

### **Sand-rich, Tide-dominated Deltaic systems of the Lower Miocene, Central Sumatran Basin, Indonesia**

Johansen, Steven <sup>1</sup>; Semimbar, Habash <sup>2</sup> (1) Development Geologist, Saudi Arabian Chevron, Inc., Houston, TX. (2) Petronas, Kuala Lumpur, Malaysia.

Most producing oil fields in the Central Sumatran Basin are in the Miocene Sihapas Group, which consists of sand-rich, tide-dominated deltaic systems and updip fluvial equivalents. Duri steamflood, with over 8,000 wells within an area of 200 km<sup>2</sup>, provides a unique opportunity to study the stratigraphic architecture of tropical tidal deltas. The preserved depositional systems tracts extend from up-dip deposits dominated by fluviotidal channels, through down-dip delta-front deposits of tidal marine sands and muds, and transition into shelf systems, where delta front deposits intertongue with marine mudstones, foraminiferal grainstones, and cross-bedded glauconitic sands.

We propose that parasequence architecture reflects fluctuations between two idealized end-member geomorphic profiles, neither of which were ever fully attained. When fluvial sediment supply was abundant, the system aggraded towards the profile of a fluvial-dominated distributary & mouth bar complex. Conversely, when sediment supply waned, tidal currents re-sculpted the mouth bar into subtidal bars and channels, and the subaqueous delta platform prograded seaward. Tidal channels robbed saltation load from the lower delta plain and transported a significant portion of it seaward.

A two-tiered architecture is proposed for the most complete and expanded progradational delta-front sequences. The lower tier consists of gently inclined marine bar sands and muds, and the upper tier contains proximal mouth bar and fluviotidal distributary channel deposits. In fully-expanded sequences, the two tiers are separated by a pronounced surface of shallow marine erosion and sediment bypass or a thin zone containing an amalgamation of these surfaces. This ravinement surface is inferred to be the stratal record of the subaqueous delta platform. In settings with less accommodation space, the fluviotidal channels of the upper tier scour deeply into the lower tier and remove most or all of it. The upper tier is not present in locations further down-dip, and only marine bar sands and muds of the lower tier are deposited or preserved.