

ILLAWARA reversal horizon in the Permian of the Hronic nappe (Western Carpathians, Slovak Republic)

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Abstract: Hronic multinape unit is the higher tectonic unit in the Central Western Carpathians. The magnetostratigraphic investigation on the profile of the Upper Carboniferous-Permian belonging to the Hronic Unit in the Nízke Tatry Mts. revealed occurrence of the first-order time marker, so called Illawara Reversal, near the boundary separating 2nd and 3rd megacycles at localities of the Malužiná Fm.

The continental sequences of the Permian in the Western Carpathians are generally very poor in organic remnants determining insufficient radiometric data. The time period within the range of 300 – 250 Ma is prevalently represented by clastic sediments and volcanics, which are preserved in the structure of Alpine units of the Western Carpathians in relics only. The complete profile of Upper Carboniferous-Permian of the Hronic Unit in the Nízke Tatry Mts. was analysed by standard magnetostatigraphical methods. At these complexes we assume preservation of primary remanent magnetic polarization. Moreover, these sequences are continuously preserved from the underlying Upper Carboniferous rocks to the overlying Lower Triassic rocks.

The 351 rock samples from 23 outcrops of investigated profile were elaborated. Each sample was undergone thermal magnetic cleaning. Paleomagnetic measurements were carried out in Paleomagnetic laboratory of the Geophysical Institute SAS Bratislava. The demagnetization step of 50 °C from the natural stage till to 650 °C was used. The remanent magnetic polarization as well as volume magnetic susceptibility were measured after each demagnetization step. Thermal cleaning was performed into MAVACS – system, magnetic polarization was measured on spinner magnetometer JR-5 and

volume magnetic susceptibility on cappa-bridge KLY-3. The demagnetization graphs, so called Zijderveld-diagrams of XY and XZ components and stereographic projection of the remanent magnetization vectors was performed. Mean paleodirection of each locality (outcrops) was calculated using the Fisher statistics.

In the Upper Carboniferous, the reversal pattern has been extended into the whole profile. The mean values of magnetic inclination is ranging from –30° to –40°. The set of measured samples from the both Upper Carboniferous localities is characterized by reversely and homogeneously magnetized rocks. Within the lower part of the Permian sediments both normal and reversal magnetization have been found besides some inhomogeneous samples. Prevalent part of sediments is characterized by reversal polarity with the mean inclination between 0° and –30°. Several normal magnetized horizons were found. The mean positive inclination varies between 0° and +45°. We assume, despite of this uncertainty, that the sediments of the Upper Carboniferous and lower Permian of the Hronic Unit belong to the Carboniferous-Permian Reversed Megazone.

There were obtained the evidences that within the lower part of the Upper Permian sequence a systematic change in the inclination occurs. The mean value of inclination is shifting from +80 to negative inclination. This zone could be correlated with Illawara Reversal (IR). This assumption is supported by the radiometric data 263 resp. 274 Ma from the lithostratigraphical equivalent uranium-bearing horizon. Beyond this IR horizon there are alternating reversed and normal polarity zones. They should be correlated with The Permian-Triassic Mixed Megazone.