

Paper Number: 3738

Mesoproterozoic tidalites from southern part of Lalsot Basin, North Delhi Fold Belt, Rajasthan, India

Bhattacharya, B. and Sharma, S. K.

Department of Earth Sciences, Indian Institute of Technology, Roorkee, Uttarakhand-247667, India. Email: bb.geol.dgc@gmail.com; bbgeofes@iitr.ac.in

Tidalites are recorded from part of the metavolcano-sedimentary succession of the Mesoproterozoic Bayana Formation (Alwar Group), in the southern part of the NNE-SSW trending Lalsot Basin, North Delhi Fold Belt (NDFB), Rajasthan, India.

The studied succession of the Bayana Formation is ~850m thick and is constituted of three major facies associations, namely – (i) subaerial bar/fan facies association in the lower part, characterized by subaerial accumulation of sediment gravity flow deposits; (ii) tidally modified mouth bar facies association in the middle part, characterized by subaqueous emplacements of the sediment-gravity flow deposits and their reworking by tidal currents; and (iii) tide-wave facies association, characterized by subtidal-intertidal sedimentation with intermittent wave reworking in a relatively stable and open marine setting. The overall facies sequence and their architecture suggest – (a) initial progradational sedimentation due to more supply of coarser clastics in the tectonically unstable basin marginal part, followed by (b) retrogradational sedimentation in a transgressive marginal marine depositional system under relatively stable phase.

Tidalites are present within the sandstone-mudstone heterolithic units in the middle and upper parts of the studied succession. Tidal signatures include – (i) herringbone cross strata, (ii) tidal bundles of various types including bidirectional cross-strata, laterally accreted strata bundle with mudstone-draped sandy foresets, reactivation surfaces separating the strata bundles, sigmoidal strata bundles, (iii) tidal bedding like flaser and lenticular beddings, and (iv) tidal rhythmites. Thick–thin pairs of rhythmic foreset bundles/lamina correspond to neap–spring tidal cycles. The architecture of tidalites within alternate sandstone-dominated and mudstone-rich units attests to sedimentation in a shifting subtidal to intertidal flat setting. Tidal sedimentation was affected by intermittent strong to weak reworking by open marine waves/storms. Wave reworking is manifested by wave ripples and combined-flow ripples superposed on tidal bundles.

This study records a transitional basinal setup from initial unstable, tectonically active conditions to more stable platformal setup with mature tidal flats. This signifies a record of the interaction between changing sea levels, variation in sediment supply and creation of net accommodation space caused by tectono-sedimentary changes in the south-eastern part of the North Delhi Fold Belt (NDFB) during the Mesoproterozoic time.

Acknowledgments: BB is grateful to Indian Institute of Technology, Roorkee, for financial assistance (under FIG scheme) and infrastructural facilities.

