



Miocene fault activity in the southern Vienna Basin based on fault backstripping

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The Vienna Basin (Austria) is a structurally complex thin-skinned pull-apart basin at the junction of the Eastern Alps and the Western Carpathians. It covers an area of about 3200 km² and sediment fill comprises up to 5.8 km thick Miocene clastic deposits.

To quantify the kinematics and date Miocene fault movements the southern part of the basin has been investigated. To allocate the complex structural build-up, faults and stratigraphic horizons are mapped within the 3D seismic block “Moosbrunn” (with courtesy of OMV-Austria). The area, like the whole basin, consists of a complex system of horst and grabens. Seismic data covers a major fault zone in the central part of the block including a negative flower structure and the part of another major basin forming fault (Leopoldsdorf Fault) with a maximal normal offset of 3000 m.

Dip-slip movement of faults are quantified with the fault backstripping technique. This method is based on comparing basement subsidence curves (the decompacted sedimentary record) of the hangingwall and footwall blocks. Parallel segments of subsidence curves indicate inactivity or strike-slip movement and the relative sense of fault movement can be determined by calculations or directly read off converging or diverging curves indicating reversals in the sense of faulting.

For subsidence calculations, data from 21 wells have been compiled, including thickness of stratigraphic layers, lithological properties from geophysical data and palaeontological data, mainly based on molluscs, foraminifera and calcareous nannoplankton investigations. The new stratigraphic time scale for the Neogene of Austria is used as base for the investigated period (U. Karpatian – U. Pannonian; 16.3 – 7.8 Ma).

The basement subsidence curves show a corresponding trend with changes from high

to low subsidence rates ($\sim 400 - 1300$ m/Ma) from the Upper Karpatian to the Upper Pannonian (16.3 – 7.8 Ma). Curves are very steep during the Lagenid Zone (14.5 – 14.2 Ma; max. basement subsidence rates: ~ 1300 m/Ma) and are flattening through the Sarmatian and Pannonian (14.2 – 7.8 Ma) with rates of max. 440 m/Ma.

Transects within the seismic cube have been fixed, where fault movement is reconstructed in detail and results are cross-checked.