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Variations of rock magnetic parameters in a Brunhes Chron loess/paleosol-sequence in Austria

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Results of numerous studies of loess/paleosol-sequences in Europe and Asia have shown, that the magnetic properties of paleosol are generally credited to superparamagnetic magnetite while loessic sediments are dominated by singledomain and multidomain grains. The studied loess/paleosol-sequence Aschet in Upper Austria includes five paleosols with different intensity of pedogenesis. A comprehensive paleomagnetic investigation aimed at providing detailed information concerning the chronostratigraphic setting of the sedimentary succession by means of geomagnetic excursion stratigraphy and at a quantified reconstruction of the climate changes in the Northern Alpine foreland during the middle Pleistocene using rock magnetic parameters. Two profiles of 12 meters thickness were excavated, and 580 oriented samples were taken for laboratory investigations by using 8 ccm standard paleomagnetic sampling cubes. Observations of the susceptibility-temperature variation yielded Curie-points at 580˚C indicative of magnetite, and a small contribution from a higher temperature component. Isothermal remanence acquisition experiments in pulse fields between 10 and 2500 mT showed the presence of a high-coercivity phase in merely all loess samples, whereas the saturation curves of samples from paleosols were dominated by a magnetite-like phase. The contribution from high coercivity components to the NRM was generally low. Most samples could be fully demagnetized by means of alternating-field demagnetization in up to 15 steps between 2 and 140 mT. Samples that exposed significant intensity of remanence after alternating-field treatment, were subsequently consolidated using non-magnetic stone-strengthener, and demagnetized

thermally in the temperature range between 200˚C and 590˚C. The demagnetizations and additional mineral magnetic experiments proofed that the magnetic remanence mainly resided in two different magnetite-like phases; however both phases carried very similar vector components. The climate related rock magnetic parameters as well as multi-proxy parameters yielded strong variation with depth in accordance with the lithology. Several marker horizons with strongly enhanced magnetic susceptibility, remanence intensity and other magnetic parameters could be distinguished. Financial support for this study was provided by the Austrian Academy of Sciences.