STRUCTURE AND KINEMATICS OF A COMPLEX CRATER, UPHEAVAL DOME, SE UTAH. B. J. Kriens[1], K. E. Herkenhoff[2], and E. M. Shoemaker[3], [1]Department of Earth Sciences, CSU Dominguez Hills, Carson, CA 90747, USA (bkriens@dhvx20.csudh.edu), [2]Jet Propulsion Laboratory, Mail Stop 183-501, Pasadena CA 91109, USA (keh@jplsc8.span.nasa.gov), [3]U.S. Geological Survey, Branch of Astrogeology, Flagstaff AZ 86001, USA (gshoemaker@astrog.span.nasa.gov).

Two vastly different phenomena, extraterrestrial impact and salt diapirism, have been proposed for the origin of Upheaval Dome, a ca. 2.5 km-diameter structural dome surrounded by a 5 km-diameter ring structural depression which is in turn flanked by extensive, nearly flat-lying Colorado Plateau strata. Seismic refraction data[1] and geologic mapping indicate that the dome originated by collapse of a transient cavity formed by impact and that rising salt has had a negligible influence on dome development. Evidence is: (1) the occurrence of a rare lag deposit of impactite, (2) fan-tailed fracture surfaces (shattersurfaces) and a few shattercones are present, (3) the top of the underlying salt horizon is at least 500 m below the center of the dome and there are no exposures of salt in the dome to support the possibility that a salt diapir has ascended through it, (4) sedimentary strata in the center are significantly imbricated by top-to-the-center thrust faulting and are complexly folded as well, (5) top-to-the-center low-angle normal faults are found at the perimeter of the structure, and (6) clastic dikes are widespread. The scarcity of melt rocks and shock fabrics is attributed to approximately 0.5 km of erosion; the structures of the dome reflect processes of complex crater development at a depth level of about 0.5 km below the crater floor.

Based on mapping and kinematic analysis, we infer that the dome formed mainly by centerward motion of rock units along listric faults. Outcrop-scale folding and upturning of beds, especially common in the center, was largely a consequence of this motion. In addition, we have also detected some centerward motion of fault-bounded wedges resulting from displacements on subhorizontal faults that conjoin and die out within horizontal bedding in the perimeter of the structure. Collectively, the observed deformation accounts for the creation of both the central uplift and the encircling ring syncline.

References: [1] Louie J. N. et al. (1995) *EOS, 76,* 337.