

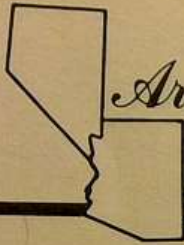
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Participating Societies

Arizona Junior Academy of Science
American Water Resources Association
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APRIL 1989

9:40-9:55 RECONSTRUCTION OF CINDER CONE BREACHING
EVENTS: AN EXAMPLE AT STRAWBERRY CRATER AND O'NEILL CRATER,
ARIZONA

Richard Harwood (Northern Arizona University, Flagstaff, Arizona)

Examination and mapping of rafted agglutinate mounds can be used to reconstruct breaching events of cinder cones. Position of rafted mounds is used to determine; 1) the relative timing of the breach in relation to the lava flow event, and 2) the number of flow units. Textural examination is used to place the rafted mounds stratigraphically in the cone, thus allowing the stratigraphic position of the initial breach to be determined.

Studies at Strawberry and O'Neill Crater, Pleistocene cinder cones in the San Francisco volcanic field, north-central Arizona, have revealed unique breaching histories. At Strawberry Crater, over-steepening of agglutinate beds and radially oriented extension cracks in the rim suggest occupation of the crater by a lava lake prior to breaching. Breaching of the cone by over-topping of the rim is indicated by distally located rafted mounds whose original stratigraphic position was the rim.

Rafted mounds at O'Neill Crater show two periods of lava extrusion. The first flow was a non-breaching event, supported by the absence of rafted material on the flow. The second flow breached the cone near the base, rafting the eastern portion of the cone a short distance, thus opening a gap through which the lava flowed.

Citation

Harwood, Richard, 1989, Reconstruction of cinder cone breaching events: an example at Strawberry Crater and O'Neill Crater, Arizona; Journal of the Arizona-Nevada Academy of Science, v. 24, p. 42-43.

10:30-10:45 ANALYSIS OF BREACH AZIMUTHS FOR CINDER CONES
IN THE SAN FRANCISCO VOLCANIC FIELD, ARIZONA

Richard Harwood (Northern Arizona University, Flagstaff, Arizona)

Statistical analysis of breach azimuths for 36 cinder cones in the San Francisco volcanic field, north-central Arizona, results in a bimodal distribution with mean vectors of the azimuths at S57.7E (122.3°) and N67.9W (292.10°). These directions are roughly perpendicular to the least principal horizontal stress direction of N50E (50°) determined for the volcanic field. Four local controls on breaching mechanisms appear to operate in determining the direction of breach in cinder cones: 1) local topographic stress regimes, 2) local fault/joint system control, 3) wind direction/cone strength, and 4) vent location of the breaching lava. The connection between the identified local controls and the influence by the regional stress regime is not fully understood and is the subject of continuing investigation.

Citation

Harwood, Richard, 1989, Analysis of breach azimuths for cinder cones in the San Francisco volcanic field, Arizona; Journal of the Arizona-Nevada Academy of Science, v. 24, p. 43.