

## **Brittle overprints in the high-grade metamorphic rocks of the Bras-E'Or terrane, Nova Scotia: Can they be linked to exhumation history or major faults?**

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This study investigates the possibility of using brittle overprints and retrograde mineral assemblages in various high grade metamorphic rock packages within the Bras d'Or terrane to put constraints on exhumation history or activity on major faults in the area. The Boisdale Hills area contains the Proterozoic Frenchvale Road metamorphic suite, a package of rocks containing carbonate rocks, amphibolite, and paragneiss ± andalusite, sillimanite and/ or cordierite. The Georges River fault, with its youngest period of motion documented in the Carboniferous, forms the southeastern boundary of the metamorphic suite. The northeastern boundary is the Late Neoproterozoic Boisdale Hills Pluton which intruded the metamorphic rocks by ca. 560–530 Ma. The metamorphic rocks in this area are not well-characterized with respect to specific P-T conditions or structures relating to exhumation of these rocks. In order to compare brittle overprints in different metamorphic packages within the Bras d'Or terrane the initial work has focussed on the higher grade metamorphic rocks in the Frenchvale Road metamorphic suite, particularly carbonate rocks and amphibolite. Brittle structures overprinting the main metamorphic assemblages in the Frenchvale Road carbonate rocks include outcrop scale fractures trending N-NW and dipping moderately to the NE, fracture surfaces with associated SW plunging slickensides, and fractures within carbonate rocks and amphibolite filled with chlorite and epidote. Some impure siliceous carbonates show micro-fractures filled with chlorite and others which crosscut individual mineral grains without fracture fills. Preliminary data indicates that the dominant brittle fracture patterns are not kinematically linked to the interpreted NE- trending, subvertical orientation of the Georges River fault. The overprinting mineral assemblages associated with these brittle structures likely pre-date the latest movement on the Georges River fault. In order to investigate this hypothesis, future work will focus on attempting to constrain the age of formation of the retrograde mineral assemblages, and investigating the kinematics of brittle faulting over a larger area, including the lower grade metamorphic rocks of the Benacadie Brook metamorphic suite and the plutonic rocks of the central Boisdale Hills area.