

Structural evolution of the Carpathian Foredeep from the Neogene till Recent (mesostructural analysis)

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Mesostructures visible in the outcrops in the western (Nida Trough) and the eastern (the sulphur open-pit Ma-

chów near Tarnobrzeg) parts of Carpathian Foredeep were studied. During the Neogene three tectonic phases have been distinguished in the Carpathian Foredeep area, corresponding with the late stage of Late Alpine evolution (tectogenesis) of the Carpathians. These phases were as follows: the

syntectonic Early Styrian phase (Early Badenian in age), Late Styrian phase (Early/Late Badenian) and the Attican phase (Sarmatian–Pliocene?). During the first and second phases a gravitational stress field was acting together with small extension of NE–SW to E–W direction. At that time, the NW–SE orientated faults, which existed earlier in the Neogene basement, became reactivated. Due to a listric shape of the NW–SE fault surface, beds of footwalls were antithetically rotated. During the Attican phase stress field pattern was changed and a horizontal compression prevailed. In the central part of the Carpathian Foredeep the compression of N–S direction turned to NE–SW (30–50°) in the western part. Sinistral strike-slip faults of NE–SW and ENE–WSW directions were developed. The complementary shear fractures and a meridional pattern of master joints

were initiated in the horizontal compressional stress field. At the end of sinistral transcurrent movements, the N–S extension (transtension) affected oblique character of many main faults (i.e. the Kurdwanów–Zawichost zone). All the structures were neotectonically renewed, especially during Valachian and Pasadenian phases. The evidence of neotectonic movements are deformations of the pre-glacial Witów gravels and of the Quaternary deposits and morphostructures, as well. The magnitude of normal fault throws and of transcurrent displacements enable one to define the Late Styrian and Attican phases as the main tectonic phases during the Neogene of the Carpathian Foredeep area. The other registered tectonic deformations — Early Styrian and neotectonics were formed due to a minor earthquakes and hydrotectonic phenomena — without stronger regional stress.