

**AAPG International Conference
Barcelona, Spain
September 21-24, 2003**

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Frontier Exploration Areas in the South China Sea: the "Big Picture" from Potential Fields Data

Frontier areas outboard of current oil and gas production in the South China Sea (SCS) can be explored easily and effectively using potential fields data in map views coupled with geological literature. 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 southern China, eastern Vietnam, northern Borneo and Palawan.

Hydrocarbon sourcing is a key issue due to the thinness of the Cenozoic section outside the major basins. Gravity derivatives, a sediment isopach calculated from depth to magnetic basement, and corroboration from the literature provide the basis for mapping depocenters. Thermal maturity, driven by heat flow varying with tectonic timing, will be a key discriminator between oil and gas.

Clastic reservoirs are more likely to offer sealed traps than the numerous reefs and carbonate banks, which often grow to the seafloor. Gravity attributes underpin the interpretation that the more established clastic delivery systems did not reach most of this area leaving the synrift section with the best chance of sandstone reservoirs, sealed by post-rift deepwater mudstones.

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 1000 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.