

Ripple mark styles in the Belait Formation: Implications on depositional historyPADMANABHAN, E.^{1*}, A.S. MOHD PAUZI², M.S. MASNAN², M.A. MOKHTAR² & PRASANNA M.V.³¹ Petroleum and Geosciences Department, Universiti Teknologi Petronas,
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The Belait Formation comprises alternating sandstones, sand and clays in varying proportions and thickness and is believed to have been deposited as an isolated basin infilling oscillating between littoral and deltaic-paralic type. Ripples are occasionally encountered in this Formation. However, there is a lack of information on the kind of ripples present and the link between the ripples and the associated flow dynamics within the Belait Formation. This information is extremely useful for a better understanding of the formation of these sedimentary basins especially for the oil and gas industry.

Therefore, the main objective of this study was to evaluate the ripple marks occurring in an outcrop belonging to this Formation. The specific objectives were to ascertain the origin of these marks, to estimate the principal flow directions and to link the characteristics of the ripple marks to the flow characteristics.

Approximately 800 measurements of ripples were made at this outcrop along three vertical transects. Ripples are generally asymmetrical in cross section and the ripple indices are inconsistent throughout the outcrop. The ripple indices show temporal and spatial variations within and between strata. The majority of the ripples have sinuous in phase patterns. A few strata at the top of the outcrop exhibit linguoid patterns. Principal flow directions as assessed from the ripples were NE or SE.

All strata have fine sand texture. The quartz grains are subrounded and do not exhibit any preferred orientation. Interstitial spaces are filled with iron-oxyhydroxides. Taking into consideration the mean particle size in each strata, the estimated mean flow velocity in a unidirectional sense would be about 0.3-0.4m/s under laminar flow conditions. Evidently, there has been no appreciable increase in this flow rate as there are no evidences of planar stratification in the field.

The change in the flow direction is non-systematic from a temporal perspective. These changes appear to be linked to the meandering nature of the large channel. The study also shows that the Belait Formation has a complex depositional history at the micro and meso-scales of observation.