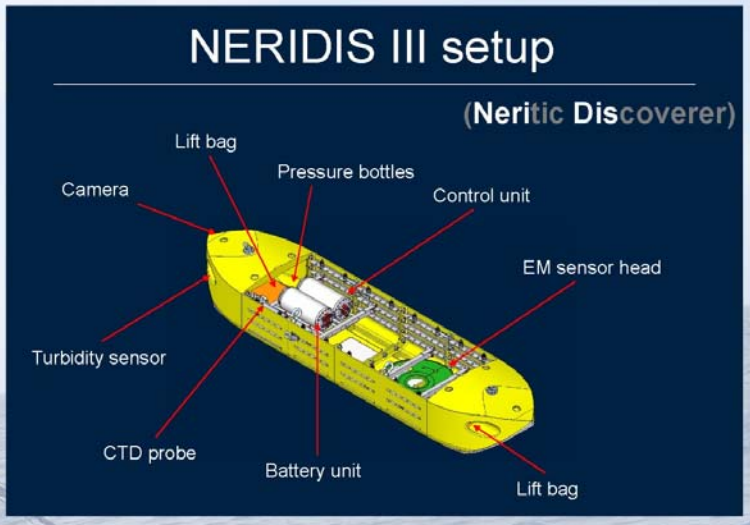
Electromagnetic Imaging of the marine sub-surface



(H. Müller, 2011)

On land, electromagnetic (EM) geophysical methods are standard tools to investigate the earth interior from the upper mantle to the very near surface.

In comparison to the extensive use on land, near sub-surface applications of electromagnetic methods in coastal and shelf regions are relatively novel. Recognizing the power of this method, to provide information about many different fields in marine geoscience ranging from geotechnics to sediment dynamics, we developed the electromagnetic benthic profiler NERIDIS III at the MARUM - Center for Marine Environmental Sciences. From the EM data we can simultaneously reconstruct magnetic susceptibility and electric conductivity of the sub-sea-bottom. Magnetic susceptibility offers clues to the mineral composition of the sediments, whereas electric conductivity is mainly controlled by the pore fluid. The spatial variation of these both parameters can be connected to other bulk material properties such as clay content, pore water salinity, porosity or grain size as well as metallic accumulations and contaminants. Therefore this new instrument enables us to estimate sedimentological parameters from a large area in a short time.

In my PhD project I investigate the surficial sediments on the NW Iberian Shelf by EM profiling to assess sediment patterns, bed forms and sediment dynamics on a clastic shelf system.

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