

EARLY FRACTURES AS INDICATORS OF PALAEOSTRESS FIELD: CASE STUDY OF THE POLISH OUTER CARPATHIANS

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We have analyzed 380 stations spread throughout the Polish segment of the Outer Carpathians. Nearly 80% of our data pertain to Paleocene through lower Miocene strata. Joints are ubiquitous in the upper Cretaceous-Tertiary flysch strata of the Polish Outer Carpathians. Kathetal joints compose 1-3 sets of cross-fold joints and 1-2 sets of fold-parallel joints. The cross-fold joints form two sets (labelled D1 and D2), intersecting one another at 60-70°, whose acute bisector is perpendicular to map-scale folds, and a single set of transversal joints T, which is also perpendicular to map-scale folds. The D joints are shear or hybrid-shear fractures that were formed at an early stage of regional folding. The T joints are extension fractures. Abutting relationships indicate that the D joints are roughly coeval and form a conjugate system. The age of T joints remains unknown. The fold-parallel joints are younger, and their orientation is much more consistent as compared to that of the cross-fold joints. They were probably formed due to extension following the regional folding.

The position of shear joints-related maximum stress axis was horizontal, its orientation changing from NW, through NNE, to NE in the western, medial, and eastern portions of the Outer Carpathians, respectively. Extension associated with the T joints was oriented, respectively, NE, E-W, and NW, whereas that related to the formation of fold-parallel joints was NW, NW to N-S, and NE.