

TAYLOR, B., Hawaii Institute of Geophysics, Honolulu, HI, K. CROOK, Australia National University, Canberra, Australia, J. SINTON, Hawaii Institute of Geophysics, Honolulu, HI, and the SHIPBOARD PARTY of *Mauna Wave*, 8517 and 18

Fast Spreading and Sulfide Deposition in Manus Back-Arc Basin

The detailed location of the active plate boundaries in the Manus basin, north of the New Britain arc-trench system, is revealed by geophysical surveys and bottom sampling/photography completed in January 1986. More than 40,000 km² of sea floor was mapped using the SeaMARC II side-scan sonar and bathymetry system. The Weitin fault on New Ireland extends northwest, offshore to the eastern end of three overlapping, en echelon, sigmoidal spreading centers north of the Gazelle Peninsula. These spreading centers link westward with a rhomb-shaped microplate bounded on the northeast and southwest by northwest-trending transform faults, on the south by two en echelon rift grabens with axial basalt flows, and on the northwest by a 100-km long, oblique spreading, curving, propagating spreading center. The fabric of the transferred or possibly rotated crust of the 12,000 km² microplate trends

north-south. The southern boundaries of the microplate are not teleseismic.

A new type of plate boundary, herein termed an "extensional transform zone" (ETZ), was discovered. It links the southwest end of the oblique spreading center (trend 050°) to the left-lateral transform fault (trend 115°), which bounds the northeastern edge of the Willaumez Rise. The 90-km long ETZ is characterized by overlapping, right-stepping en echelon spreading ridges (trend 075°) cut by a Reidel shear (trend 105°) synthetic to the western transform. These features may be explained in terms of the second-order strain ellipse associated with the transform fault to the west.

Dredges and bottom-camera surveys of the main spreading center (opening rate > 100 mm/year) revealed fresh glassy pillow basalts and sheet flows, with occasional fissures and a light dusting of sediment. The first photographs of metalliferous sulfide chimneys in the western Pacific were taken on January 5, 1986. A new species of gastropods dominated the otherwise typical vent fauna.