SEAPEX Exploration Conference 2003
Orchard Hotel, Singapore
9th – 11th April 2003

ABSTRACT

Author(s) : Janice M. Christ (J-SEA Geoscience)
William G Dickson (DIGs)
James W Granath (Granath & associates)
Company Affiliation : (in brackets)

INSIGHTS ON PROSPECTIVITY OF DISPUTED ZONES, SOUTH CHINA SEA.

Disputed areas of the South China Sea (SCS) can be explored effectively ahead of boundary settlements by using potential fields data 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 available. The authors used potential fields data processed and displayed by GETECH's proprietary methods to revamp the tectonic interpretation of the SCS, redefine basins and identify new depocenters, structures, and sediment delivery systems.

The disputed areas "outboard" of current oil and gas production will be discussed: the Xisha Trough, southeastern Qiongdongnan Basin, Phu Khanh/Nha Trang Basin, Tu Chinh/Vung May Basin and the carbonate bank regions of the northern and southern margins of the SCS. The Phu Khanh and southern Qiongdongnan basins in particular have been redefined and extended.

Hydrocarbon sourcing is a key issue over much of the outboard area due to the thinness of the Cenozoic section outside of the major basins. Indications of hydrocarbons do occur in both the basins and banks areas. Gravity derivatives, a sediment isopach calculated from depth to magnetic basement, and corroboration from the literature provide the basis for mapping depocenters. The depocenters are interpreted as having mainly Cenozoic fill, with inferred Paleogene source rocks, but significant Pre-Tertiary sections and Pre-Tertiary hydrocarbon sources may be a component of some. Thermal maturity will be a key discriminator between oil and gas. Heat flow variations with time will be a major factor in modeling thermal maturity because of differences in the relative timing of tectonic events across the area.

Clastic reservoirs are more likely to offer sealed traps than the numerous reefs and carbonate banks, which often grow to the seafloor. The synrift section offers the best chance of sandstone reservoirs, sealed by post-rift deepwater mudstones. Gravity attribute and derivative image interpretation indicates that the more established sediment delivery systems did not reach most of this area. A few speculative canyon systems are mapped outboard of the Northwest Palawan Basin, but nearly all channel “signatures” are short, discontinuous, local features.

Structures are present in all basins. Fault-related highs between the grabens/half-grabens should provide structural targets in the marginal banks areas. Given the resolution of the gravity data used by the authors (approximately 6-8 km), mappable structures are large. Large targets are an economic necessity because most of the outboard disputed zones are in water depths greater than 1000 m.

The deep water, combined with boundary issues, will delay seismic exploration and drilling, but potential fields interpretation indicates areas worth further investigation. Political progress is being made in addressing disputed zones in the SCS. Perhaps we will yet see some of these areas thoroughly tested.