



0.0.1 High-resolution sequence stratigraphic analysis of a well in the central Paratethyan Vienna Basin covering the Middle to Late Miocene

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In order to obtain a detailed and continuous stratigraphic record of the northern Vienna Basin infill during the Middle and Late Miocene a set of high-resolution well logs were recorded in a deep industry well of the Austrian petroleum company OMV. The 2 km deep well traverses the Badenian, Sarmatian and Pannonian stages. The logs acquired include electrical borehole images for detailed stratigraphic information and a TU Delft-owned research tool that combines the measurements of the magnetic susceptibility and the total induced magnetic field for magnetostratigraphic age dating. By combining these two measurements with a simultaneous measurement of the total Earth magnetic field at the surface it is possible to estimate in-situ the remanent magnetization of the penetrated rocks, although not in a vectorial but a scalar form. By correlating the susceptibility with the calculated remanent magnetism a sequence of polarity reversals is obtained that, when tied to the Geological Polarity Time Scale (GPTS), results in magnetostratigraphic age dating.

Additional chronostratigraphic constraints will be obtained from biostratigraphic analyses of borehole cuttings and will be used to validate the magnetostratigraphic age dating. The electrical borehole images provide detailed information on the layering and will be analyzed for sedimentary sequences and cyclicities using a variety of algorithms such as the Fourier and the wavelet transforms. Combining this with the chronostratigraphic age dating methods will provide insights into the exact timing and

control mechanism of the basin infill, whereby the regional tectonic development will be taken into account. In particular, the goal is to determine the relative effects of eustatic and tectonic control of the basin infill.

The downhole measurements as well as the surface measurements proved to be of good quality with excellent repeatability. The processed palaeomagnetic logs show clear polarity reversals over long intervals in the upper part of the well covering the Pannonian and Sarmatian stages. A tentative correlation with the GPTS is made for these stages from which sedimentation rates are calculated. This will be further validated with biostratigraphy. For the lower part of the well in the Badenian stage however the magnetic susceptibility appears to be very weak probably due to the absence of ferromagnetic particles in the rocks. Therefore, the determination of the remanent signal and magnetostratigraphic age dating becomes difficult for this interval.