Ramgarh Magnetic Anomaly in the Chambal Valley Sector of Vindhyan Basin: a Possible Meteorite Impact Structure and its Implications in Hydrocarbon Exploration

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The Vindhyan Basin, a classic example of Proterozoic intra-continental basin in the central part of the Indian shield is widely regarded as a Frontier basin. It is broadly divided into two sub-basins: Son valley (eastern sector) and Chambal valley (western sector). The present paper deals with the Chambal Valley sector of the Vindhyan Basin. It has often been observed that new plays are often successful when old paradigms are challenged and replaced by different out of box ideas. A new play related to a buried meteorite impact structure has been identified from magnetic signatures by special processing of aeromagnetic data in the Ramgarh Dome area. It is also supported by other geophysical and geological evidences. The oval-shaped magnetic anomaly near Ramgarh lends credence to the interpretation that it is an impact structure. Various interpretations have been put forward by earlier workers for this feature. Some have opined it to be a dome while others have interpreted it as a meteorite crater. Comparison of Ramgarh impact structure with other craters of the world reveals that the Meteor Crater, Arizona has a similar shape and the magnetic anomaly and is analogous to Jackpine Creek magnetic anomaly of British Columbia. The importance of impact structure from hydrocarbon point of view lies in the fact that when meteorite impact occurs in a sedimentary basin, it can create a trap generating structure (rim and central uplift) and reservoir rocks (ejecta piles and breccia infill), both at the same time. The meteorite impact structures/craters can be very good hydrocarbon prospects. Steen River in Alberta, Viewfield in Saskatchewan, Ames Hole in Oklahoma and Red Wing Creek in North Dakota are examples of oil and gas fields producing from buried impact structures. Identification of meteorite impact structure enhances the hydrocarbon prospectivity of Chambal Valley sector of Vindhyan basin.