

Comparison of Tidalites in Siliciclastics and Mixed Siliciclastic Carbonate Systems: An Outstanding Example from Proterozoic Simla Basin, Western Lesser Himalaya, India

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Abstract : The comparison of ancient tidalites recorded in both siliciclastics and carbonates has not been well documented due to a lack of suitable outcropping examples. The Proterozoic Simla Basin, Lesser Himalaya serves a unique example in this regard. An attempt has been made in the present work to differentiate sedimentary facies and architectural elements of tidalites in both siliciclastics and carbonates recorded in the Simla Basin. Lithofacies and microfacies analysis led to identification of 11 lithofacies and 4 architectural elements from the siliciclastics, 6 lithofacies and 3 architectural elements from the carbonates. The most diagnostic features for comparison of the two tidalite systems are sedimentary structures, textures, and architectural elements. The physical features such as flaser-lenticular bedding, mud/silt couplets, tidal rhythmites, tidal bundles, cross stratified successions, tidal bars, tidal channels, microbial structures are common to both the environments. The architecture of these tidalites attests to sedimentation in shallow subtidal to intertidal flat facies, affected by intermittent reworking by open marine waves/storms. The seventeen facies attributes were categorized into two major facies belts (FA1 and FA2). FA1 delineated from the lower part of the Chhaosa Formation (middle part of the Simla Basin) represents a prograding muddy pro-delta deposit whereas FA2 delineated from the upper part of the Basantpur Formation (lower part of the Simla Basin) bears the signature of an inner-mid carbonate ramp deposit. Facies distribution indicates development of highstand systems tract (HST) during sea level still stand related to normal regression. The aggradational to progradational bedsets record the history of slow rise in sea level.

Keywords : proterozoic, Simla Basin, tidalites, inner-mid carbonate ramp, prodelta, TST, HST

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