Geophysical Research Abstracts, Vol. 9, 08765, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08765

Messinian signature in the Eastern Paratethys: new seismic constraints from the Dacic Basin (Romania)

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Which are the factors that control the final stages of foreland sedimentation and basin evolution in the aftermath of continental collision? Paratethys is an epicontinental shallow sea that was separated from the progressively closing Tethys ocean and dissected by the emerging Alpine orogenic belt. In a setting of decaying tectonic subsidence, water level variations would have played a large role in determining the basin infill and (dis)connections between the different Paratethyan domains.

In this context, we address the following issue: how did the effects of the Messinian Salinity Crisis in the Mediterranean extend to the Paratethys? We present new seismic data on the infill of the western part of the Dacic Basin, the Romanian part of Paratethys adjacent to the South Carpathians and representing the transition between the Central (Pannonian Basin) and Eastern Paratethys. Early Pontian erosion on the basin margins (Vasiliev, 2006) was caused by a major water level drop of some 200 m, and associated with the evolution of a large W-SW prograding low stand fan system in a remnant 300 m deep lake. Sediments were derived from the exposed plains in a northern - eastern source area and as a result, deposition and progradation rates were high. A subsequent water level rise was accompanied by the evolution of an equally large fan system prograding towards the east and north. Time constraints from well and field data (Clauzon et al., 2005; Snel et al., 2006; Vasiliev et al., 2005) strongly suggest that the water level variations were associated with the Messinian Salinity Crisis in the Mediterranean.

Questions remain on the importance of base level changes as a cause of the Pontian

break in sedimentation and the origin of the western fan system. We propose three potential explanations of the deposition of the fan system in relation to the Danube crossing the South Carpathians, (1) downwearing of an antecedent river, (2) capture of the Pannonian drainage or lake by an east-flowing river, and (3) upstream paleogeographic changes in the Pannonian basin. These are tested by numerical modelling in a companion contribution. To conclude, water level variation due to the Messinian salinity crisis alone probably is not a sufficient explanation for the observed change in basin sedimentation; the base level change may have driven fluvial incision and drainage capture, thus greatly increasing the sediment supply.