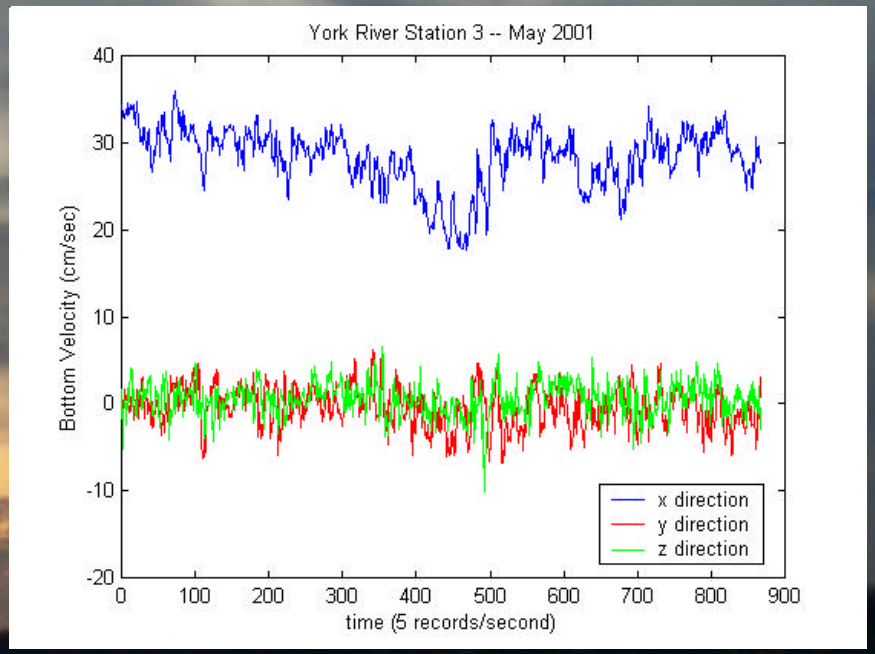
Optical Backscatter Sensor

OBS



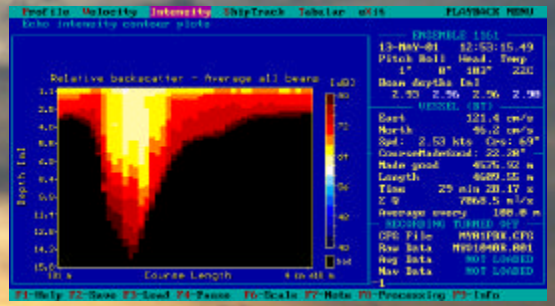
Backscattered light within the OBS sampling volume is used to estimate suspended sediment concentration at the sensor height

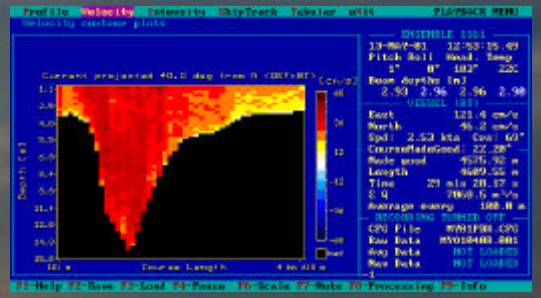
Acoustic Doppler Velocimeter ADV



Sound emitted by an Acoustic transmitter is backscattered off of suspended particles within the sampling volume and detected by three receivers to estimate water velocity at a single location in the x, y and z directions.

Acoustic Doppler Current Profiler **ADCP**

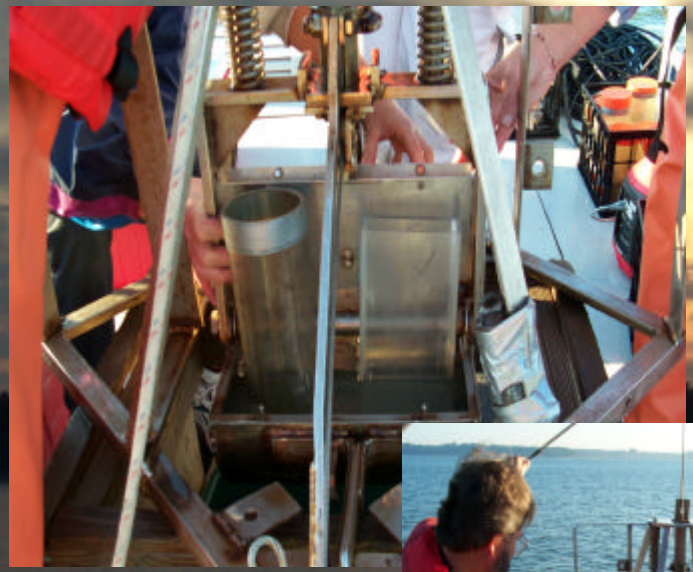




The ADCP measures the water velocities in 0.25 m (0.8 ft) bins from just below the instrument mounted on the vessel to the bottom of the water column. Sampling while the vessel is underway allows for velocity estimates over larger spatial scales (such as cross sections of Chesapeake Bay in Maryland). Sound backscatter strength can be also be used to estimate the suspended sediment concentrations.

Smith-Mac Sediment Grab

Bottom Sediment collected using the Smith-Mac allows coupling of Sediment type (clay, silt or sand), and porosity (trapped water) with the water column properties
measured with the ADCP and profiler



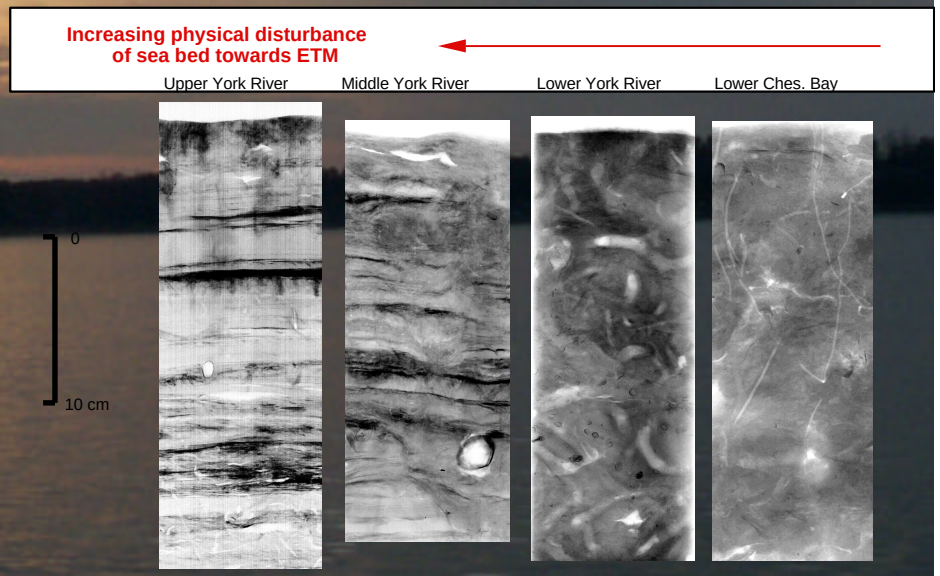


FIG 6 . Compilation of x-radiagraphs from cores collected in the 1980's along the main channel of the York River and in the Lower Chesapeake Bay outside the mouth of the York. From Schaffner (1997).