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FRACTURE-ZONE ASSOCIATED BASALTIC IGNEOUS ACTIVITY: EXAMPLES FROM WESTERN NEWFOUNDLAND AND THE CENTRAL ATLANTIC, W.S.F. Kidd, S. E. DeLong, J. F. Dewey, P. J. Fox, J. Karson, T. Shibata, all Dept. Geol. Sciences, SUNY-Albany, NY 12222

Oceanic crust and mantle adjacent to fracture zone extensions of ridge/ridge transform faults consists of two strips on either side of and parallel with the fracture zone. Another strip with a transform fault deformation history is welded to a younger strip that has not suffered a transform history. Observations of oceanic fracture zones and theoretical model building indicate that both strips have quite different and complex petrologic and structural histories and relationships from oceanic crust and mantle generated at ridge segments away from fracture zones. Off-ridge axis volcanism has been reported from some oceanic fracture zones. Our studies have concentrated on the Oceanographer Fracture Zone where the distribution of basaltic occurrences can be interpreted in relation to changes in plate motion. Geologic relationships predicted by our simple model building are matched in a remarkably precise way in ophiolite assemblages in Western Newfoundland. The Coastal Complex, a hitherto enigmatic, varied, and complex assemblage of sediments, and ultramafic and mafic igneous rocks is believed to have acquired its complexity during movement through a late Cambrian ridge/ridge transform domain and past a ridge termination. The Bay of Islands Ophiolite Complex is, in one region, in structural continuity with the Coastal Complex and is believed to have originated on the non-transform side of that ridge termination past which the Coastal Complex was moving. This late Cambrian/early Ordovician fracture zone may have nucleated the medial Ordovician obduction site, the younger higher Bay of Islands Complex riding across the older, lower Coastal Complex side and, locally, carrying with it and preserving strips of the older fracture zone assemblage.

The high frequency of fracture zones along some accreting plate margins in modern oceans suggests the likelihood that ophiolite complexes will contain portions of oceanic crust and mantle preserving a fracture zone history. This likelihood is further enhanced if fracture zones nucleate obduction zones. Many published accounts of ophiolite complexes, particularly in the Alpine System of Europe and the Middle East, include descriptions of petrologic and structural relationships that accord well with relationships observed in the Coastal Complex and also may have been developed in oceanic fracture zones.