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Sedimentary evolution and integrated stratigraphy: a key to structural evolution in the Eastern Pannonian Basin, Hungary

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The Late Neogene sedimentary succession in the E part of the Pannonian Basin was studied by means of integrated stratigraphy, applying subsurface geology on the basis of regional composit seismic profiles and analysis of the well-log response. The focused area (Derecske Trough and its surroundings) was characterized by sediment input from the NE direction which was one of the main delta systems reaching and filling the Pannonian Basin. Dip sections were studied defining the stratigraphic architecture, depositional environments, lithostratigraphy, 3rd and 4th order sequences, as well as the sedimentary evolution of the area and some conclusions are related to structural evolution.

Late Neogene **sedimentation** occured on a wide shelf in this area. The studied formations can be subdivided having formed in four main depositional environments: slope, delta front, coastal plain and alluvial plain in the study area, while deep-water turbidites were formed in a limited zone in the deepest depression only. Slope and delta front sediments are the most widespread, the latter is extremely thick, it can exceed 1000 m, interfingering with coastal plain deposits towards the NE. Alluvial deposits can be traced only to NE and SW of the focused study area where the delta front sediments thin out.

Sequence stratigraphic interpretation was carried out on composit regional profile network, the 3rd order sequences of VAKARCS (1997) were correlated on the whole area, while 4th order cycles were interpreted locally and independently. On a sedimentary evolutionary base the 3rd order cycle interval between 9,15- 6,85 Ma has

high significance. In this succession sigmoid and wedge-shaped 4th order cycles can be traced, and a major progradational-retrogradational pattern can be observed.

In the focused time frame there was a **major backstep of the delta complex** at the end of the studied interval, just before the 3rd order sequence boundary Pan4 causing a widespread major transgression onto fluvial floodplains far away of the shoreline. Transgression resulted deposition of mouth bars and offshore sediments above several 100 m thick older fluvial deposits. The enormous magnitude of this transgression was not observed before as delta front facies appears in a rather elevated level.

In the southern part and flanks of the Derecske basin a **thickening back of the** 4th order cycles can be clearly observed in the uppermost part of this (Pan4) 3rd order sequence indicating strong tectonic imprint on the sedimentary succession. Following the trangression a high magnitude base level drop of appr. 300 m can be estimated at the 3^{rd} order sequence boundary Pan4, with sudden facies changes.

The stratigraphic architecture and the sedimentary facies indicate that the formation of the 4th order cycles in the study area has probably a climatic background but the sequence architecture of the Pan4; Pan5 3rd order sequences was driven certainly by strong tectonic events. Carrying out detailed studies of the focused interval, the **onset of a new era of structural evolution** (uplifting and/or tilting, strike slip faulting which might have been related to regional or basin scale compression after HORVATH 1995, HORVATH AND CLOETINGH 1996, HORVÁTH, F. & TARI, G. 1999**)** could be dated on the basis of the above mentioned phenomena.

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