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Magnetostratigraphy of the Miocene sediments at Háj u Duchcova and Sokolov (West Bohemia)

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Magnetostratigraphic investigation was conducted on the newly excavated drill core HD-50 and previously retreived drill cores DP-333-09 and JP-585-10. The new drill core HD-50 was sampled at the old coal mine 1.Máj near Háj u Duchcova in the Most Basin, while the DP-333-09 and JP-585-10 are from the benches of opencast coal mines Družba and Jiří in the Sokolov Basin. Both basins are parts of one segment of the European Cenozoic Rift System. The sediments in both basins are of Burdigalian age (lower Miocene). Their lithology mainly comprise fossil-free clays/silts above the main coal seam, with two phosphatic horizons with mineral crandalite in the Most Basin and several greigite layers in the Sokolov Basin.
Anisotropy of magnetic susceptibility (AMS), alternate field demagnetization and remanent magnetization were measured in all samples. Unusually behaving samples with extremely high magnetic susceptibility (siderite), prolate anisotropy of AMS and samples with the angle of the main AMS axis exceeding 20 degrees was excluded from further evaluation.
The sedimentation rate was computed by multivariate spectral analysis on data acquired by X-ray fluorescence. The spectral analysis was performed with our original software solution for identification of typical frequencies and their assignement to Milanković cycles.[1] The sedimentation rate (after compaction) was around 15 cm/ky for the drill core DP-333-09 and around 30 cm/ky for the core JP-585-10.
The sediment succession above the coal seam at drill core DP-333-09 starts with 20 meters, in which the magnetic polarity could not be reconstructed (70 – 50 m), then there is a top part of reverse zone (50 – 49 m) and short normal subzone above it (49 – 48 m). Above that there is the second reverse zone (45 – 4 m). Two additional magnetozones above that could be found only in the drill core HD-50 from the Most Basin. The drill core JP-585-10 begins with 14 meters of disturbed zone (94 – 80 m), then 12 meters of normal polarity (69 – 80 m) was found. Above that, after a small gap of magnetically disturbed sediments, there are 60 meters of sediments with reverse polarity (62 – 2 m) with short normal excursion at the upper half (24 – 17 m).
According to the detailed analysis of drill core HK591 (Matys Grygar et al. 2014), we suppose, that the succession begins in C5En (only JP-585-10), then C5Dr. Validity of subzone C5Dr.1n in the drills JP-585-10 and DP-333-09 is still under discussion. The zone C5Cr could be found only in the HD-50 core. In comparison of the interpreted polarities with ATNTS2012 the time span in the studied cores is approximately 17.5 to 17.9 Ma for DP-333-09, 17.8 to 18.1 for JP-585-[2]10 and 17.1 to 17.7 Ma for HD-50. Additional investigation should be done.

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Matys Grygar, T., Mach, K., Pruner, P., Schnabl, P., Laurin, J., Martinez, M., 2014. A lacustrine record of the early stage of the Miocene Climatic Optimum in Central Europe from the Most Basin, Ohře (Eger) Graben, Czech Republic, Geol. Mag. 151 (6), 1013-1033.