Upheaval Dome, Southeast Utah: The Evidence Ignored by Both Sides

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Upheaval Dome near Moab in SE Utah has been identified over the years by various parties as either a salt dome or a meteorite impact. However, none of the authors of the last 30 years mentions the fact that the structure is located dead center on a magnetic anomaly arising from a Precambrian age intrusion of 8 km diameter in the underlying basement. Due to the exact one-on-one correlation of the Upheaval Dome structure with the underlying intrusion it would seem to be statistically impossible that they are not related. What would be the nature of this relationship? The only geologically plausible explanation is that 1) the intrusion was more resistant to erosion and hence gave rise to a basement hill, or monadnock, at its center, 2) the monadnock, in turn, gave rise to a compactional anticline, or dome, in the overlying sedimentary section, and 3) this anticline triggered the rise of the overlying Pennsylvanian Paradox salt to form a salt dome. Whereas the author developed the above explanation about 20 years ago (Gay, 1992, 1996) precisely the same explanation was published 45 years ago (AAPG, 1965) by geologist Richard B. Mattox of Texas Technological College in Lubbock, Texas, in a concise study of then available evidence. This correlation is rather hard to explain away by a random impact.

Over the last couple of decades there has been much additional field work and many conflicting opinions published. Noteworthy were the extensive field studies of a team of Exxon geologists led by M. R. Hudec in 1990-92 (Jackson, 1998), who concluded definitively that the feature was a pinched off salt dome. But the latest paper to weigh in on the side of the impact argument is a recent one by two German petrographers titled “Impact Origin Confirmed” (Buchner and Kenkmann, 2008). They claimed that the occurrence of a few “rare” (their word) grains of shocked quartz in the Lower Jurassic Kayenta Formation “proved” the impact origin. I suggest that this only proves the ubiquitous nature of small amounts of detrital shocked quartz throughout the sedimentary section, perhaps this formation in particular. In fact, as their search for shocked quartz was apparently quite thorough and they found only background amounts and not the pervasive distribution one would encounter around true impact structures, they have proved it is not an impact structure, thus putting the last nail in the coffin of that theory.