



Determining the magnetic properties of marine sediments by low-temperature measurements with the Magnetic Property Measurement System XL-7

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Low-temperature magnetic measurements play an increasing role in rock magnetism. In many cases, magnetic minerals present typical behaviour at low temperatures, where they undergo phase transitions or indicative magnetization or coercivity changes diagnostic of magnetic particles in terms of mineralogy as well as magnetic domain state. The MPMS XL-7 performs different kinds of temperature (2 – 800 K), field (0 – 7 T) and frequency (0.1 – 1000 Hz) dependent measurements. One of these instruments, exclusively dedicated to geoscientific applications, is located at the University of Bremen, Germany. A large collection of samples from the marine realm was investigated. Here, we present some representative results of sediment samples originating from the South Atlantic, the subtropical Atlantic and the Norwegian Sea covering different time intervals. In Late Quaternary sediments from the Atlantic, iron oxides and iron sulfides are the prevailing magnetominerals, whereas in mid-Eocene sediments from the Norwegian Sea iron and/or manganese carbonates dominate the low-temperature properties. Thermal demagnetization of magnetic remanence after cooling in zero-field as well as in high fields was determined completed by the measurement of frequency-dependent susceptibility and magnetic hysteresis loops. Additionally so-called room-temperature remanence cycling was conducted. Measurements of bulk sediments and extracted magnetic particles gave supplementing results emphasizing different magnetic features. The samples were investigated with respect to early diagenetic alteration to provide evidences on formation, alteration and dissolution of magnetominerals reflecting specific redox conditions within the sediment column.