PRELIMINARY RESULTS OF MAGNETOSTRATIGRAPHIC INVESTIGATIONS ACROSS THE JURASSIC/CRETACEOUS BOUNDARY STRATA IN THE NUTZHOF, AUSTRIA

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A high resolution study focusing on the detailed biostratigraphy of the limestone-, marly limestone- and marl succession at Nutzhof has been carried out at a new outcrop in the Pieniny Klippenbelt of Lower Austria. The assembled outcrop is located about 20 km south of Böheimkirchen and 5 km north of Hainfeld. The surrounding area is called Kleindurlas and the locality itself Nutzhof. Lithological, sedimentological and palaeoecological studies of the succession uncovered rich spectra of Tithonian to Berriasian macro- and microfaunal elements. The evaluation of the thin sections and washed samples indicates a change from a saccocomid facies to a calpionellid facies within the succession.

The Pieniny Klippenbelt is in this area a small band of Upper Jurassic to Lower Cretaceous sediments from 200-500 m breadth. It is surrounded by mighty sediments of the Rhenodanubian Flysch Zone. Tectonically, the outcrop is situated only 5 km north of the main border of the Rhenodanubian Flysch Zone and the more southern Northern Calcareous Alps. The log at Nutzhof contains 18 m of inverse, cm to dm beds showing at meter 6 the Jurassic-Cretaceous boundary. The stratigraphic investigation of the micro- and nannofauna revealed that the Nutzhof section comprises sedimentary sequence of Early Tithonian to Middle Berriasian in age. The ammonites from the lower part strengthen these results. The upper part shows only aptychi but is barren of ammonites. The fact that the Jurassic-Cretaceous boundary is detected in this outcrop and the detailed biostratigraphy makes a magnetostratigraphic study reasonable.

The principal aim of a detailed magnetostratigraphic and micropalaeontological investigation of the Jurassic/Cretaceous (J/K) boundary limestones in the basal portion (18m) of the Nutzhof section is to determine precisely the boundaries of magnetozones and narrow reverse subzones, and to find a correlation between magnetostratigraphic data (reflecting global events).

A summary of results of magnetostratigraphic and micropalaeontological investigations of the Jurassic/Cretaceous (J/K) boundary strata in the Tethyan realm hitherto obtained at three localities yielding reliable interpretation results. The localities in the Tethyan realm include the J/K sections at Brodno near Žilina (Western Carpathians, W Slovakia), the Bosso Valley (Umbria, central Italy) and at Puerto Escaño (Province of Cordóba, S Spain). These localities provided very detailed to high-resolution magnetostratigraphic data across the J/K boundary.

The reverse subzones were precisely localized in all the sections in analogous relative positions in magnetozones M20n and M19n, respectively. The reverse subzones proposed

to be named ”Kysuca Subzone” in M20n and ”Brodno Subzone” in M19n were precisely localized. All the magnetozones and subzones are well correlable with the M-sequence of marine magnetic anomalies. At the locality of Brodno, the transition from N (R) to R (N) polarity of the Earth´s palaeomagnetic field was inferred indicating the duration of transition within a time interval of ± 5ka.

Oriented hand samples (38) from the Nutzhof section were cuting to 86 laboratory specimens. Remanent magnetization (RM) was investigated to study the magnetic polarity for magnetostratigraphic purposes. Progressive stepwise alternating field (AF) demagnetization up to a maximum field of 150 mT was performed with a 2G Enterprises degausser system or thermal demagnetization employing the MAVACS demagnetizer in 12–13 thermal fields up to the unblocking temperatures of minerals – carriers of palaeomagnetization. After each demagnetization step, the remanent magnetization was measured on a 2G Enterprises cryogenic magnetometer or JR-6A spinner magnetometer in the Paleomagnetic laboratory, Praha (GACR 205-07-1365). The measured data were subjected to the multi-component analysis of remanence. The mean ChRM directions were analyzed using the statistics on sphere.

Low-field magnetic susceptibility (k) ranges from -5.9 to 94.9×10^{-6} SI and the intensity of the natural remanent magnetization (NRM) varies between 0.31 and 6.15×10^{-4} A/m. The samples display a two- to three-component remanence. Our study concentrated on the investigation of the basal 18-m thick portion of the section, on the limestone strata around the J/K boundary, to preliminary determine the boundaries of magnetozones M17R to M22R (six reverse and five normal zones). The average sampling density for the whole section was around two samples per 1 m of true thickness of limestone strata. Although both magnetic polarities are present, the directions are highly scattered. Consequently, the mean direction for samples with normal polarity is D=314.7°, I=32.0°, α_{95}=14.1° and reverse polarity, D=131.8°, I=-58.6°, α_{95} =21.9°. This normal polarity direction is in agreeement with the magnetic field for the J/K, but the reverse polarity presents high inclination. The next step of magnetostratigrafic investigation will be to determine the boundaries of submagnetozones M19 and M20 the average sampling density for the whole section must be around 5 to 8 samples per 1 m and 20 and more samples per 1 m in critical portions of the section.

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