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Geomagnetism)

A06/A07 Applied Rock Magnetism (Div. I) / Theoretical and Experimental Rock Magnetism (Div. I)



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Abstract content:

Unmixing of magnetic mineral components of sediment rocks by continuous wavelet transform of coercive force spectra

A coercive force spectra provide an important tool to characterize magnetic mineral components. Magnetostatic interactions modifies the coercive force (CS) d.f. into function that has intermediate between normal and log-normal Gaussian distributions. It is shown that adoption of a power scale of the external magnetic field provides an optimal way to identify parameters of CS. The identification itself was made in continuous wavelet transform domain with basis constructed on the Gaussian function (MHAT). Lake sediments from lake Hubsugul provide case studies on which the proposed unmixing method is tested. In so doing, a several magnetic components have been obtained. Two of these components were identified as populations of SD magnetic grains. We suggest that the grains have biological origin being remains of magnetotactic bacteria (MB). TEM analysis, thermomagnetic and lithological data and data about water salinity have been used for proving the biological origin of these grains. Also mineralogical differences between two types of MB remains has been obtained, namely, magnetite and greigite grains were detected. These magnetic data are supposed to be used for further paleoenvironmental reconstruction from lake sediments.

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