

A Neoproterozoic history of the Hollow Fault Zone, Antigonish Highlands, Nova Scotia

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Shear zones commonly have a complex polyphase history. One of the major problems in deciphering their kinematic history is that older movements are overprinted by younger ones. Repeated movements along the Hollow Fault Zone in the northern Antigonish Highlands in the Avalon Terrane of Nova Scotia have resulted in episodes of intense deformation that may range from Neoproterozoic to Mesozoic in age. In the Paleozoic, the Hollow Fault Zone was active during the formation of the Appalachian Orogen and the amalgamation of Pangea, and was probably active during the opening of the Atlantic in the Mesozoic. Its potential Neoproterozoic history, however, is unclear.

Along the Northumberland Strait, detailed mapping and structural analysis of a 500 m stretch of coastline have identified the preservation of Neoproterozoic fabrics of the Hollow Fault Zone from a time when the Avalon Terrane was located along the periphery of Gondwana, thereby providing a window into kinematics along that continental margin. The study

area contains basalt, pelites, and marbles of the Georgeville Group post-kinematically intruded by ca. 610 Ma hornblende gabbro and anorthosite of the Greendale complex. A ductile strike-slip shear zone affects the Georgeville Group host rocks but is truncated by the younger intrusive rocks, indicating that the shear zone is Neoproterozoic in age. S-C fabrics, asymmetric augen structures, small folds, and mineralized extensional fractures within the shear zone indicate a predominantly dextral component of shear. This ductile shear is interpreted to be coeval with Neoproterozoic arc-related activity along the periphery of Gondwana. Preservation of these ancient fabrics is attributed to a "pressure shadow" effect produced by the more competent plutonic rocks during progressive regional deformation. Results of the study may also be useful in locating and examining relict fabrics in polyphase shear zones and will contribute to the understanding of Neoproterozoic kinematics along the edge of Gondwana.