

BACKSTRIPPING FAULTS: APPARENT DIP SLIP RATES ALONG MIOCENE FAULTS IN THE VIENNA BASIN (AUSTRIA)

Michael Wagneich & Hanns Peter Schmid

The dating of movements on synsedimentary faults relies mainly on relative ages of offset and sealing strata. TEN VEEN & KLEINSPEHN (2000) used backstripped basement subsidence curves from both the hanging wall and the footwall blocks adjacent to major normal faults to evaluate timing and sense of dip-slip along these faults. The sense of fault movements can be directly determined, e.g. converging or crossing basement subsidence curves indicate reversals in the sense of faulting. Based on this method, we calculated the normal slip component of slip rates of major faults for given biostratigraphic zones and formations along a transect through the central part of the Miocene Vienna Basin.

The structural evolution of the Vienna Basin is characterized by a complex interplay of compression, strike-slip movements and extension, related to final compression and lateral extrusion. Sedimentation started during the Early Miocene (Eggenburgian-Ottangian-Karpatian) with the development of a marine piggyback basin on top of moving Alpine thrusts. Inversion in the central Vienna Basin at the Karpatian-Badenian boundary, indicated by an erosional unconformity and fluvial conglomerate deposition (WEISSENBÄCK, 1996), was followed by the development of a fully marine pull-apart basin in a strike-slip/transensional setting during the Badenian (DECKER, 1996).

Standard backstripping and fault backstripping methods were applied, based on borehole data provided by OMV, including lithology information from interpreted logs (spontaneous and resistivity logs). Absolute basement subsidence rates are as high as 3000–4000 m/Ma, absolute tectonic subsidence rates range up to 3000 m/Ma; the highest subsidence rates are recorded during the Karpatian (sedimentation of Gänserndorf and Aderklaa formations). Subsidence rates decrease

during the Lower Badenian. During the Middle Badenian (*Spiroplectammia*-Zone), the Lower Sarmatian, and the Middle Pannonian increased subsidence rates are recognized.

Backstripping for individual fault systems of the transect indicates varying time intervals and senses of fault movements. The western marginal fault, the Bisamberg Fault, displays no or pure strike-slip activity during the Karpatian to Early Badenian, followed by dip slip rates up to 540 m/Ma during the Late Early Badenian to Middle Badenian and a second major fault activity during the Late Sarmatian to Middle Pannonian. Major dip slip with rates as high as 940 m/Ma is recorded in the central part of the Vienna Basin during the Karpatian. Reversed sense of movements along normal faults during the Early Badenian indicates a major rearrangement in the fault pattern. During the Early Sarmatian a short pulse of dip slip along the investigated faults is recorded.

References

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Authors' address:

Dr. Michael Wagneich, Mag. Hanns Peter Schmid, Institute of Geology, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria