

ACTIVE SINKHOLES AT METEOR CRATER, ARIZONA.

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Introduction: It is not widely known that Barringer (Meteor) Crater in northern Arizona, perhaps the best studied of all terrestrial impact structures, is presently surrounded by actively forming sinkholes. In map view the crater rim appears slightly squared, rather than circular, a feature attributed to target rock failure along fissures within a pre-existing regional joint system [1]. This same joint pattern underlies much of the Colorado plateau and influences the placement of rivers, canyons, and karst solution features [2].

Sinkholes at the crater: The first small sinkhole, south of the crater, was brought to our attention by elk hunters in the winter of 1998. During the following years it has changed from a cylindrical vegetated pit, 2.5m deep and 2m wide, to a broad shallow funnel some 10m wide. Although vegetation has been grazed bare, and its walls are now collapsed by cattle, an open fissure continues to drain the feature. Reconnaissance by light aircraft and by foot has revealed least ten more active sinks within a few crater diameters from ground zero. Most are difficult to detect, even from the ground at a few meters distance. Local ranchers are aware of some of these hazards and have partially filled them with debris. Several active fissures west of the crater underlie crater debris deposits and are associated with drainage tributaries to Canyon Diablo.



FIG. 1: Oblique aerial photograph of 2.5m wide by 6m long active sinkhole (horizontal feature in center). View to south, scattered cedars and ranch road in foreground. Sinkhole depth is unknown..

Origin of the sinkholes: At present, no direct link between the impact and formation of local sinkholes can be clearly seen. They appear to be part of the larger regional pattern of joints and fissures.

References: [1] Shoemaker, E.M. and Kieffer, S.E., 1974. *Guidebook to the geology of Meteor Crater, Arizona*, Arizona St. Univ. Center for Meteorite Studies Publication 17, Tempe, Arizona, 66p. [2] Neal J.T. and Johnson K.S., 2001, *Evaporite Karst in the Holbrook Basin, Arizona*, 18 pp., Technical Papers – Fall 2001 Mtg, 7 – 10 Oct 2001, Albuquerque, New Mexico, USA
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