

Geology and Structure of the "A-C-D" Zones, Heath Steele Mines, New Brunswick

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The "A", "C", and "D" zones at Heath Steele Mines, New Brunswick, are base metal sulphide deposits that are spatially associated with a horizon of Lower Palaeozoic sediment, in a succession dominated by volcanics and volcanoclastics. The host sequence has been subjected to prograde metamorphism of low grade, and penetrative polyphase deformation. Five phases of deformation have been distinguished on the basis of systematic overprinting criteria on the mesoscale. The earliest tectonic event (D_1) that can be recognized is characterized by tight to isoclinal, upright folds of a compositional layering. These folds commonly have a differentiated axial plane cleavage (S_1), and were locally refolded about, on average, gently dipping axial planes (S_2) during phase two. S_2 is marked by a cleavage, and in

detail shows a dome and basin pattern due to two events of upright folding with axial plane cleavages S_3 and S_4 . Both cleavages were gently reoriented during a stage of shortening along a vertical axis (D_2). Cleavage and fold patterns throughout the area illustrate an increasingly heterogeneous distribution of strain, and diminishing overall deformation intensity during the five stages of development of the present fold complex.

Macroscopically, the "A", "C" and "D" sulphide zones are planar to tabular bodies, the geometry of which reflects D_1 folding. The presence of the largest sulphide masses of highest sulphide grades in D_1 fold hinges normally rules out post- D_1 epigenetic sulphide zone formation, but secondary growth of at least some sulphides can be demonstrated mesoscopically.