LIDAR-BASED ANALYSIS OF CINDER CONE MORPHOLOGY AT NEWBERRY VOLCANO, CENTRAL OREGON: STATUS REPORT ON PRELIMINARY STUDIES ASSOCIATED WITH THE IDES PROGRAM AT OREGON STATE UNIVERSITY

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Newberry Volcano is a broad, shield-shaped volcano located in central Oregon ~60 km east of the Cascade Range. With over 400 mafic cinder cones and fissure vents, Newberry is an ideal area to study cone degradation models and apply relative dating techniques to the numerous cones. This presentation provides an overview of a pilot test that is under development to identify and map debris aprons associated with cinder cones. This project is an extension of work previously conducted by the Earth Science undergraduate research group at Western Oregon University (e.g., Taylor et al., 2007).

The project focuses on a set of cones in the Lava Cast Forest 7.5-minute Quadrangle on the north flank of Newberry, which encompasses a significant portion of the post-Mazama northwest rift zone eruption (~7000 years ago; Mckay et al., 2009). The intent is to use LiDAR-based DEMs and ArcGIS to identify the topographic slope break between the cone apron and the main edifice of single cones. LiDAR (light detection and ranging) altimetry provides high-resolution elevation data covering the earth's surface. Geographical Information Systems (GIS) combine hardware and software to help visualize and interpret data collected across select spatial domains. Using these techniques, morphometric parameters such as cone height, apron area, cone-slope angle, mean apron-slope angle, cone-slope length, and apron-slope length can be determined for each cone (cf., Dohrenwend et al., 1986). Comparative analysis of these data will allow discrete morphologic cone populations to be identified and provide an extended framework for relative geomorphic dating of Newberry cone populations. This preliminary study will provide a framework for implementing field investigations and testing existing cone degradation models posited in previous studies (Taylor et al., 2003; 2005; 2007).