Aspects of the Hydrocarbon Potential of the Phu Khanh Basin, Offshore Central Vietnam, South China Sea

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The Phu Khanh Basin is untested by wells. Analysis of seismic data indicates a complicated development with three rift-phases, transpression, inversion and regional syn- and post-rift subsidence. Grabens with alluvial fans along the margins and lacustrine mudstones and coals in the central parts formed in several places. Carbonate platforms and reefs are particular common in parts of the Miocene section. Geochemical analyses of seep oils occurring closely adjacent to the basin show the presence of three crude oils, of which two originated from early mature to peak mature Cenozoic lacustrine source rocks and a mixed source of marine marls with contribution from higher land plants. Sedimentological analyses of outcrops and the 500 m long ENRECA-1 core from a small graben (4–12 km wide, 35–40 km long) in the Neogene Song Ba Trough reveal that excellent oil-prone source rocks (20–25 m thick, TOC up to 11 wt%, HI up to 800) occasionally formed in shallow stratified lakes in spite of the dominance of fluvial deposition of conglomerates and sandstones.

The mudstones have a generation potential of up to 8.5 Mio barrels of oil/km2, which is very encouraging as seismic data indicate several deeply buried lake successions in the Phu Khanh Basin. A seismic section trending perpendicular to the coast and terminating close to the oil seeps was modelled using IES software and gravity data. The results point out the likely position of two hydrocarbon kitchens with mature source rocks. The integration of seismic and gravity data, outcrop analogs, seep oil analyses and basin modelling thus indicate that the Phu Khanh Basin is a highly prospective basin.