important near optical mooring locations. Recently, strong emphasis has been placed on determining other pigments by means of HPLC analysis to confirm the fluorometric chlorophyll *a* and phaeopigment measurements (Volume V, Chapter 3) and to quantify the influence that other pigments may have on remote sensing data quality.

During MOOS and BTM mooring recovery/maintenance/deployments for example, CTD rosette casts are made to measure physical and biological water column attributes and primary productivity studies, and radiometric profiles are measured. During equatorial Pacific mooring visits a SeaWiFS Profiling Multi-channel Radiometer (SPMR) profiles are measured and various water samples are collected for measurements of pigments concentration (Vol. V, Chapters 2 and 3) and absorption on filters (Vol. IV, Chapter 4).

3.5 DATA BUOY OPERATIONS AND MEASUREMENT METHODS

Upon determining the objective, location, configuration and instrumentation of the mooring or drifter platform, the specific measurement and operation methods, logistics, and shipboard support must be determined.

Deployment/recovery schedules and methods

Deployment and recovery schedules for moorings and drifters will vary dependent upon the selected location, available power supply, and at which expected rates of bio-fouling may significantly degrade sensor performance. For example, MOOS moorings in Monterey Bay take advantage of maintenance visits every 3-4 weeks (sometimes by divers) to maintain the instrument integrity, check for bio-fouling, and replace power supply. The moorings undergo yearly recovery and deployments (turn-arounds) but have bi-annual instrument and OASIS controller swap-outs dependent upon status. Each buoy, tower, and bridle (annotated with serial numbers) is checked for any faults caused from corrosion and documented accordingly. The moorings are built in a staging area at MBARI and undergo rigorous testing before being deployed from the R/V Pt. Sur.

In the GoMOOS project, each mooring is on a 6-month duty cycle, during which time servicing or maintenance is performed on an as needed basis only. This is mainly due to programmatic cost limitations. Each mooring, buoy and associated instruments are completely replaced approximately every 6 months, depending on weather and ship scheduling. Thus, the operational goal of GoMOOS is deployments of 6 months without (or minimal) servicing. In terms of the optical sensors, the 6 month duty cycle is too long for most of the instrumentation due to the effects of biofouling. In our analysis, the above water downwelling irradiance sensor, the chlorophyll fluorometers, and the VSF sensors performance over 6 months is acceptable, and most of the effects of biofouling can be removed or minimized using post-processing procedures and pre- and post-calibrations. However, the ac9 and the in water radiometric sensors do suffer from biofouling that is very difficult to account for using post-recovery processing procedures. We feel that once an effective copper shutter system is developed, the in water irradiance and radiance sensors will be able to collect data over the 6 month duty cycle with only minimal effects of biofouling. The ac9, however, is in need of further anti-biofouling prevention above the copper pipe tubing system we use. The main problem we are having is with the organic film that builds up over the first 2 months of deployment on the optical surfaces. Originally we had proposed to GoMOOS to have divers service the optical systems every 2-3 months, by retrieving the optical packages off of the mooring, and then cleaning and calibrating the sensors before returning them to the mooring system. In fact all of our in water optical packages can easily be removed from the mooring chain without having to retrieve the entire mooring (using a set of strongbacks and clamping systems) or interrupt the hourly mooring sampling schedule (using under water protective cable connectors). However, again, due to GoMOOS programmatic cost limitations, this proposed servicing of the optical sensors was cut from the program.

In remote locations such as in the equatorial Pacific, TAO mooring visits may only occur every 3-6 months with annual turnarounds. Therefore, those moorings are designed to stay completely operational for one year without visits. As a result of the schedule and deck space aboard the *R/V Ka'imimoana*, the buoys are built, tested, and deployed sometimes within a 24 hour time period. Prior to leaving port, all mooring hardware is checked for integrity and serial numbers are carefully documented before deployment. Immediately following deployment, ARGOS data transmission is verified and deployment locations are documented.