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Endmember analysis of isothermal and high-temperature magnetization data from ODP 910C, Yermak Plateau, NW Svalbard

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Room temperature magnetic initial curves, upper hysteresis curves, acquisition curves of induced remanent magnetization (IRM), and backfield (BF) curves have been measured between -1.5 T and 1.5 T for more than 430 samples from Ocean Drilling Program (ODP) Hole 910C. The core was drilled in 556.4 m water depth on the southern Yermak Plateau (80°15.896'N, 6°35.430'E), NW Svalbard. In total, 507.4 m of sediments were cored, and average recovery was 57%, with 80% between 170 and 504.7 meter below seafloor (mbsf). For this study, the borehole was re-sampled between 150 mbsf and 504.7 mbsf for environmental magnetic, inorganic geochemical, and sedimentological analyses (443 samples). The lithology is mainly silty-clay with some enrichments of fine sands in the lower section (below 400 mbsf). For all samples, a Curie express balance was used to obtain the temperature dependence of induced magnetization in air at a heating rate of 100 °C/min up to a maximum temperature of 800 °C. The hysteresis curves were used to infer classical hysteresis parameters like saturation remanence (M_{rs}), saturation magnetization (M_s), remanence coercivity (H_{cr}) or coercivity (H_c). In addition several other parameters, like hysteresis energy, high-field slope or saturation field have been determined and help to characterize the down-core variation of the magnetic fractions. Acquisition curves of isothermal remanent magnetization are decomposed into endmembers using non-negative matrix factorization. The obtained mixing coefficients decompose hysteresis loops, back-field, thermomagnetic curves, geochemistry, and sedimentological parameters into their related endmember components. Down-core variation of the endmembers enables reconstruction of sediment transport processes and in-situ formation of magnetic mineral phases.