

Upper Cretaceous-Paleocene Mutne Sandstone Mb. with olistholites of carbonate rocks (Magura Nappe, Outer Carpathians, Poland)

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The Mutne Sandstone (Cieszkowski *et al.*, 2007. *Ann. Soc. Geol. Pol.* 77,3: 269-290) is a lithostratigraphic member of the Jaworzynka Formation. This formation, traditionally called Inoceramus beds (biotitic facies), is widespread in the northern zone of the Magura Nappe in the West Outer Carpathians. It is equivalent of the Solan Formation divided in Czech and Slovak republics but exerts also significant similarities with the Altlenkbach Formation from the Rhenodanubian Flysch in the Eastern Alps. The Mutne Sandstone Member consists of the thick-bedded sandstones up to 2,0 m. They are medium- and coarse-grained, occasionally with layers of conglomerates. Massive sandstones pass up the top of the layer to parallel, ripple cross- or convolute lamination. In some cases large-scale cross-bedding, load-casts and flame-structures can be observed. The grain composition of sandstones consist mainly of quartz, with admixture of feldspar, clasts of metamorphic rocks, phyllites as well as shales, marls and limestones. In conglomerates clasts of carbonate rocks are more frequent. Limestones from pebbles are massive, but also display parallel- or/and cross lamination. In some of them assemblages of planctonic foraminifers including *Globotruncanidae* and radiolarians were noticed. In some layers the numerous of limestone clasts arranged parallelly to the bedding form a kind of sedimentary breccia. The large olistolite of the marly limestones up to dozen or so meters in size occur within the sandstones outcropped in Mutne.

The micropaleontological analysis of the deep-water agglutinated foraminiferal assemblages documents the Late Mastrichtian age of the lower part of Mutne Sandstone Member in its type locality in Mutne village. Between others the several taxa e.g. *Gerochammina lenis* (Grzybowski) and *Caudammina gigantea* (Geroch) from examined assemblages are characteristic for Late Cretaceous. Occurrence of *Rzehakina inclusa* (Grzybowski) determine the Late Cretaceous age of the studied deposits. Beside of this several forms in the investigated assemblages are typical for latest Cretaceous – Paleocene. Assemblages from others localities of the Mutne Sandstone Member exert similar taxonomical character as in Mutne village and include specimens of *Rzehakina inclusa* (Grzybowski) and *Remesella varians* (Glaessner). The variegated shales of the Łabowa Shale Formation normally overlies the Mutne Sandstones in the lithostratigraphic section contain in its lower part the Late Paleocene assemblage of agglutinated forams. Between others assemblages include typical Paleocene species *Rzehakina fissistomata* (Grzybowski) and *Haplophragmoides cf. mjatliukae* Maslakova. The *Hormosina velascoensis* (Cushman) was also encountered there. So the age of the Mutne Sandstone Member was estimated as Mastrichtian-Paleocene. Probable Paleocene age of uppermost part of this division results from its position in the lithostratigraphic section of the Magura Series in the Siary Subunit beneath of the Łabowa Shale Formation, dated in its lower part as the Late Paleocene.