

References

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Quaternary Tectonic Activity of the Central Part of the Polish Carpathian Foredeep, Evidences from Archaeological Open Site at Brzezcie near Kraków

Wojciech WŁODARSKI¹, Marta RAUCH-WŁODARSKA², Tomasz KALICKI³ and Anna BUDEK³

¹ Adam Mickiewicz University Poznań, Institute of Geology, Maków Polnych 16, 61-686 Poznań, Poland

² Polish Academy of Sciences, Institute of Geological Sciences, Kraków Research Centre, Senacka 1, 31-002 Kraków, Poland

³ Institute of Geography and Spatial Organisation Polish Academy of Sciences, Department of Geomorphology and Hydrology Mountains and Uplands, 31-018 Kraków, Sw Jana 22, Poland

The fossil graben and associated with it the normal faults and joints within the Vistulian and Holocene sediments are the object of considerations here. These structures were observed in the archaeological open site at Brzezcie, in the central part of the Polish Carpathian Foredeep (Fig. 1A).

The normal faults cut the Pleistocene gleyed loess, laminated loess, Eoholocene buried soil and the lower part of the Mezo-holocene deluvium that includes an archaeological artefacts from the Neolith and early Bronze Age (Fig. 1B). These structures die out within the middle and upper part of the Neoholocene deluvium including archaeological artefacts from the Lusatian culture. The normal faults strike mostly NNE-SSW and dip steeply about 65–85° (Fig. 1C). Some of them, the master normal faults, bound the fossil graben (Fig. 1B). The surfaces of the normal faults are slightly striated. The fault-slip analysis shows that the maximum principal stress axis (σ_1) was in subvertical position, the minimum principal stress axis (σ_3) was horizontal and WNW-ESE-directed (Fig. 1D). The joints occur within the graben and outside of it. They group into three sets: 1) the NNE-SSW-trending; 2) the WNW-ESE-trending and 3) the ENE-WSW-trending (Fig. 1E). The joints of the two first sets predominate. They form an orthogonal joint pattern, where the joints of the (1) set strike parallel to the normal faults and the joints of the (2) set strike perpendicular to them. Additionally, these joints are closely spaced close to the normal faults. Stewart and Hancock (1990) described the similar relationships between joints and faults and suggesting that the development of joints was connected with the normal faulting. Therefore we believe that jointing was simultaneous with faulting at Brzezcie. The basement of the study area is cut by NE-SW-trending faults that represent fragment of the Kurdwanów-Zawichost Fault Zone (Fig. 1A). There are some evidences of sinistral reactivation of this fault zone during the Late Miocene and later (Rauch-Włodarska et al. 2005). The normal faults and joints observed at Brzezcie could be caused by activity of the Kurdwanów-Zawichost fault zone during the Pleistocene and Holocene.

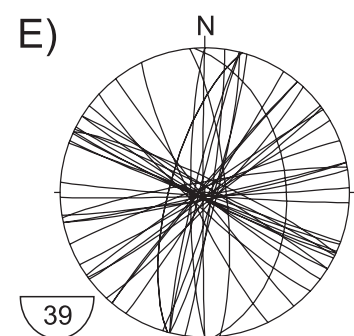
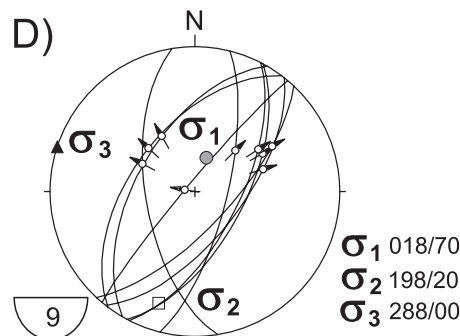
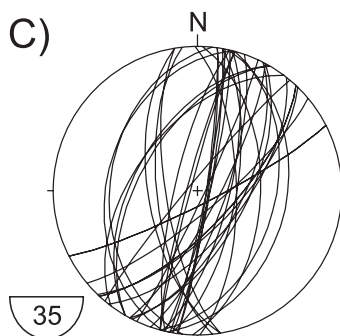
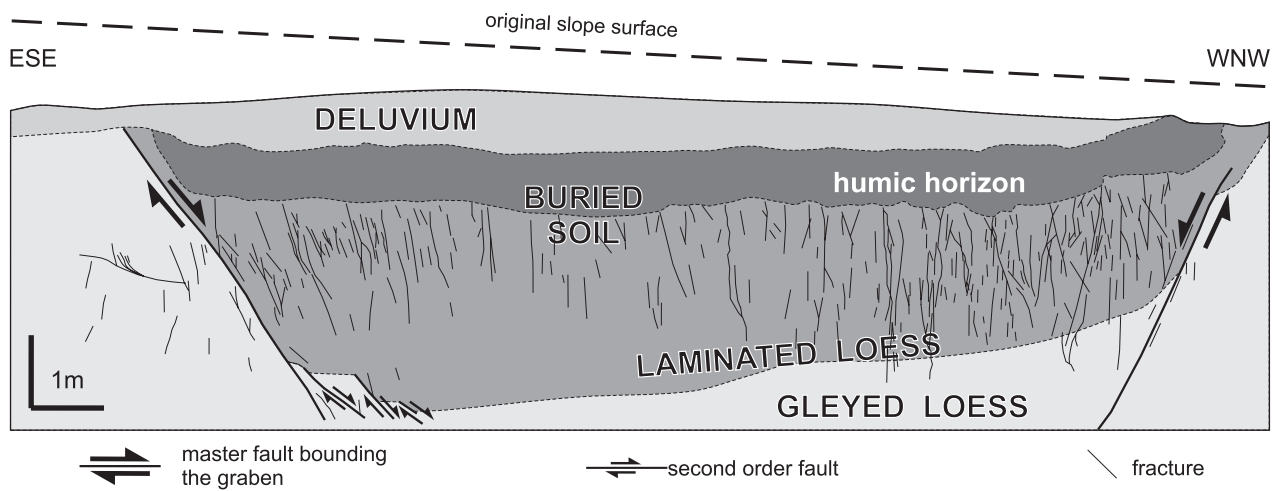
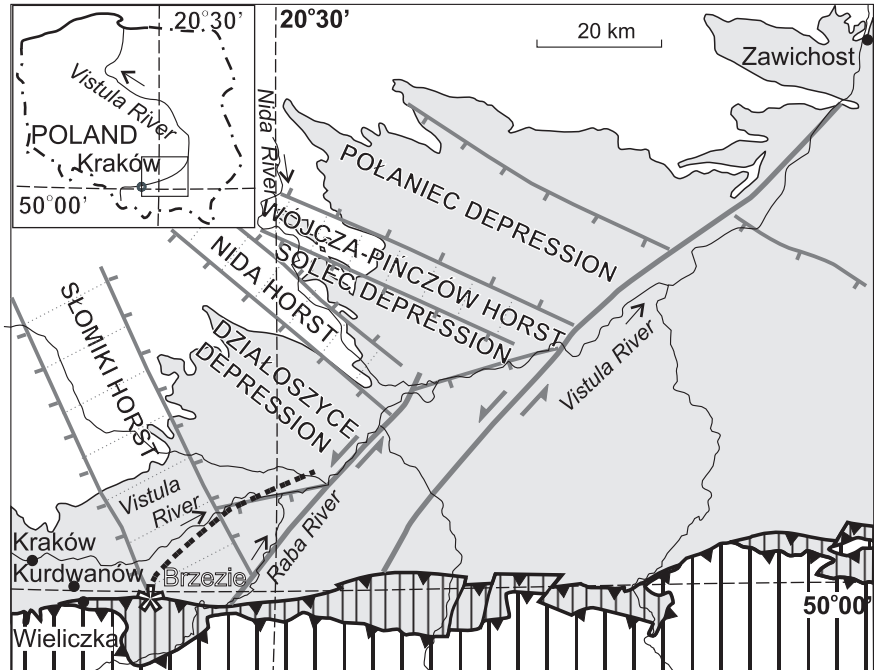
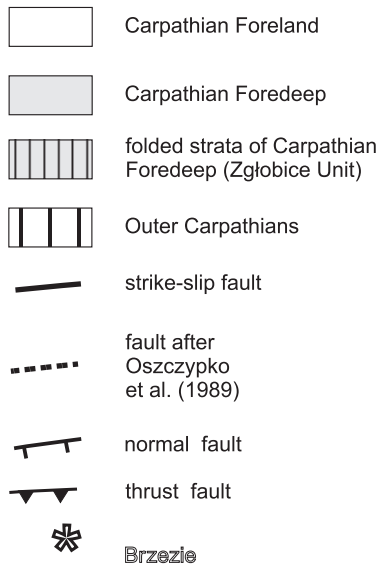
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■ Fig. 1. A) Tectonic sketch of the central part of Polish Carpathian Foredeep (after Krysiak 2000) showing location of Brzezie, the Zglobice Unit after Połtowicz (1991, simplified); B) Cross-section of graben; C) Plot of normal fault surfaces; D) Plot of normal faults with striations and orientation of reconstructed principal stress axes (using program TectonicsFP); E) Plot of joint surfaces. All plots on the lower hemisphere.