Sedimentology and magnetic susceptibility of recent littoral sediments from New Caledonia, France and Belgium

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Abstract

The interpretation of the magnetic susceptibility (MS) signal from ancient rocks suffers notably from the scarcity of recent studies. To bring new data, a study of littoral sediments of New Caledonia (Jadot & Boulvain, 2015), Brittany, Belgium and north of France was undertaken. New Caledonia is surrounded by a nearly uninterrupted reef barrier, isolating a wide lagoon from the open ocean. The erosion of extremely varied rocks (from mantle rocks to laterites) produces different types of detrital sediments, which are mixed with the indigenous precipitated carbonates. This generates different types of coastal sediments, detrital-, chlorozoan carbonate-dominated or mixed. The coast running from Belgium to Picardy is characterized by a detrital dominated sedimentation with mature quartz sands and the Brittany sites are mixed detrital-foramol carbonate sediments.

More than 400 samples from 28 beaches were analyzed for grain size, nature of sediment, MS and geochemistry (major elements). The first results show that: (1) tropical carbonate sands and silts are characterized by lower MS than detrital sediments; (2) MS signal of mixed sediments is mostly influenced by the proportion of detrital sediments; (3) MS is directly correlated with Mn and Fe content; (4) beachrocks are characterized by lower MS than equivalent loose sediment; (5) MS signal of carbonate sediments is locally positively correlated with granulometry; (6) there is no MS change between surface and 20 cm deep samples; (7) when the subsurface sediment is reducing, MS is higher than that from surface sediment.

Reference:

JADOT, H. & BOULVAIN, F., 2015. Sedimentology and magnetic susceptibility of recent sediments from New Caledonia. In: A. C. Da Silva, M. T. Whalen, J. Hladil, L. Chadimova, D. Chen, S. Spassov, F. Boulvain and X. Devleeschouwer (Eds): Magnetic Susceptibility Application: A Window onto Ancient Environments and Climatic Variations. Geological Society of London Special Publication, 414.