Deep-water conduits of the Lake Pannon, southern Transylvanian Basin, Romania

LILLA TŐKÉS[1], ISTVÁN RÓBERT BARTHA[1], LÓRÁND SILYE[2], CSABA KRÉZSEK[3] and ORSOLYA SZTANÓ[1]

1 – Department of Physical and Applied Geology, Eötvös Loránd University, Budapest, Hungary

2 – Department of Geology, Babeş-Bolyai University, Cluj Napoca, Romania

3 – OMV-Petrom S.A., Bucharest, Romania

The Carpathians were the major source of sediment for the Pannonian Basin during the late Miocene. Tectonic pulses and climatic changes in the source area could readily influence the sedimentary patterns even in the deep basins. The Transylvanian Basin offers outcrops of turbidites fed by the uplifting South Carpathians. High-resolution facies analysis was carried out in order to reveal the internal anatomy of the architectural elements.

Primary channelform surfaces in the outcrop near Daia are smooth and steep sided. The middle of channelform bodies are made up of conglomerate lags, passing upwards into thick amalgamated sandstones with rip-up clay clasts and rare cross stratification. These beds laterally transition into a thin-bedded mixed sand-mud facies association, containing abundant parallel and cross laminated intervals. Secondary channelform surfaces and erosional bases of beds are present within primary ones. The primary surfaces are dominantly laterally, slightly vertically stacked. The offset stacking preserves the evolution of the channel.

High density pebbly and sandy turbidity currents were the major agents in this system. The highest energy and volume flows could carve the channelform surfaces. As erosion changed into bypass, conglomerate lags were left as the coarsest sediment load. As flows became more depositional at the point of observation, thick sand beds were produced in the axis of the channel. The upper, low density parts of the same flows formed traction deposits and mud drapes on the confining margins of the channel. The filled channel gave way to a new suit of flows, but the conduit laterally migrated. The multiple cut-and-fill cycles were terminated by the final abandonment of the channel complex, recorded by a capping mud unit. Erosion-bypass-deposition cycles are driven by the changing magnitude of flows, probably resulting from hinterland tectonic pulses, climatic changes or the relative water-level changes.

Depositional cycles are also preserved in the downstream counterparts of the channel in the Transylvanian turbidite system. Another compound channel fill has more lateral migration and is more homogenous in grain size, no lag deposits and mud drapes are present. However, the basal incisional surface is preserved, and scattered outcrops indicate that isolated channels formed probably as a result of avulsions and low aggradation rate. The lobes of the system record upward thinning and fining cycles. Amalgamated pebbly sandstones and scour surfaces suggest a channelized lobe, probably a proximal axial

or medial axial part of a lobe. A mixed sand-mud facies association with laterally varying bed thickness indicates a proximal lobe fringe setting. Upward thinning cycles are attributed to lateral or upstream stepping of lobe elements. Signs of lobe abandonment and switching are preserved by thin-bedded turbidites, mud drapes and erosional bases of lobes. The diverse architectural elements could develop in one turbidite system, reflecting downstream and along strike variations.

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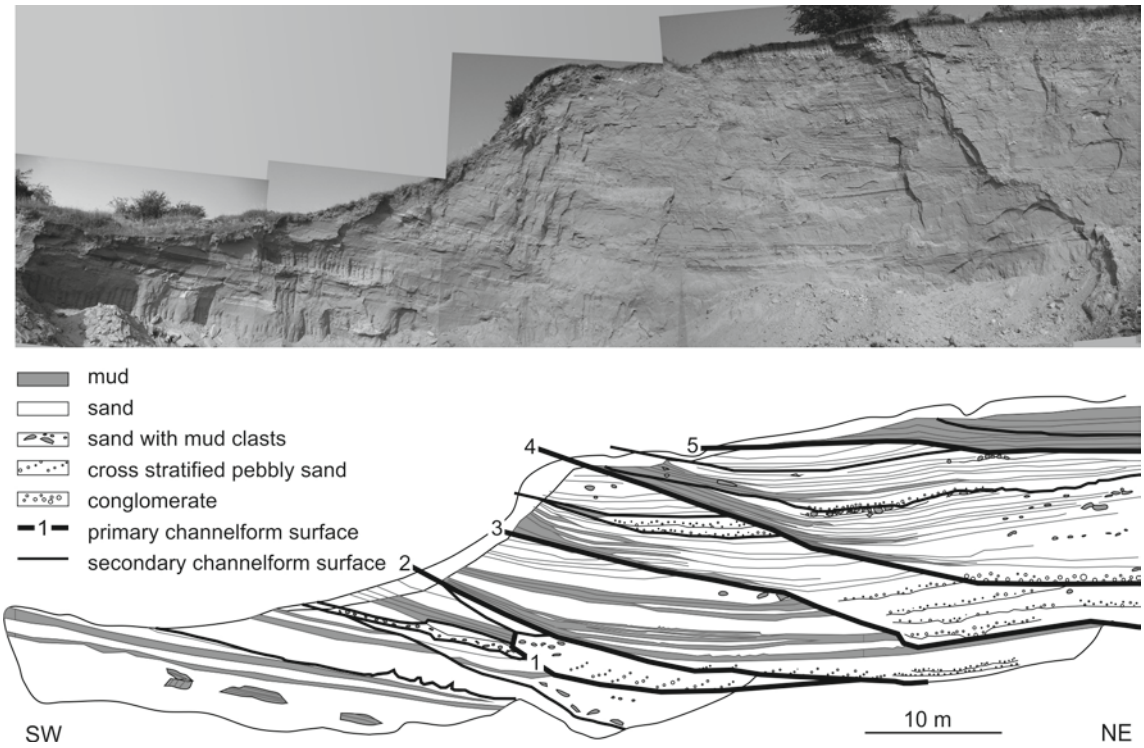

Figure 1: Channelform surfaces and bodies of the Daia outcrop.