

KESS Cruise 2nd -leg Overview

This leg departed Yokohama of the R/V Thompson late afternoon on June 5, 2004 and returned in the afternoon of June 19, 2004. Nelson Hogg served as Chief Scientist and was assisted by scientists and colleagues from a variety of institutions including WHOI, the University of Hawaii, the University of Hokkaido, the US Navy base in Yokosuka, the US Coast Guard and NOAA-PMEL.

The objectives of this leg were:

1. to set a series of 7 Moored Profiler moorings across the Kuroshio near the PIES locations B4, C4, D4, E4, F3, G2, and H2;
2. to set a single surface flux mooring near location H2 ;and
3. to release 16 Apex/ARGO profiling floats.

The first mooring operations appeared to be going along routinely until we were notified by our support people back at WHOI that they were receiving satellite messages from a transmitter that was attached to the topmost flotation element on the first mooring that had been deployed. As this sphere was intended to be at 250m depth this meant that the mooring had failed. We then began to hear from the 4th mooring as well. Recovery of the top part of these moorings revealed that the wire had snapped and, after considerable thought, we came to the conclusion that the anchors were too heavy. In order to prevent the moorings from “walking” under the influence of the strong currents the anchors had been specified at 4500lb, some 900lb heavier than normally used. The mooring design programs indicated no problem as the breaking strength of the wire is around 8000lb but clearly the transient loads on anchor launch were exceeding this. We reconfigured the moorings, essentially by redistributing the buoyancy and adding extra instrumentation. Then, without further problems, we reset one of the two failed moorings (C4, we had just one spare anchor) and the remaining 3 moorings.

After the last moored profiler mooring we set a surface mooring which contained air-sea flux instrumentation as well as temperature and salinity measurements in the upper 500m.

Along the mooring line several of the Apex floats were released. At the completion of the mooring work the remainder were deployed in a closed cyclonic feature to the east of the moorings and in a larger anticyclonic recirculation to the west on our transit back to port. The location of these features had been determined by receiving up-to-date information on the sea surface height on board ship obtained from a numerical model that was assimilating altimeter observations.