
Investigation of the form and age of the Bloody Creek Crater, southwestern Nova Scotia

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Virtually all terrestrial impact craters exhibit a circular geometry in plan-form; only three impact sites exhibiting non-circular, elongate forms have been identified on Earth. One of these exceptional sites is the Bloody Creek Crater located in southwestern Nova Scotia, an approximately 0.42 km long-axis elliptical crater first identified in 1987 during a regional air photo survey. It was confirmed as an impact crater in 2009 through integrated geomorphic, geophysical, and petrographic data. The structure's rare ellipticity, pristine definition, preservation through shock metamorphic features of anomalously high pressures at the rim, low depth-to-diameter ratio, as well as age remain ambiguous and complicate the interpretation of the origin and evolution of the crater.

The purpose of this study is to quantify the form of the feature as well as to develop better constraints on its age. To achieve this objective, an extensive review of the literature was performed to understand the controls on crater formation as well as to synthesize a model for the geological evolution of the site which would aid in the interpretation of the age of the structure. The Bloody Creek Crater provides a unique opportunity to study resultant structures and shock deformation associated with low-angle impact into a homogeneous crystalline target. Such research will supplement our knowledge of how target geology influences the nature of observed shock effects, which may facilitate future identification of potential impact structures in similar geological environments. Moreover, continued identification of terrestrial impact craters contributes to the statistical data base for estimating past impact rates on Earth. The identification of low-angle impact craters in particular will contribute to discussions of the statistical probability of their occurrence on Earth, as well as the role of the terrestrial atmosphere in filtering such impact events.