

The North Group - A Possible Multiple Impact Crater Site in Southwestern Nova Scotia

Trevor Brisco¹, Ian Spooner¹, Peir Pufahl¹, Edward King², and George Stevens¹

1. *Department of Earth and Environmental Science, Acadia University, Wolfville, NS, B4P 2R6 Canada*
trevor_brisco1@hotmail.com

2. *Geological Survey of Canada Atlantic, Bedford Institute of Oceanography, Dartmouth, NS, B2Y 4A2 Canada*
Edward.King@NRCan-RNCan.gc.ca

An approximately 0.4 km diameter elliptical structure was identified in southwestern Nova Scotia in 1987 during a regional airphoto survey. The structure was confirmed as an impact crater in 2009, and was named the Bloody Creek structure (BCS). In addition to the main crater, a cluster of discontinuous arcuate scarps located approximately 1 km north of the BCS was identified. These arcuate scarps have been called the North Group. This study has identified these arcuate scarps as possible impact crater remnants, suggesting the impactor fragmented upon entry into the atmosphere producing a crater field. Evidence for impact origin is based on an integrated analysis of geomorphic, geophysical and petrological data collected in the summer fall and winter of 2009.

A detailed aerial photo analysis of the site revealed several discontinuous arcuate scarps (1 to 2 m high) sharply outlining flat depressed inner floors. Sonar and lake sediment probing across a few of the structures revealed a shallow crater-like morphology beneath the depressed inner floors. The craters are interpreted to be infilled with lacustrine sediment and peat.

Thin-section analysis of bedrock samples collected proximal to the eastern rim crests of the North Group document several features that are supportive of shock metamorphism. These include kink-bands in feldspar and biotite and planar microstructures (PMs) in quartz and feldspar. The PMs consist of planar fractures (PFs) in both quartz and feldspar and possible planar deformation features (PDFs) in quartz. Of these features, the PDFs are considered uniquely diagnostic of shock metamorphism.

The age of both the Bloody Creek and North Group structures is uncertain. The low depth-to-diameter ratio for both features suggest that they are either the eroded remnants of ancient impact craters or, alternatively were formed by impact onto glacier ice during the waning stages of the Wisconsinian deglaciation (about 12 ka BP).