

ENDEAVOR 275 CRUISE SUMMARY: PRIMER I

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The first cruise of the shelf-slope PRIMER was successfully carried out in December, 1995 aboard R/V ENDEAVOR. The purpose of the cruise was to deploy the slopewater moored array, which will be in place for two years spanning the two intensive shelfbreak field studies.

The cruise began with a high resolution XBT/bathymetric/shipboard-ADCP survey across the outer shelf and shelfbreak, along TOPEX altimetric sub-track 126. ENDEAVOR's chirp sonar data was obtained digitally in real time and used to construct an accurate bathymetric cross-section for deciding where to place the two shoreward moorings. In all, five moorings were deployed. The two shoreward moorings are bottom-mounted upward-looking ADCPs spaced 18 km apart just inshore of the shelf-break (Figure 1). A surface guard buoy was placed alongside each mooring to help prohibit damage from fishing activity. Farther offshore, three conventional current meter moorings were set in the slope water at depths of 1000 m, 2200 m, and 2850 m.

VACMs and temperature sensors were placed at 100 m, 400 m, 800 m, 1400 m, 2000 m, 2500 m, and D-200 m. Selected depths include pressure sensors as well.

In addition to the mooring deployments, a deep CTD section was occupied to the 3200 m isobath (Figure 1). A Mark-III CTD was used with 24 10-liter bottles. Salinity was measured at each bottle depth using an autosal (for calibration purposes), and CFCs and tritium measurements were taken at selected depths. The tracer component is being undertaken jointly by W. Smethie and P. Schlosser of LDEO. This deep section is an exact re-occupation of one of the BOUNCE sections collected by Pickart and Smethie in late 1994 and again in early 1995. By the conclusion of PRIMER we will have occupied this line 7 times over a three-year period. Each CTD cast also contained a lowered ADCP (attached to the frame), and a POGO float drop at the conclusion of the cast. These data together provide an accurate measure of the synoptic total velocity field.

At the conclusion of the cruise a rapid CTD/shipboard-ADCP section was taken across the shelfbreak, providing a second survey of the shelfbreak current over a three-day period. In order to do this survey the Mark-III was taken off the frame and used alone with a pinger and weights. Each cast extended to < 5 m off the bottom. The combination of this survey and the deep CTD section is perhaps the first such complete synoptic shelf/slope occupation with tracers and absolute velocity. IR imagery indicated that a ring was interacting with the shelf just downstream of the TOPEX line during our cruise. Although we did not see any Gulf Stream water on the shelf, preliminary results from the first shelfbreak survey revealed an interesting thermal structure and particularly strong shelfbreak current (Figure 2) perhaps influenced by the nearby ring. Comparison with

similar high-resolution occupations during PRIMER, under a variety of conditions, will be very revealing.