



High-resolution metal gradients measured by in situ DGT/DET deployment in Black Sea sediments using an autonomous benthic lander

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ABSTRACT: DET (Diffusive equilibration in thin films) and DGT (diffusive gradients in thin films) have been deployed in situ using an autonomous benthic lander to measure concentrations and induced fluxes of Fe and Mn (DET/DGT) and trace metals (DGT) in pore waters at millimeter spatial resolutions. The newly developed deployment system is described, and based on these first results, its strengths and weaknesses are discussed. Deployments were made in the Western Black Sea in shelf sediments overlain by well-oxygenated water at a water depth of 77 m. Maxima of the redox-sensitive metals at 4 and 8 cm deep within the sediment indicated that two zones of reduction dominated the geochemistry. Sharp, but systematic, features were superimposed on this general picture and were well replicated in the profiles of Mn, Co, and Cd, but the sharp features in the Fe profile were offset from those of the other elements by several millimeters. Detection of this functional discrimination between Fe and Mn as regulators of trace metals would not have been possible using more conventional sampling procedures.

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