Geophysical Research Abstracts
Vol. 14, EGU2012-5201, 2012
EGU General Assembly 2012

Contribution to the discussion of folded Pannonian strata in the Southern Vienna Basin

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It is well known that Neogene Basins in Eastern Austria were formed by regional extensional tectonics. Nevertheless Peresson & Decker (1997) reported local folding in the Vienna Basin, which they interpreted as a result of post-Miocene compression. Based on their hypothesis we now present three locations of folded Pannonian formations, which we interpret as tectonic ones. First the coal bearing Neufeld formation of the Neufeld-Zillingdorf mining area, second the folded Neufeld formation of Steinbrunn, the coming into existence of which currently is under discussion, and third the folded Pannonian beds of Oberlaa near Vienna.

In 1952 Ruttner described big inclined folds in the coal bearing Pannonian of the Neufeld open coal pit with NNE plunging axes. The well mapped faults of the entire mining area revealed an en echelon pattern, which can be interpreted as a result of sinistral strike slip faulting along the crystalline belt of the Central Alpine basement (Leitha Mountains – Rosalia). Historic photographs proof the existence of folds with wavelengths and amplitudes on the order of several meters, horizontally inclined and overturned, indicating local post-Miocene folding.

In Steinbrunn, only a few kilometers east of Zillingdorf, another outcrop reveals folded deposits of the Neufeld formation, and was subject to several tectonic and sedimentological investigations. While Peresson & Decker (1997) implied a tectonic origin, Exner et al. (2008) favoured the hypothesis of a synsedimentary evolution of these folds. Grundtner et al. (2009) identified a coarsening upward and shallowing upward of these Upper Pannonian strata, and interpreted the brackish-limnic succession as deposits in a floodplain depositional environment. Within such an environment a paleo-slope enabling slumping and sliding of Upper Pannonian soft sediments forming sedimentary folds with a wavelength and amplitude of several meters is quite unlikely. Eventual high resolution geophysical investigations in this area, carried out in 2011, did not reveal features supporting the sedimentary hypothesis. We therefore interpret these inclined folds of the Neufeld formation of Steinbrunn in accordance with Peresson & Decker (1997).

About 50 kilometers north of these two outcrops, in Vienna-Oberlaa, folds of the same style and dimension were documented during excavation works in 2009. Located in the vicinity of the prominent Leopoldsdorf fault, we interpret the folded Pannonian beds of Oberlaa to be of compressional nature, which came to exist along the bended Leopoldsdorf fault in Plio-/Pleistocene times.

On a regional scale we compare these folded Panonnian strata in the Southern Vienna Basin with similar folding structures reported from the southwestern Pannonian Basin. Horváth et al. (2006, fig. 8) interpreted young syn- and anticlines of Pannonian strata as formed within a transpressive regime along prominent strike slip faults. Furthermore Cloetingh et al. (2006) reported that after a rifting phase during late Early Miocene to Pliocene times, the Pannonian Basin has been subjected to compressional stresses leading to gradual basin inversion during Quaternary times. In conclusion we do not rule out that the described folded Pannonian strata in the Southern Vienna Basin were each formed in a local transpressive regime along strike slip faults, too.