Meandering Channels: Detecting Freshwater and Brackish Water Conditions from the Ichnofabric Approach

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Abstract

Meandering channels occur in fluvial environments but also are common in coastal settings, where they can be modulated by the action of tide and/or waves, and affected by salinity fluctuations. Because tidal and wave-generated features are not always preserved and some of these structures may occur in more than one environment (i.e. inclined heterolithic stratification in fluvial, estuarine and open-marine settings), accurate interpretations of the depositional setting of meandering channels can be difficult using only physical sedimentology. However, by means of the ichnofabric approach, it is possible to distinguish between a continental and a marginal marine setting and to differentiate the associated subenvironments in order to delineate complex facies mosaics. This study is based on the Upper Cretaceous deposits of the Tremp Formation in South-Central Pyrenees (Spain), which record sedimentation in a meandering channel system located close to the shoreline. These deposits have been considered as formed in a fluvial-freshwater system (e.g. Vila et al., 2013) but signatures of marine/tidal influence have been documented as well (Díaz-Molina, 1987; Díez-Canseco et al., 2013). The meandering channel deposits of the Tremp Formation outcrop along a 300 m stratigraphic section, displaying numerous examples of their depositional geometry and the detailed distribution of their sedimentological and ichnological attributes.

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