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SKIP

DETECTION OF CHEMICAL CHANGE IN LACUSTRINE SEDIMENTS BY NON INVASIVE MAGNETIC METHOD

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Lake sediments contain a magnetic record that is composed of induced and remanent magnetic carriers. Most of the recent environmental research uses induced magnetic properties (e.g. susceptibility) to indicate the paleo-environmental record of the sediment. Climatic changes can induce chemical precipitation of the existing sediment that involves re-crystallization of iron oxides. We suggest that this chemical change can be detected by analysis of the efficiency of magnetic remanence - REM (Remanent Efficiency of Magnetization = Natural Remanent Magnetization normalized by Saturation Remanent Magnetization). This ratio is very specific to the mode of formation of new magnetic phase within the sediment. When the sedimentary magnetic grains acquire chemical remanent magnetization (CRM) by increasing its volume (it passes through the “blocking volume” for which magnetic minerals block magnetic remanence induced by geomagnetic field) the efficiency of this process is 1-2%. However, when grains acquire detrital remanent magnetization the efficiency is close to 0.1-0.2%. This feature allows quick determination of chemical change in the sediment and reliability of the paleo-climate indicators. This process will be illustrated using lake Baikal (Russia) and Escondido (Argentina) sediments. In sediment from lake Baikal this approach reveals a buried detrital record at a depth of 500-700m. Change from chemical to detrital magnetism of sediment from lake Escondido correlates with the climate change from glacial to interglacial period at 10,000 years ago, respectively.

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Return to search results