Fractured pebbles in the Upper Miocene-Pliocene gravelstones: contribution to structural evolution of the Orava Basin, West Carpathians, Poland

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The Orava Basin is an intramontane basin, superimposed upon the boundary between the Inner and Outer Carpathians, which is filled by fresh-water Neogene molasses and Quaternary sediments. A part of the basin fill is the Upper Miocene–Pliocene Domański Wierch series, more than 220 m thick. Within the series, clasts (up to 1.3 m in diameter) are commonly fractured. In particular exposures, these fractures occur either as a single set of extensional joints or as two sets of shear fractures conjugated under small dihedral angle. The fractures were formed due to regional stress field with the maximum stress axis horizontal and trending NE to NNE. It follows from the analysis of tectonic deformation in the Orava Basin substratum that a similarly oriented stress field occurred in the area during Middle Miocene time. Moreover, the results of breakout analyses in that part of the West Carpathians indicate that similarly oriented stress field occurs there at Present. We conclude, therefore, that the stress arrangement within the Orava Basin region has not undergone significant rotations since the Middle Miocene. Such an arrangement has been characterised by the horizontal maximum stress axis, trending NE to NNE.