*Paper 9*

# Potential of impact-structure plays in Continental Southeast Asia

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Craters abound on the surfaces of the Moon, of the solid planets and of their satellites. Prior to the manned Apollo missions, views that the craters of the Moon were products of volcanism or of meteorite impacts were about equally strong. The collected Moon rocks show definitive features of high pressure but relatively low-temperature metamorphism that overwhelmingly favour impact origin. On Earth, the suspected impact depression in the Southwestern United States known as Meteor crater, was found associated with high-pressure quartz, or coesite. Currently some 300 terrestrial structures are considered products of impacts by extraterrestrial objects. Almost two hundred of these have been proven as such by the presence of arcuate-circular surface morphology, circular gravity anomaly patterns, shatter cones, poly-megabreccias containing cleaved quartz, quartz and feldspars with mosaicism (patchy extinction), the high-pressure quartz polymorphs of coesite and stishovite, anomalously high Iridium, diaplectic glass, and sometimes microdiamonds. The comparatively low density of terrestrial impact craters on the Earth's surface is attributable to reworking by exogenous processes of weathering, erosion, organic activity, burial by younger deposits, and to the fact that 70 per cent of the surface is covered by water.

In other words, impact craters should be as common on Earth as on the solid extraterrestrial bodies. Calculations suggest a mean probability of over 15,000 significant impact craters having hit land. On land the average depth to diameter ratio of an impact crater is 1:0.2, while rim height is about 4 per cent of the total diameter. Also on land, the dimensions of simple, bowl-shaped impact craters probably do not exceed 4 km in igneous rocks and about 2 km in sedimentary rock. Beyond these limits, complex crater morphologies develop as result of flattening through gravity.

Renewed attention to impact structure plays is relatively recent and was fueled by the 1991 single-strike discovery (25 MMBO, 15 BCFG recoverable reserves) in the vicinity of Ames, Oklahoma, U.S.A. About twenty years earlier other significant discoveries were made at Red Wing Creek, North Dakota (20 MMBO, 25 BCFG), and at the world-famous Chicxulub, Yucatan Peninsula, Mexico (30 BBO, 15 TCFG). However, the structures of these earlier finds were not identified as astroblèmes and at the time of their discoveries the respective reservoirs were considered ordinary fractured carbonates and fractured granite-and-carbonates.

An impact structure creates a local, closed lacustrine or marine depression for source rock to develop and also assist in trapping. Reservoirs are sandstones, carbonates and crystalline rocks whose porosity became enhanced by the impact event. Oil and gas are typically entrapped in and above the encircling rim anticline and in the central rebound peak.



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