**Weaubleau structure, west-central Missouri:**

**A mid-Mississippian marine impact**

**Kevin R. Evans, Dept. of Geography, Geology, and Planning, Missouri State University, 901 S. National Ave., Springfield, MO 65897; *kevinevans@missouristatate.edu***

Recovery of shocked quartz, including abundant grains with multiple directions of planar deformational features (PDFs), provides evidence for a meteorite impact origin of the mid-Mississippian (latest Osagean or early Meramecian series) Weaubleau structure. The structure shows remarkable preservation and encompasses an area of intensive (proximal) to gentle (distal) structural deformation in a stable platform setting. Several breccia facies, as well as pervasive fractures, faults, and folds are found in the dominantly carbonate target rock. The structure is characterized by two eccentric annular stream drainage systems that are coincident with an area we interpret as the main impact area, 8 km diameter, and tectonic rim, 19 km diameter. A Bouguer gravity anomaly indicates a central uplift located at depth in the main impact area. Drill core recovered in the eastern part of the main impact area demonstrates minimally 500 m uplift of crystalline basement rocks. From the main impact area outward, a fan-shaped field of deformation dies out laterally and with decreasing depth toward the northeast. The eccentricity of the main impact area in relation to the tectonic rim is consistent with a model for down-trajectory structural transport toward the northeast during a low-angle impact. Shallowly focused differential deformation within the tectonic rim is attributable to variations in material strength of the target succession: incompetent siltstone beds of the Northview Formation served as a décollement, locally separating allochthonous from parautochthonous domains. The age of impact and sedimentary features of the uppermost breccias indicate a paleo-east-directed, marine impact.