

A new device to mount portable energy dispersive X-ray fluorescence spectrometers (p-ED-XRF) for semi-continuous analyses of split (sediment) cores and solid samples

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Portable energy-dispersive X-ray fluorescence spectrometers (p-ED-XRF) have become increasingly popular in sedimentary laboratories to quantify the chemical composition of a range of materials such as sediments, solid samples, and artefacts. Here, we introduce a low-cost, clearly arranged unit that functions as a sample chamber (German industrial property right no. 20 2014 106 048.0) for p-ED-XRF devices to facilitate economic, non-destructive, fast, and semi-continuous analysis of (sediment) cores and/or other solid samples. The spatial resolution of the measurements is limited to the specifications of the applied p-ED-XRF device – in our case a Thermo Scientific NITON XL3t p-ED-XRF spectrometer with a maximum spatial resolution of 1 cm and equipped with a charge-coupled device (CCD)-camera to document the measurement spot. We demonstrate the strength of combining p-ED-XRF analyses with this new sample chamber to identify Holocene facies changes (e.g. marine vs terrestrial sedimentary facies) using a sediment core from an estuarine environment in context of a geoarchaeological investigation at the Atlantic coast of southern Spain.