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Possible Correlation of the Burdigalian Strata in Sokolov and Most Basins (ECRIS, Czech Republic)

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Abstract

Several drill cores were studied in order to correlate Sokolov and Most basins.

Both magnetostratigraphy and cyclostratigraphic investigation was conducted on the drill core JP585. The new drill core from of opencast coal mine Jiří in the Sokolov Basin. Both basins are parts of eastern segment of the European Cenozoic Rift System (ECRIS). The sediments in both basins are of Burdigalian age (lower Miocene). Their lithology mainly comprises fossil-free clays/silts above the main coal seam, with three phosphatic horizons with mineral crandallite in the Most Basin and several greigite layers in the Sokolov Basin.

The sedimentation rate was computed by multivariate spectral analysis on data acquired by X-ray fluorescence (Fig. 1). The spectral analysis was performed with our original software solution for identification of typical frequencies and their assignement to Milanković cycles. The sedimentation rates (after compaction) were around 12.6 cm/ky for the upper 25 m of the drill core JP585 and around 27 cm/ky for lower part.

The most important methods were: alternate field demagnetization, anisotropy of magnetic susceptibility (AMS), measured in all sediment samples. Unusually behaving samples with extremely high magnetic susceptibility and inverse AMS structure (siderite) were omitted from further evaluation. Samples with the angle of the main AMS axis exceeding 20 degrees were excluded from further evaluation. The multicomponent analysis was performed after alternate field demagneization.

The drill core JP585 begins with 14 m of magnetically disturbed zone (94–80 m), then continues by ca. 12 m of normal polarity (69–80 m). Above that, after a small gap of magnetically disturbed sediments, there are 60 m of sediments with reverse polarity (62–2 m) with short residue of normal geopolarity zone at the upper half (24–17 m).

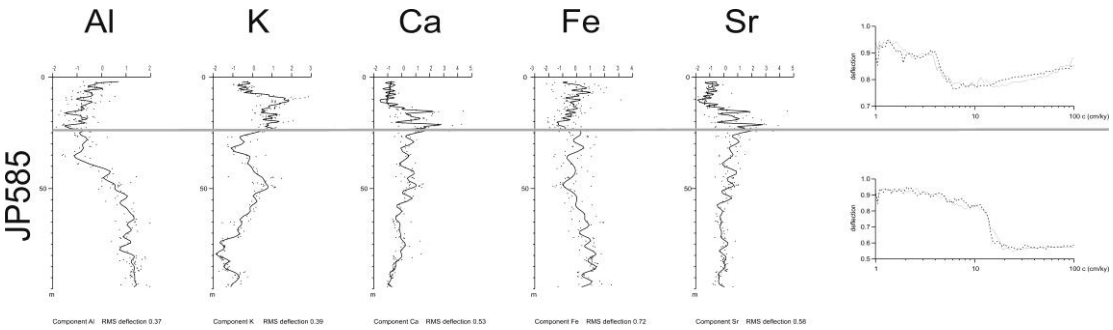

Fig. 1. The figure on the left shows X-ray fluorescence data and fitting curves calculated from the eccentricity signal defined by sedimentation rate found by multivariate spectral analysis (right). The grey line represents the main hiatus and sedimentation rate boundary. The dashed line was calculated as a mean data deflection for different sedimentation rates. The thin black lines represent fit of artificial data defined by sedimentation rate, noise and changes in the sedimentation rate.

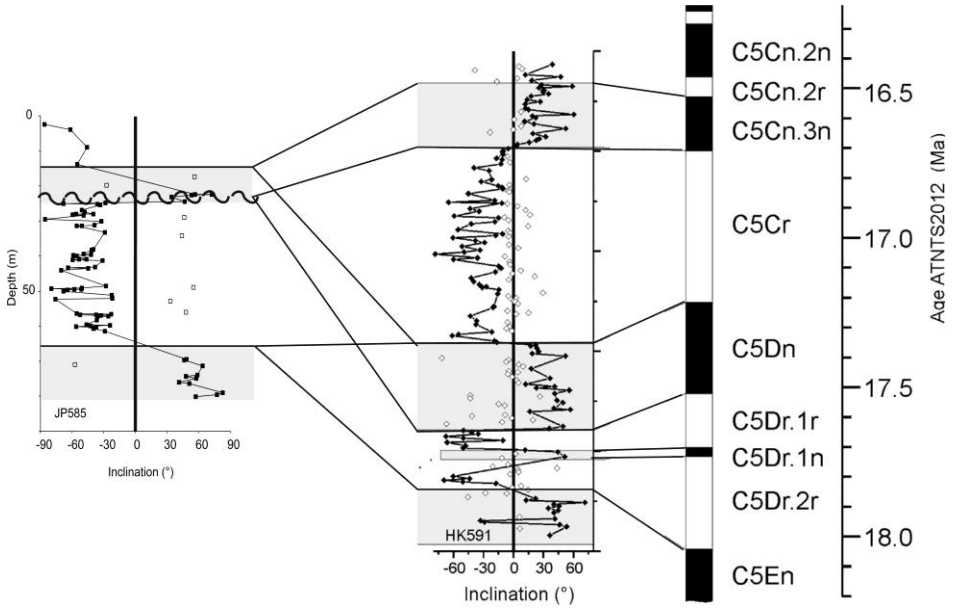

Fig. 2. Paleomagnetic inclination at the upper 80 meters of the JP585 drill core and its correlation to HK591 drill core.

According to comparison with detailed analysis of drill core HK591 (Matys Grygar *et al.* 2014), we suppose, that the most probable succession in JP585 begins in C5En, and ends in the zone C5Cr. The time span in the studied core for JP585 should be approximately 17.1 to 18.2. The second possibility dates the sedimentary infill between C5Dn and C5Cn.2r while the time span is 16.5–17.3 (Fig. 2). The marked hiatus around 25-meter depth represents time gap between 400 and 700 thousand years.

Keywords: magnetostratigraphy, cyclostratigraphy, Holešice and Libkovice Mb., Cypris Mb., Miocene.

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