more dynamic and complex than in the open ocean and experimental logistics are often problematic. Time-series measurements of bio-optical properties are necessary for the design of accurate coupled physical-biogeochemical models (e.g. determination of limits on grid spacing and time steps), for long-term monitoring of anthropogenic effects on the biology, chemistry, and geology of the oceans (e.g. sewage outfalls, storm runoff and resuspension of contaminants, river transport of chemicals and tailings, etc.), and for the interpretation of remote sensing data in the nearshore coastal ocean in order to quantify the global carbon budget, visibility, and bathymetry.

Shelf Edge Exchange Processes (SEEP)

The Shelf Edge Exchange Processes (SEEP-I and -II) experiments in 1983-1984 and 1988-1989 were amongst the first multidisciplinary programs to utilize moored bio-optical instrumentation in a coastal environment (Biscaye et al., 1988, 1994). Fluorometers and beam transmissometers, in addition to physical instruments and sediment traps, were deployed on moorings on the continental shelf (to the shelfbreak) of the Middle Atlantic Bight (MAB), south of Cape Cod, Massachusetts to investigate the fate of continental shelf particulate matter, in particular, organic carbon. The major result from the SEEP studies was that there is not an export of a large proportion of particulate matter from the shelf to the adjacent slope and open ocean. Rather, most of the biogenic particulate matter is recycled by consumption and oxidation on the shelf (Biscaye et al., 1994).

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Sediment TRansport Events on Shelves and Slopes (STRESS)

The Sediment TRansport Events on Shelves and Slopes (STRESS) program was designed to investigate the processes controlling sediment transport and to develop models to predict these processes on a continental shelf (see *Continental Shelf Research,* Vol. 14, 1994). The site of the STRESS experiment was on the Russian River shelf off the coast of northern California. Measurements in the field were obtained in fall and winter 1988-1989 and 1990-1991 and focused on storm-generated sediment resuspension. Optical time series were obtained with bottom-mounted optical instrumentation: optical backscatterance sensors (OBSs), beam transmissometers, an optical settling box, a stereocamera for photographs of bed conditions, and Laser *In Situ* Settling Tubes (LISSTs; see *Continental Shelf Research,* Vol. 14, 1994). The time-series of interdisciplinary parameters collected during the STRESS program successfully resolved small-scale topography and estimated particle concentration, size, and settling velocity by use of optics. Supporting physical measurements determined the vertical distribution of velocity, temperature, and salinity throughout the continental shelf bottom boundary layer.

Coastal Mixing and Optics (CMO)

The Coastal Mixing and Optics (CMO) program was conducted in the "Mud Patch" of the MAB continental shelf off the southern coast of Massachusetts (Figure 4a; see Journal of Geophysical Research, Vol. 106, pp. 9425-9638, 2001; introduction/overview by Dickey and Williams, 2001). CMO was an interdisciplinary program focused on the mixing of ocean water on a continental shelf and the effects of mixing and other physical processes on water column and ocean bottom optical properties. Several particularly interesting oceanographic conditions and processes occur at the CMO study site, e.g. seasonal cycle in hydrography and biology, internal solitary waves, shelf-slope dynamics (frontal intrusions, jets, meanders, filaments, eddies, etc.), and intense storms ("nor'easters") and hurricanes.

A number of sampling platforms were utilized during CMO: moorings, tripods (Figure 4b), towed profilers (SeaSoar), shipboard profiles, satellites, and acoustical arrays (part of the Primer study, see Dickey and Williams, 2001). Time-series of bio-optical properties at several depths were collected by use of moored and bottom-mounted 9-wavelength absorption-attenuation meters (ac-9s), beam transmissometers, fluorometers, scalar irradiance sensors (for PAR), and upwelling radiance sensors (683 nm). Total minus water spectral absorption data collected by the ac-9s were partitioned into phytoplankton absorption and detritus components plus gelbstoff absorption following the methods in Chang and Dickey (1999) to investigate particle types. Time series of sediment characteristics were also obtained from a bottom-mounted floc camera and LISST-100 instruments. A meteorological buoy, temperature and conductivity sensors and an uplooking acoustic Doppler current were also deployed for supporting physical measurements. Instruments sampled several times per hour between July 1996 and June 1997. This allowed the study of temporal variability of bio-optical properties as related to physical processes on time scales of minutes to seasons, covering the range of scales associated with internal gravity and solitary waves, phytoplankton light and nutrient adaptations, phytoplankton community-scale blooms and successions, tides, upwelling, storms and hurricanes, shelf/slope frontal activity and other