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TOWARDS A GENETIC MODEL FOR THE ANALYSIS OF HYPERPYCNAL SYSTEMS

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Hyperpycnal systems constitute a new type of depositional system originated when a river in flood extends its course below a lacustrine or marine water body. Although hyperpycnal discharges are at present very common, only few examples of fossil hyperpycnites can be found in literature. A hyperpycnite is a particular type of turbidite with distinctive and poorly known facies. Its origin closely related to a fluvial discharge results in facies types and depositional features that often resemble those considered typical of fluvial environments. Facies analysis performed during the last 6 years in a number of lacustrine and marine basins of Argentina, Mexico and Venezuela, allowed the distilling of a genetic and predictive facies tract for the analysis of hyperpycnal deposits. The proposed facies tract is composed of three genetically-related facies groups termed B, S and L, corresponding to bedload, suspended load and lofting respectively. Facies B (bedload) are coarse grained and related to frictional drag forces provided by the overpassing long-lived turbulent flow. Three main categories are recognized, termed B1 (massive conglomerates), B2 (pebbly sandstones with low angle asymptotic cross-stratification) and B3 (pebbly sandstones with diffuse planar lamination). Facies S are almost fine grained, and relate to the gravitational collapse of suspended load. Four facies types are recognized, denominated S1 (massive sandstones), S2 (laminated sandstones), S3 (sandstones with climbing ripples) and S4 (massive siltstones and mudstones). Facies L (lofting) relates to the buoyancy reversal provoked by the lift-up of a less dense fluid (in the case freshwater) on marine environments. Finest suspended materials are also lifted from the substrate, and settle down forming silt/sand couplets of great lateral extension. Facies L develops only in marine/saline environments while facies S3 and S4 are more common in lacustrine (low salinity) environments. Hyperpycnal clastic bodies are often very complex having internal discontinuities and gradual recurrence of facies related to deposition from long-lived and highly fluctuating flows. Facies B characterize transfer zones, and are useful to predict the basinward occurrence of sandstone deposits (facies S). Facies L are mostly developed in channel margin areas.

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