

# Geophysical Characterization of the Wenchang 13-1 and 13-2 oil Fields, South China Sea

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Husky Energy has acquired a 40% working interest in a development and production of two light oil fields, Wenchang 13-1 and 13-2, discovered and operated by CNOOC. The two large fields, 7 km apart, are situated 100 km east of Hainan Island, in 100 m of water.

A proven hydrocarbon system exists in the Pearl River Mouth basin, offshore China. Up to 5000 bopd were produced from drill stem tests in four Wenchang discovery and delineation wells. Development included 18 highly deviated and 3 horizontal wells (Figure 1).

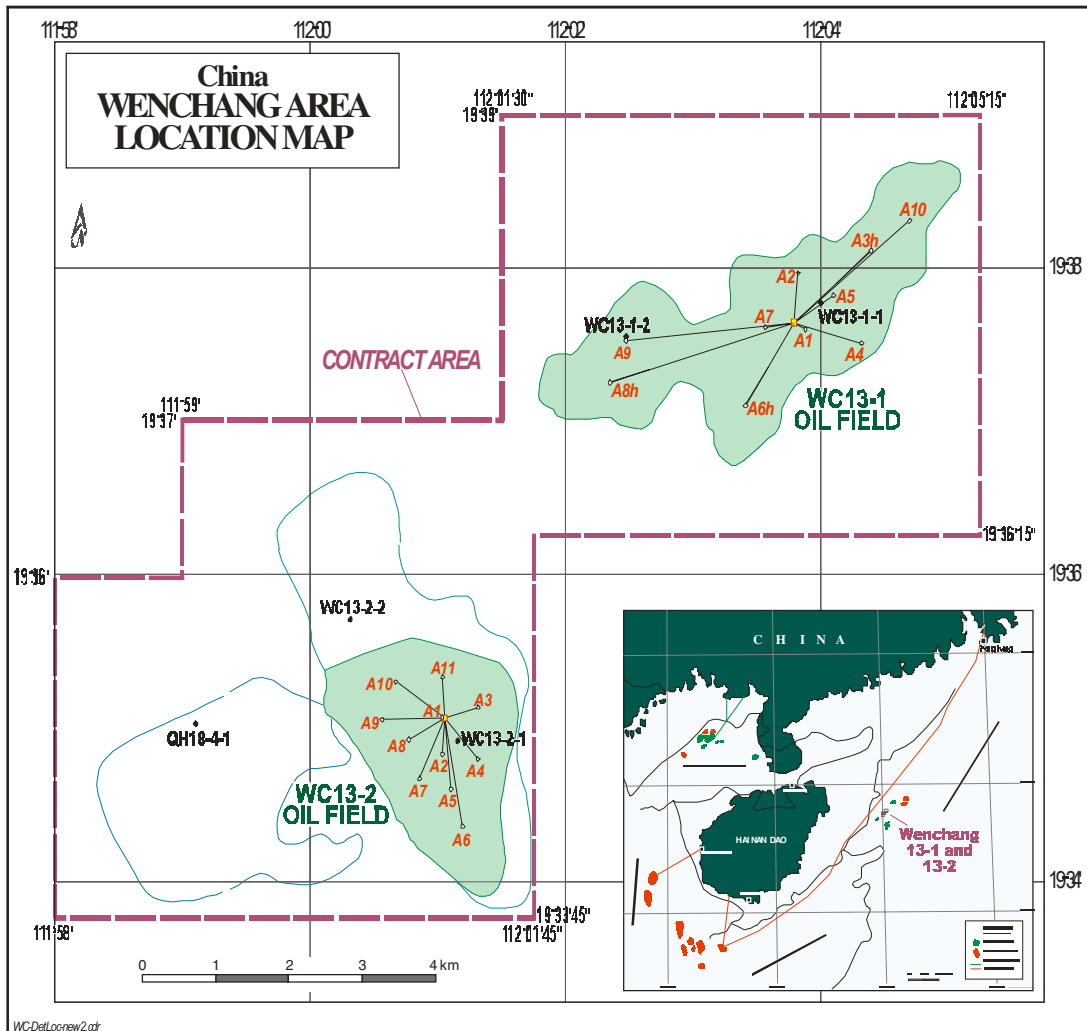


Figure 1. South China Sea - Wenchang 13-1 and 13-2 oil fields area location map and development wells.

Both Wenchang fields and the surrounding area are covered by a 12.5 by 12.5m binned 3D seismic survey that exhibits overall high frequency, good marker continuity and excellent amplitude content. Seismic interpretation shows that pre-rift basement is severely faulted and has considerable relief. Two major half-grabens and an intervening ridge, containing the Wenchang anticlines, are identified. The pronounced relief at the basement level is generally attenuated after the deposition of the syn-rift sediments that contains the source rock.

The two Wenchang simple drape anticlines are formed above the highest basement features, and are separated by a local low (Figure 2). The Wenchang 13-1 field presents two local culminations corresponding to two basement buried hills. The depths to the main reservoirs are between 980 and 1320 m in Wenchang 13-2 (major pay zone oil gravity 26 to 29° API) and 1220 to 1470 in Wenchang 13-1 (major pay zone oil gravity is 40 to 47° API).

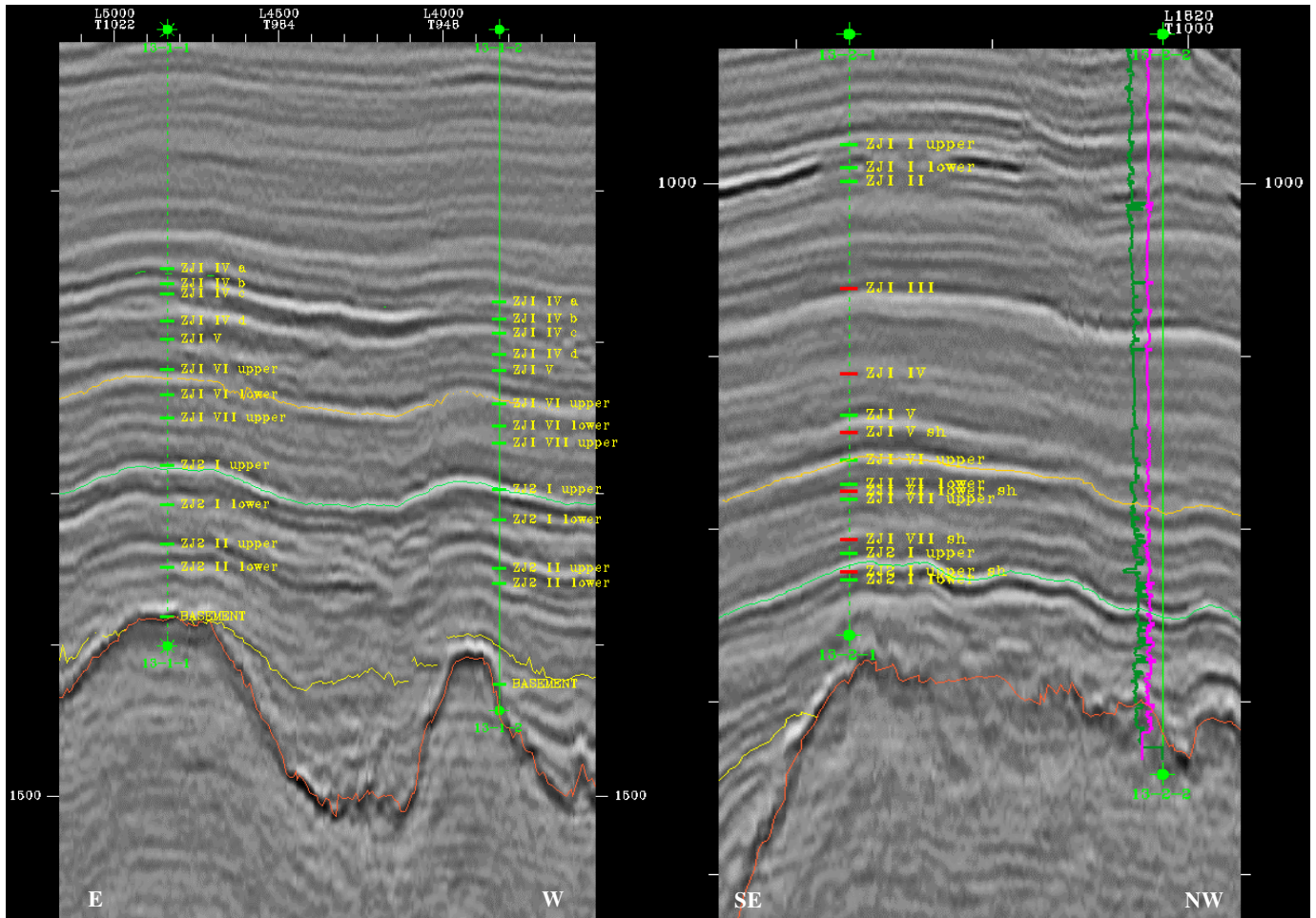


Figure 2. Wenchang 13-1 and 13-2 simple anticlines.

The reservoir sandstones are the Miocene aged Zhujang Formation (Figure 3). The Zhujang Formation consists of two members, named the ZJ1 and the ZJ2. The ZJ1 member sandstones were deposited in a shallow marine environment while the underlying ZJ2 sandstones were deposited in a tidal flat environment with numerous tidal channels cross cutting the fields.

The lacustrine source rock, easily recognizable on the seismic data, is in the underlying Eocene aged Wenchang and Enping Formations (Figure 3). The source is mature in both the northern and southern sags that border the Wenchang ridge.

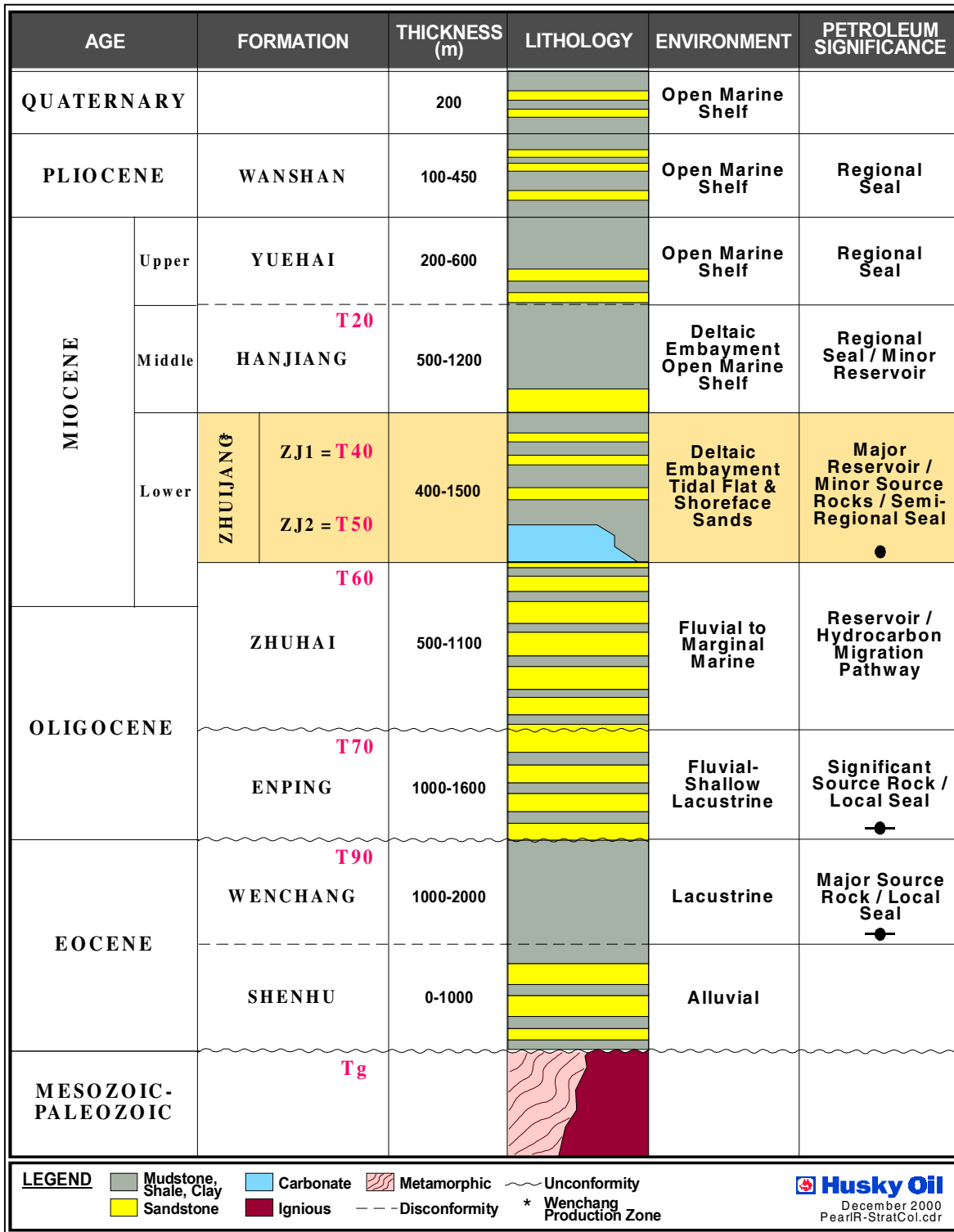


Figure 3. Generalized Stratigraphic Column of Wenchang oil fields.

Several areal amplitude anomalies are mapped within the reservoir sandstone intervals over the Wenchang anticlines, but after detail lithological correlation they are associated with sandstone diagenesis rather than hydrocarbon content. Other amplitude anomalies outside of the field area remain enigmatic (Figure 4).

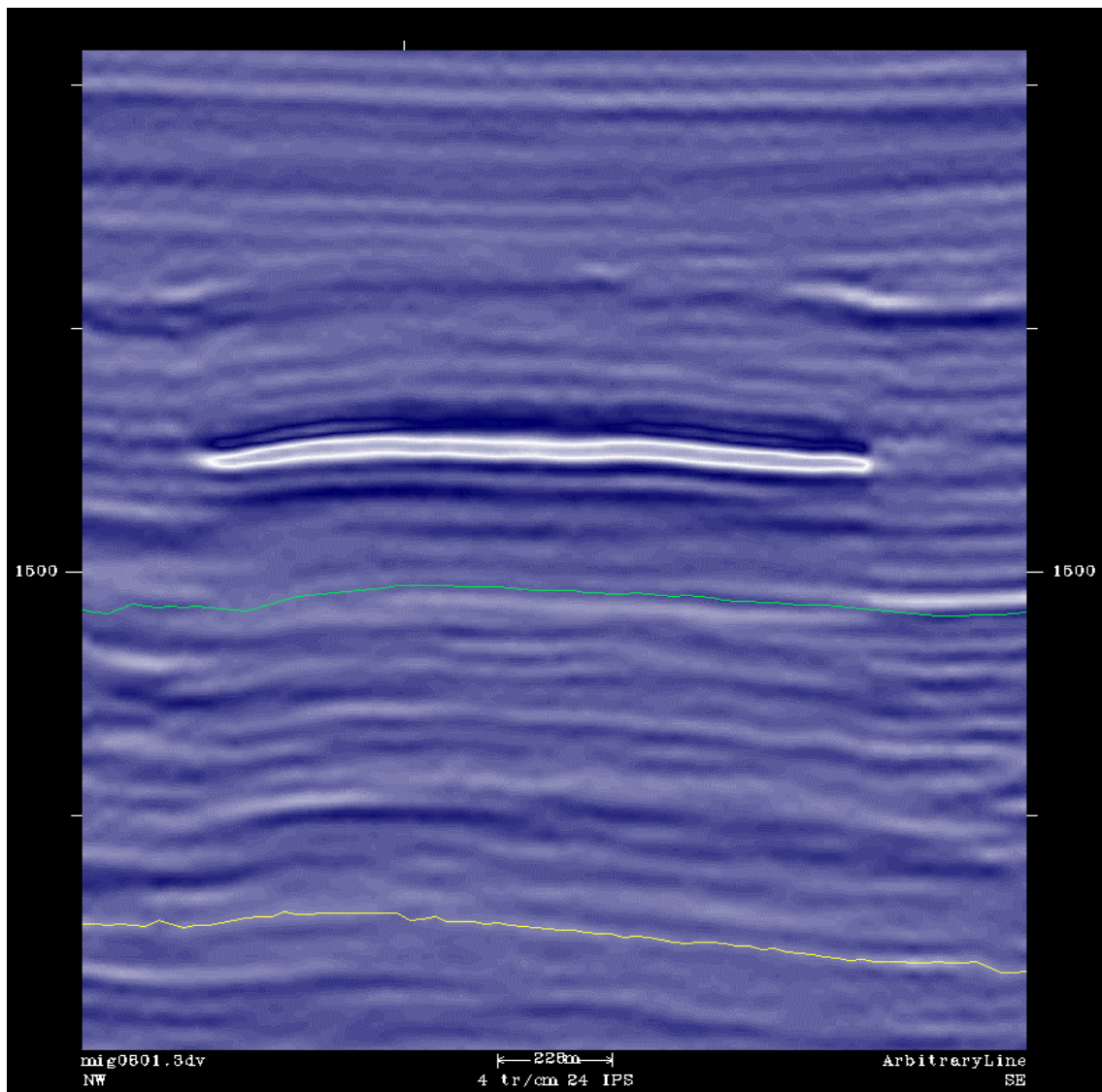


Figure 4. Enigmatic amplitude anomaly in the Wenchang fields area.