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An Environmental Magnetic Survey of the Schlei Inlet, Baltic Sea

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Marine inlets, such as the 42 km long Schlei on the Baltic coast of Northern Germany, are interesting interphases between freshwater and marine environments. Their sediments have signatures of tidal and bottom currents, fluvial discharge, coastal erosion, biological production, human land use and contamination.

In order to map and explain the resulting complex distribution patterns of minerals, elements and grain sizes, a combined survey including environmental magnetic, geochemical and sedimentological methods was performed. For reconnaissance, we took shallow *in situ* measurements of magnetic susceptibility at over 1000 locations. This grid covered the uppermost part on the Schlei inlet adjacent to the 1200 year old town of Schleswig and the historic Viking site of Haithabu. These data revealed systematic spatial variations of magnetic mineral content delineating particle fluxes, down-slope gradients, erosional features and depocenters. The lowest susceptibilities were found for organic mud with high porosities and magnetite-reducing anoxic milieus, whilst highest susceptibilities could be related to sandy sections.

For a detailed sediment characterization, some 80 sites were selected on the basis of the reconnaissance map and sampled by box coring. According to the measurements performed so far (water content, loss on ignition, XRF element analysis, laser particle sizing, magnetic hysteresis and remanence), the recovered material shows a diverse range of properties, which are spatially systematic and mutually intercorrelated. We will present a multivariate analysis and synoptic interpretation of these findings, demonstrating a combination of natural processes and human impact.