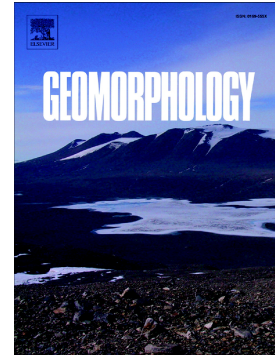


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Magnetic fingerprint of the sediment load in a meander bend section of the Seine River (France)

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Abstract

This study aims to evaluate the potential of magnetic methods to determine the composition of the sediment load in a cross section of an unmanaged meander in the upstream stretch of the Seine River (Marnay-sur-Seine). Suspended particulate matter (SPM) was collected based on a regular sampling scheme along a cross section of the river, at two different depth levels: during a low-water stage (May 2014) and a high-water stage (February 2015). River bed sediments (RBS) were collected during the low-water stage and supplementary samples were taken from the outer and inner banks. Magnetic properties of the dry bulk SPM and sieved RBS and bank sediments were analysed. After characterizing the main magnetic carrier as magnetite, hysteresis parameters were measured, giving access to the grain size and the concentration of these magnetite particles. The results combined with sedimentary grain size data were compared to the three-dimensional velocity profile of the river flow. In the RBS where the magnetic grain size is rather uniform, the concentration of magnetite is inversely proportional to the mean grain size of the total sediment indicating that magnetite is strongly associated with the fine sedimentary fraction. The same pattern is observed in the samples from the outer and inner banks. During the low-water stage, the uniformly fine SPM

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