

**MONTHLY GEOPHYSICAL SOCIETY OF ALASKA MEETING
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SPEAKER

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TITLE

Characterizing a physical model of a collapsing void using time-lapse surface-wave analysis

ABSTRACT

Time-lapse seismic surface-wave surveys successfully estimated shear-wave velocity (V_s) variations in a laboratory test box using a physical model designed to simulate void roof failure and migration to the ground surface. A trapdoor simulating the roof of a void, moved vertically downward while time-lapse photographs were taken to visually monitor failure features. Six 2D V_s profiles were generated using surface-wave inversion of seismic data, with velocity variations interpreted and correlated to observed failure features. Based on the 2D V_s images, temporal variations in the bulk-velocity structure were consistent with the development of repeated failure visually described as an arch (or dome) above the collapsing void. The combined results from this physical model support the conceptual model that V_s variations can be an indicator of stress-field variations in the roof structure above a void and used to map the progression of a collapse structure.

BIOGRAPHY

Sarah Morton Rupert is an Engineering Geophysicist with over 10 years of experience in applied geophysics research for engineering and geohazards-related projects. Her career started at the U.S. Geological Survey in 2010 followed by research positions with the Connecticut Geological Survey, the National Center for Research on Earthquake Engineering in Taiwan, the U.S. Army Corps of Engineers Research and Development Center, and the Kansas Geological Survey. This year she joined the U.S. Bureau of Reclamation as a Geophysicist in the Engineering Geology and Geophysics Group in Colorado.