

MULTI-SOURCE, MULTI-SCALE IMAGERY OF THE MAR, 25 - 27° NORTH

T B Reed IV (1) D Smith (2) and B E Tucholke (2)

(1) SOEST, University of Hawaii, Honolulu, HI 96822, U.S.A.

(2) WHOI, Woods Hole, MA 02543, U.S.A.

ABSTRACT

In 1992 segments of the Mid-Atlantic Ridge were surveyed with Hydrosweep, HAWAII MR1, and TOBI during two separate cruises. The Hydrosweep and HMR 1 (successor of Sea MARC II) data were collected simultaneously on cruise EW9208 of the Maurice Ewing in July and August. TOBI (Towed Ocean Bottom Instrument) sidescan data were collected on cruise CD65 of the Charles Darwin in February. The two data sets overlap in the ridge area between 25 and 27 degrees north. The 15 kHz Hydrosweep multibeam system yields both bathymetry and an estimate of backscatter amplitude for 59 beams included in a 90 degree swath. In depths of 2 to 3 km this results in a spatial resolution of the order of 50 to 75 meters. HAWAII MR-1 provides 12 kHz phase-difference bathymetry and backscatter imagery. Cross-track resolution of the processed imagery data is of the order of 5 meters. Finally, the TOBI side-scan system operates at *ca.* 30 kHz with a nominal cross track resolution of 2 meters. Towed near the bottom, it has total swath width of approximately 6 km. The Hydrosweep imagery resembles a low-pass filtered version of the HMR1 sidescan data. While relief effects dominate, variation in image character with change in surface geology (sediment ponds, fault scarps, neovolcanics) is evident, and similar to variations seen in the HMR1 imagery. Comparison of the deep-towed TOBI data with the HMR1 imagery is less straightforward, due in part to the geometric effects; nonetheless relief dominated features match nicely. Furthermore, the higher spatial detail of the TOBI imagery show seafloor of deterministically distinct character, corresponding to total variations in the HMR1 and Hydrosweep images. Preliminary analyses indicate that feature size may not be the sole limiting factor in detection; features of similar size and character in the TOBI data are not equally visible in the other data sets. Further analyses will be presented.

