Wave-generated tidal bundles as an indicator of wave-dominated tidal flats: COMMENT

COMMENT: doi: 10.1130/G25125C.1

Rajat Mazumder*
Geological Studies Unit and Fluvial Mechanics Laboratory, Indian Statistical Institute, 203, B.T. Road, Kolkata 700108, India

Yang et al. (2008) have presented a detailed analysis of some tidal bundles from recent intertidal deposits of two open-coast tidal flats, in which an interval of symmetrical build-up of wave ripple cross-lamination is present between a basal landward- and upper seaward-dipping ripple cross-laminations (Yang et al., their Figs. 2A and 2B). This finding is significant, as such structural successions in ancient sedimentary deposits may indicate the presence of wave-dominated tidal flats. However, I disagree with their arguments to call such structures “wave-generated” tidal bundles, and also to group such structures into “wave-generated” tidal rhythmites (Yang et al., 2008, p. 41).

The term “tidal rhythmite” refers to vertically and/or laterally stacked thin beds or laminae, usually of sandstone, siltstone, and mudstone, that exhibit rhythmic thickness variation as a consequence of lunar-solar tides (Williams, 1989; Kvale et al., 1999; Mazumder and Arima, 2005). “Tidal bundle” refers to rhythmic deposits in which each sand-mud couplet is formed due to variation in tidal current speed over a single tidal cycle (e.g., Dalrymple, 1992). Understandably, tidal rhythmites contain several tidal bundles. The rhythmic deposits reported by Yang et al. (2008, their Figs. 2A and 2B) are of course tidal bundles, because the middle layer (i.e., the symmetrical vertical build-up of ripples) was formed between two successive phases of reversing tidal currents overlain and underlain by mud layers (i.e., one complete tidal cycle; Yang et al., 2008, their Fig. 3). Multiple sets of such rhythmic deposits should be termed tidal rhythmites. For all practical purposes, wave components, be they weak or strong (i.e., low- or high-energy storms; Yang et al., 2007), are associated with tidal currents in the coastal/near-shore regions, and have variable control on the formation of tidal bundles/rhythmtes. If waves dominate significantly over tidal currents, one should expect rhythmic deposits similar to those described by Yang et al. (2008, their Figs. 2A and 2B). If the wave component is weak, one should get the bottom and top layers among the three-layered rhythmic deposits described by Yang et al. (2008, p. 40).

Therefore, the terms “wave-generated” tidal bundles, “wave bundle” and “wave-generated” tidal rhythmites as suggested by Yang et al. (2008) are misleading and confusing. I recommend the term “wave-dominated” to designate these very interesting tide-wave interactive rhythmic deposits.

REFERENCES CITED


*E-mail: mraja@isical.ac.in

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