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Depositional Environments of the Pab Formation (Upper Cretaceous) in the Kirther Fold-Belt, Pakistan

The Pab Formation (Maastrichtian) is potential hydrocarbon reservoir and is well exposed in the Kirther Fold-belt of western Pakistan. It is 150-250m thick and dominated by medium to thick-bedded quartzose sandstones, deposited on the western continental margin of the Indian Plate

Eight facies, grouped into four facies associations are recognised: (1) Shoreface facies association; this association consists dominantly of facies 7 (trough cross bedded sandstones) with subordinate facies 6 (parallel and low angle cross laminated sandstones), Facies 5 (hummocky cross stratified sandstones), and facies 4 (burrowed and bioturbated sandstones). All these facies show abundant evidence of strong energy conditions that are common in the shoreface to inner shelf setting. (2) Shelfal delta lobe facies association; this association is characterised by dominance of facies 3 (massive sandstones), with subordinate facies 4 (burrowed and bioturbated sandstones) facies 5 (hummocky cross stratified sandstones), facies 2 (marl intebedded with thin sandstones) and facies 1 (graded sandstones) and facies 8 (slumped units). All these facies were deposited below the fair weather wave base and some below storm wave base on the delta slope in the lower shelf area. (3) Deeper shelf ramp facies association; this association comprises facies 2 and facies 3, deposited below storm wave base in a deeper shelf ramp environment. (4) Submarine fan lobe facies association; this association comprises facies 1 (graded sandstones and associated lutites), characterised by thickening-up cycles, with more amalgamated and less well graded sandstones at the top, indicating localised progradation of minor lobes within an organised deep-water fan system.

The distribution of facies and facies association reveals overall upwards-shallowing in the Pab Formation. Palaeoflow, predominantly to the W and NW and sandstone petrography suggest supply from the uplifting Indian basement to the east, feeding a broad, W-sloping, delta-fed clastic ramp influenced by flood and episodic storm events.