
Results of a ground magnetic survey over the Bloody Creek impact structure, Bridgetown, Nova Scotia

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This study investigates the total magnetic field strength over the Bloody Creek impact structure, located approximately 10 km south of Bridgetown, Nova Scotia. This 400 m-diameter, slightly elliptical impact structure has been flooded by Nova Scotia Power's Bloody Creek hydroelectric reservoir, and thus is not directly available for study. Consequently, a ground magnetic survey was conducted over the site in the winter, when the reservoir was frozen. Measurements were standardized using a base station magnetometer, and a data quality assessment revealed that the data are highly reproducible. Results were evaluated using classical geostatistics, and a semivariogram was examined to understand the spatial variance structure. An isotropic spherical function with a small nugget effect was chosen as the appropriate model for subsequent kriging. A range of 38 m, nugget effect of 0.4 gamma², and sill of 75.8 gamma² were defined by this model. Before kriging, data were de-clustered at a scale approximating the sampling interval to ensure numerical stability in the kriging calculations. Ordinary kriging was undertaken, and an unbiased, minimum error variance surface describing the total magnetic field strength anomalies in the area was obtained. This surface was subjected to a number of empirical image analysis procedures to enhance any magnetic patterns that occur in the Bloody Creek area, including first- and second-derivative, and edge-detection maps. Interpretations of these surfaces reveal very subtle patterns that equivocally identify an elliptical crater structure. The obscure patterns suggest that the impact crater likely does not contain significant amounts of magnetic material (e.g., iron or chondrite meteor debris), and that impact did not substan-

tially modify the low relief of the magnetic field in the granitic host rocks.