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ABSTRACT

A number of circular geological structures outcrop in the sedimentary basins of Saudi Arabia, several are reviewed here to assess their mode of origin. They are unrelated to each other, are easily seen on aerial imagery, and their origins are assessed here on the basis of new fieldwork and reflection seismic data. The structures range in size from hundreds of meters to several kilometers in diameter. Jabal Rayah (28°39'N, 37°11'30"E) is 5 kilometers in diameter with ring faults and anomalously steep dips in Siluro-Devonian strata. Reflection seismic data demonstrate that underlying strata are structureless and Jabal Rayah is interpreted as a probable impact structure. Ash Shutbah (21°37'08"N, 45°39'21"E) is 2.3 kilometers in diameter and consists of a zone of concentric sub-horizontal folds in Mesozoic carbonates, surrounding a central area of disharmonic, steeply plunging folds and a mass of stratigraphically-anomalous sandstone. There are dissolution structures in the vicinity and although this is a viable explanation, the uniquely large and complex nature of Ash Shutbah suggests an alternative origin by impact. Reflection seismic data show that underlying strata in the vicinity of Ash Shutbah are structureless. A province of at least 100 circular structures occurs in northeast Saudi Arabia.