7.5 min. Subsurface temperature measurements were made on each mooring by ten temperature recorders mounted in the upper 150 m (Fig. 2).

The WHOI mooring had a 3-m discus buoy with two sets of redundant meteorological sensors and subsurface instrumentation to measure temperature, salinity, velocity, and bio-optical parameters in the upper 300 m of the water column. The meteorological sensors measured wind speed and direction, air and sea-surface temperature, relative humidity, barometric pressure, precipitation, and incoming shortwave and longwave radiation. Air–sea fluxes of momentum, heat, and fresh water were estimated from the meteorological measurements using the TOGA COARE bulk algorithms (Fairall et al., 1996a, b). Twenty temperature recorders on the mooring line in the upper 300 m sampled at least every 15 min, and seven of them were mounted in radiation shields in the upper 2.5 m to resolve the variability of the diurnal warm layer. Both temperature and conductivity were sampled every 7.5 min with five Seacat instruments (Seabird Electronics, Inc.) distributed in the upper 100 m. Five Vector-Measuring Current Meters (VMCMs, Weller and Davis, 1980) recorded horizontal velocity and temperature every 3.75 min. T. Dickey and J. Marra each deployed two multi-variable moored systems (MVMS) on WHOI. These measured temperature, conductivity, velocity, dissolved oxygen, photosynthetically available radiation (PAR), light transmission at 660 nm, natural fluorescence at 683 nm, and stimulated chlorophyll fluorescence. An additional dissolved oxygen sensor provided by C. Langdon (LDEO) was mounted on the buoy at 1.4 m depth. Bio-optical measurements and time-series of primary productivity are discussed in Dickey et al. (1998) and Marra et al. (1998), respectively. The depths of the measurements made in the upper 250 m on WHOI are indicated in Fig. 2. Complete descriptions of the instrumentation, calibrations and deployment/recovery procedures can be found in Baumgartner et al. (1997), Trask et al. (1995a, b), and Ostrom et al. (1996) for the WHOI instrumentation, in Sigurdson et al. (1995, 1996) for the UCSB MVMS, and in Ho et al. (1996a, b) for the LDEO MVMS. Significant results from the meteorological measurements and air–sea flux observations are discussed in Weller et al. (1998).

3. Meteorological forcing

The temporal variability in the surface meteorology and in sea-surface temperature (SST) was dominated by the monsoonal cycle (Fig. 3). The NE Monsoon was characterized by moderate wind speeds, clear skies and comparatively dry air from early November 1994 to mid-February 1995. During this period, the ocean lost an average of 19.7 W m^{-2} of heat, the SST cooled by 3°C and the daily average mixed layer (see Section 4 for definition) deepened to almost 100 m. The SW Monsoon was characterized by strong winds, cloudy skies and moist air from early June to mid-September 1995. During this period, the ocean gained an average of 89.5 W m^{-2} of heat, but the SST still cooled by 5.5°C and the daily average mixed layer deepened to almost 80 m. The Spring Intermonsoon period, spanning mid-February to late May 1995, was characterized by light winds, clear skies and intense solar insolation during which the ocean's average net heat gain was 101.1 W m^{-2}. Throughout this period, the SST warmed steadily with marked diurnal variability and the mixed layer shoaled to within 20 m of the surface, sometimes disappearing altogether.

Since there were only a few, isolated rainfall events in the fall of 1994 and 1995, the moisture flux was dominated by evaporation. Recorded precipitation at WHOI during the year totalled less than 50 mm, with 21.4 mm of this falling during the squall of October 22, 1994, which produced the spike in wind stress on that day in Fig. 3. Surface forcing for salinity was thus strongly evaporative. The ocean lost an average 4.2 mm of freshwater each day during the 12-month deployment due to evaporation. The maximum freshwater fluxes were observed in December during the NE Monsoon when the evaporation rate reached an average 6.9 mm day^{-1}.

Over time scales of up to 1 year, means of the wind speed components, air temperature, barometric pressure, and shortwave radiation at each