

Multiple detachment levels in the Silesian nappe near Jasło, Polish Outer Carpathians

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The Silesian nappe near Jasło includes a series of W–E to NW–SE-trending map-scale folds composed of Valanginian/Hauterivian?–Oligocene rocks (Neścieruk et al., 1995). The Silesian nappe between Nowy Żmigród and Fryszak towns comprises the Glinik, Niepla, and Moderówka synclines, and the Lubla, Brzanka–Liwocz, Potok, Żońków, Łajsce–Kopytowo, Iwonicz Zdrój, and Folsz–Dukla anticlines (Neścieruk et al., 1995). Their wavelengths range from 1.5 to 15 km. New 2D seismic data suggest that most of the outcropping folds can be interpreted as symmetric detachment folds. However, anticlines that are bounded from the north by thrusts have an asymmetric geometry. The folds comprise narrower northern forelimbs and wider southern backlimbs. The lithostratigraphic units of the Silesian nappe include the Lower Krosno Beds, Menilite Beds, Hieroglyphic Beds, Ciężkowice Beds, Variegated Beds, Lower and Upper Istebné Beds, Godula Beds, Lgota Beds, and Upper Cieszyn Beds, comprising a fairly uniform lithology of thick- and medium-bedded sandstones and shales (Neścieruk et al., 1995; Oszczypko, 2004).

Seismic data, field investigations, digital elevation models and satellite images have been interpreted to suggest the occurrence of multiple detachment horizons in the Silesian nappe. About 10 significant detachment levels have been identified within the nappe close to the depth of 6 km. However, it cannot be excluded that the thrust sheets contain more discrete detachment horizons, difficult to identify on seismic profiles. Six of the recognized décollement levels can be interpreted as existing along the

entire length of the nappe, measured between the Magura and Skole nappes. The average thickness of the thrust sheets estimated at dozens to several hundred meters was calculated between two parallel flats, belonging to the floor and roof detachments, respectively. On seismic profiles below 1 km depth, the rocks display an array of thrusts forming a series of active-roof duplexes comprising north-directed thrust sheets and fault-bend folds. A similar possibility of the occurrence of such multiple detachment levels was, for example, displayed by Mastella (1988) in the Mszana Dolna tectonic window within the Magura nappe. It seems that this is an important mechanism of strain transfer during the process of thrusting in the Outer Carpathians fold-and-thrust belt.

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