**b. Shipboard Instruments**

The HA was outfitted with sensors for air temperature (AT), relative humidity (RH), barometric pressure (BP), sea surface temperature (SST) and sea surface salinity (SSS), wind speed (WSPD), and wind direction (WDIR). An effort was made to more carefully document the data sources and instrument locations for the variables being collected, and to acquire variables consistent with those of the Shipboard Automated Meteorological Oceanographic System (SAMOS). AT and RH were measured by a RM Young model 41372 sensor mounted along the ship centerline on a short mast above the pilot house. The AT sensor height was estimated to be 15.3 m. BP was measured by a Vaisala model PTB330 mounted in the aft section of the bridge on the 03 deck. The BP sensor was estimated to be 12 m above the waterline. Wind speed and direction were measured by a RM Young model 5103 propeller and vane anemometer, mounted on the bow mast at about 15.6 m height. The anemometer measured relative wind speed and direction, which was corrected to absolute speed and direction by the SCS system. There were two sources for SST, a SBE-38 digital thermometer and a SBE-21 thermosalinograph. Both measured water from the bow intake estimated to be at 4 m depth. The SBE-38 probe was located near the intake, whereas the SBE-21 measured water that had been pumped from the forward intake to the Wet Lab at the aft of the ship. Thus, the SBE-38 was the preferred sensor for SST. Sea surface salinity (SSS) was measured by the SBE-21. SCS data were averaged to 1 minute and recorded to ASCII text files on the ship’s SCS computer.

**c. ESRL/PSD flux system**

The ESRL Physical Science Division (PSD) air-sea flux group collected surface meteorology and sea surface temperature data during the cruise. The flux measurement system consists of six components:

1. A turbulent wind measurement system with motion correction.
2. Solar and infrared radiation sensors measuring downward radiative fluxes.
3. Bulk meteorology sensors (air temperature, relative humidity and precipitation)
4. A CO2/H2O gas analyzer.
5. A differential GPS unit measuring heading, pitch and roll information.
6. A sea surface temperature measurement made with a floating thermistor.

The turbulent wind system, bulk meteorology sensors and gas analyzer were mounted on a portable 30’ tall meteorological tower at the bow of the HA. The radiometers, GPS and various electronics packages were mounted above the pilot house. An outrigger was used to deploy the floating thermistor (“sea snake”), a water temperature sensor that drags near the surface, off the port bow. These sensors were logged in the ship’s lab using equipment supplied by ESRL. The systems were run continuously through the cruise. The ship’s SCS system with a set of navigation and meteorological data was archived along with the ESRL data. Note that the best situation for obtaining flux data is with the ship going slow ahead and the wind within 45 degrees of the bow.