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Insights on prospectivity of disputed zones, South China Sea

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Disputed areas of the South China Sea (SCS) outboard of current oil and gas production can be explored easily and effectively using potential fields data in map views coupled with geological literature. Potential fields techniques are uniquely suited to such screening evaluations because the foundation data sets, particularly gravity, are seamless, cover huge areas at low cost, provide basin-scale sedimentation as well as structural information and can identify large targets. When integrated with published knowledge, gravity and magnetics data provide powerful exploration tools; in disputed zones, perhaps the only ones readily available.

Gravity and magnetics data provided by GETECH were used to revamp the tectonic interpretation of the SCS, redefine basins and identify new depocenters, structures, and sediment delivery systems from the deepwater margins of northern Borneo, Palawan, southern China and eastern Vietnam.

The basins rimming the SCS and their tectonic setting, with the "outboard" area of interest indicated, are shown on an isostatic gravity image. Extension preceding SCS spreading produced the graben/half-graben rift topography common to the Paleogene section in the outboard areas, whether the area remained on the north margin or was detached and carried its Paleogene sequence to the south margin. These restricted rift depocenters contain the primary source rocks and many of the sandstone reservoirs of both the explored and outboard areas. The Neogene post-rift section is an overall transgressive sequence that covered the rift topography as the margins of the new ocean subsided. In the outboard area, the relatively thin Neogene is expected to be primarily a regional seal and provide overburden necessary for hydrocarbon generation. Local carbonate reservoirs and source intervals are possible.

Structures seen over much of the area are large, given the approximately 6–8 km resolution of the gravity data used. Large targets are an economic necessity because water depths generally exceed 1,000 m. Deep water, remote locations and disputed political boundaries will delay seismic exploration and drilling of this frontier, but the authors' interpretation indicates areas worth further investigation.

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