

Recognition of a Thinly Bedded Distal Turbidite: A Case Study from a Proterozoic Delta System, Chaossa Formation, Simla Group, Western Lesser Himalaya, India

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Abstract : A lot of progress has been achieved in the research of turbidites during the last decades. However, their relationship to delta systems still deserves further attention. This paper addresses example of fine grained turbidite from a pro-deltaic deposit of a Proterozoic mixed energy delta system exposed along Chaossa-Baliana river section of the Chaossa Formation of the Simla Basin. Lithostratigraphic analysis of the Chaossa Formation reveals three major facies associations (prodelta deposit-FA1, delta slope deposit-FA2 and delta front deposit-FA3) based on lithofacies types, petrography and sedimentary structures. Detailed process-based facies and paleoenvironmental analysis of the study area have led to identification of more than 150 m thick coarsening-upwards deltaic successions composed of fine grained turbidites overlain by delta slope deposits. Erosional features are locally common at the base of turbidite beds and still more widespread at the top. The complete sequence has eight sub-divisions that are here termed T1 to T8. The basal subdivision (T1) comprises a massive graded unit with a sharp, scoured base, internal parallel-lamination and cross-lamination. The overlying sequence shows textural and compositional grading through alternating silt and mud laminae (T2). T2 is overlying by T3 which is characterized by climbing ripple and cross lamination. Parallel laminae are the predominant facies attributes of T4 which caps the T3 unit. T5 has a loaded scour base and is mainly characterized laminated silt. The topmost three divisions, graded mud (T6), ungraded mud (T7) and laminated mud (T8). The proposed sequence is analogous to the Bouma (1962) structural scheme for sandy turbidites. Repetition of partial sequences represents deposition from different stages of evolution of a large, muddy, turbidity flow. Detailed facies analysis of the study area reveals that the sediments of the turbidites developed during normal regression at the stage of stable or marginally rising sea level. Thin-bedded turbidites were deposited predominantly by turbidity currents in the relatively shallower part of the Simla basin. The fine-grained turbidites are developed by resedimentation of delta-front sands and slumping of upper pro-delta muds.

Keywords : turbidites, prodelta, proterozoic, Simla Basin, Bouma sequence

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