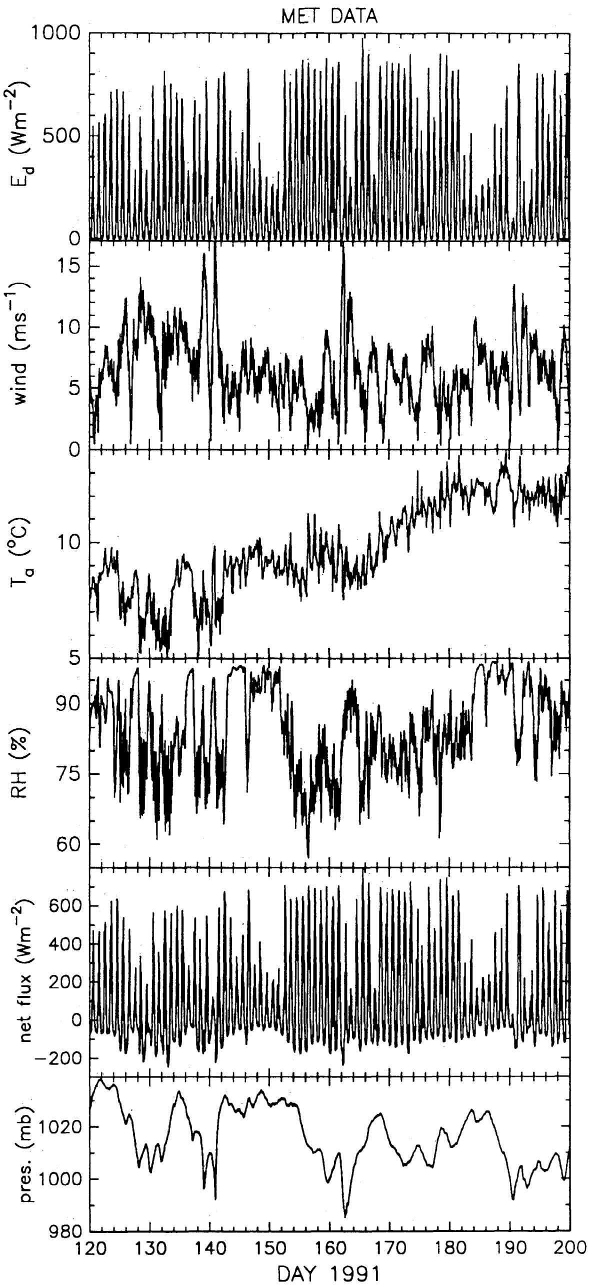

Figure 1. Time series of surface meteorological variables: downwelling irradiance (E_d), wind speed, air temperature (T_a), relative humidity (RH), net heat flux, and barometric pressure. These data were collected during the MLML 1991 experiment and are 15-min averages.

correlation in the direction of the local winds and currents, although an analysis similar to that described by *Dickey et al.* [1994] supports the notion that winds were important for the local near-surface shear (not shown here). Note that the most dramatic change in the current direction occurred on day 126, which corresponds to the beginning of the "deep ML" period. Later the direction of the current remained relatively constant.

Bio-Optical Observations

Time series of beam attenuation at 660 nm (c_{660}), chlorophyll *a* concentration from fluorometric measurements, and scalar irradiance (PAR) are shown in Figures 4, 5, and 6, respectively. As seen in Figures 4 and 5, the initial increase in the water temperature was coincident with an increase in phytoplankton biomass. A strong bloom developed soon after the mooring was deployed, with the maximum Chl *a* concentration at 10-m depth exceeding 6 mg m^{-3}, and the maximum c_{660} was about 1 m^{-1}. Later we observed a relative minimum in the biomass concentration around day 140 corresponding to a storm system (see Figure 1). This was quickly followed by an increase of the biomass after day 143, as the waters stratified again. Note that these major features in biomass concentration variability are also reflected in the variability of the underwater PAR signal (Figure 6).

It is worthwhile to analyze in more detail the dependence of the biomass distribution in the water column on the mixed layer dynamics. The superimposed fluorescence time series at 10, 30, and 90 m are shown in the middle panel of Figure 7. The MLD is depicted in the bottom panel, where numbers 1, 2, and 3 denote the three time periods defined above. We note the following.

1. When the ML was shallower (periods 1 and 3) the fluorescence and c_{660} signals were much higher in surface waters than at greater depths (see Figure 4 for c_{660}).

2. When the ML was deeper (period 2), the bio-optical signals were high at all depths, even at 90 m. For example, Chl *a* concentration at 90-m depth, exceeded 4 mg m^{-3} and c_{660} was greater than 0.8 m^{-1}. As a result, the chlorophyll integrated over the 90-m water column was much higher during that period

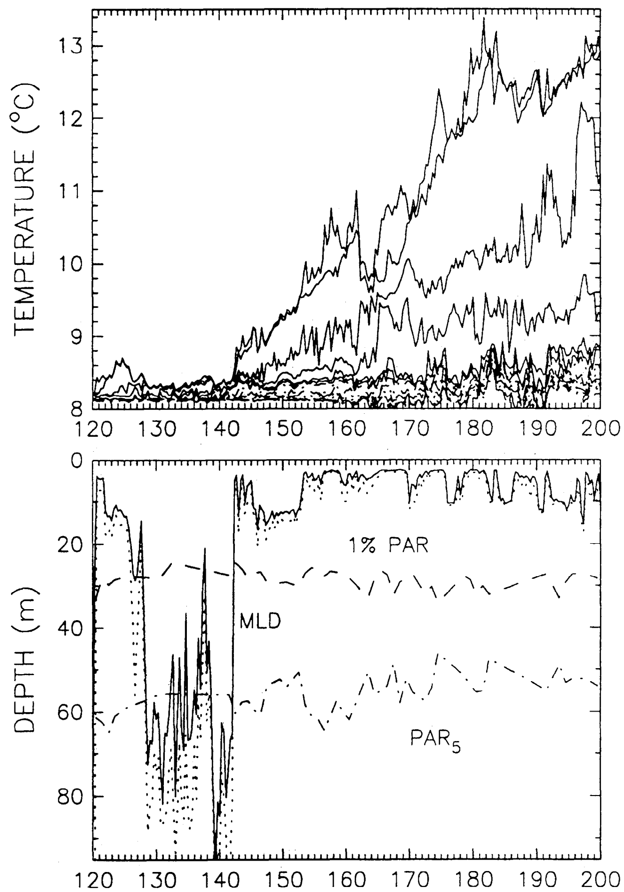

Figure 2. Time series of water temperature at 17 depths (2, 10, 30, 50, 70, 80, 90, 102, 118, 150, 166, 182, 198, 214, 230, 246, 310 m); 0.05°C (solid line) and 0.1°C (dotted) mixed layer depth; 1% and 5 mEinst m^{-2}s^{-1} (PAR 5) PAR level. Temperature data are 8-hour averages.