

IOP Data

Protocols for data analysis and quality control of beam attenuation and absorption coefficients are described in Vol. IV, Chapters 2 and 3, respectively. Protocols for determining the backscattering coefficient $b_b(\lambda)$ from measurements of the volume scattering function at one or more scattering angles are described in Vol. IV, Chapter 5.

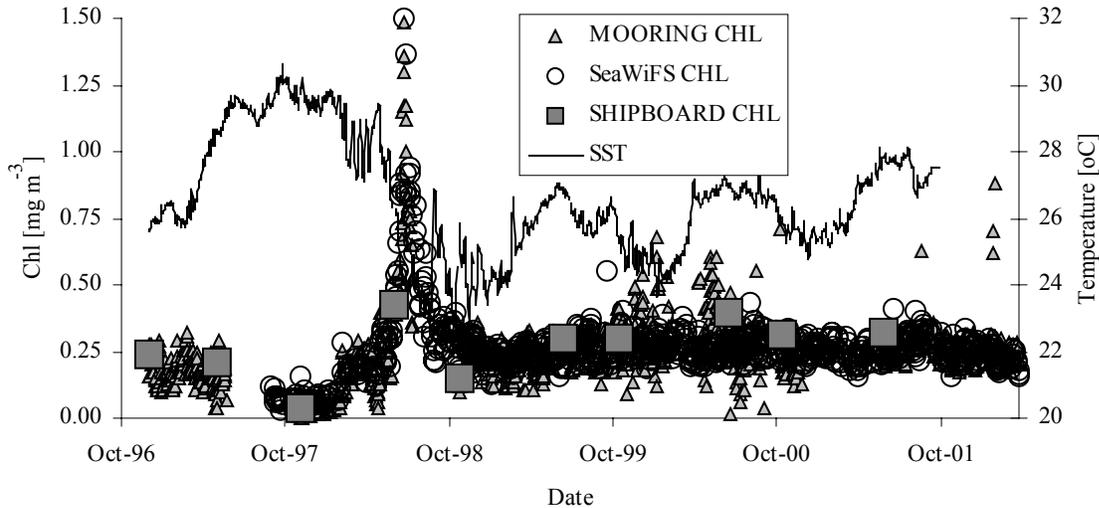


Fig. 3.16: Time series of chlorophyll concentrations derived from MBARI optical instruments, calculated from two depths (surface and 20 m depth) on the TAO mooring at EP1 ($0^{\circ}, 155^{\circ}\text{W}$). For comparison, SeaWiFS derived *Chl* and *in situ* shipboard chlorophyll *a* concentration measurements for the mooring location are also plotted.

Chlorophyll *a* Fluorescence Data

The GoMOOS moorings use the WETLabs Inc digital ECO shuttered fluorometer (DFLS) series for all chlorophyll fluorescence measurements (Table 3.3). This instrument is low power, stable, and has a copper shutter to prevent biofouling. The sensor is wrapped in copper foil tape as an additional prevention measure. The epoxy facing of the DFSL prevents calibrating the instrument against a chlorophyll standard dissolved in acetone. Therefore, the GoMOOS project calibrates the DFSL sensors against a dilution series of a monoculture of phytoplankton (*T. pseudonana*) *in vitro*, the chlorophyll *a* concentration of which is measured using the protocols of Vol. V, Chapter 2. The fluorometer responses are fit to a linear regression equation as a model for converting the data to chlorophyll concentration. Each DFSL is additionally characterized for stability (using a pure water standard) and for temperature dependence using a controlled water bath. All sensors are calibrated against a dilution series of phytoplankton and for the pure water offset before and after each deployment.

Data Processing

1. Temperature correction of the linear regression offset is applied based on the *in situ* water temperature and the results of the temperature characterization.
2. Average digital counts reported to shore are converted to chlorophyll concentration units (mg l⁻¹) based on the linear regression equation from the calibration.
3. Upon recovery of the mooring, the entire raw data record is analyzed again. For each hourly sampling period, the raw digital counts are filtered using a 1.5 standard deviation filter and then steps 1 and 2 are repeated.

Data Analysis