Geosci. Instrum. Method. Data Syst. Discuss.,
doi:10.5194/gi-2016-33-RC2, 2016

Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "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" *by* Philipp Hoelzmann et al.

Anonymous Referee #2

Received and published: 23 December 2016

Hoelzmann and co-authors present a new device to mount a handheld XRF scanner for core logging purposes. This development has potential for low cost analyses down to cm-resolution and therefor useful for publication. However, some aspects of the current paper need some additional attention before.

The introduction opens with a statement of XRF scanning ending with "... lower temporal resolution with much higher sediment accumulation rates in the range of centimeters per year that allow the application of basic XRF-instruments with much lower spatial resolution." However, the wide application of XRF scanners on marine sediment

cores proves that this is incorrect. The power of (XRF) core scanning methods is that these applications provide continuous geochemical records, whereas the resolution rather depends on the type of sediments (e.g. fine laminated or homogeneous) not of the sedimentation rate. The introduction and first part of the methods (part 2.1) need some additional attention to discard doubling and improve. Also, in line 3-6 the site is described as being part of geo-archeological research at the Mediterranean coast, but it is situated at the Atlantic coast.

The figures or the methods are partly redundant or repetitive, whereas some technical aspects are not mentioned. For example there is no indication of the distance between if a foil is used to cover the core during analyses. Some specific part of the equipment presented here are "protected" by a German Industrial Property right no., which is cited four times in the text and once as Anonymous, 2014. I suggest indicating this part once (including the patent number) in one of the figures is sufficient.

The first paragraph of the discussion suggests that sediment in-homogeneity is probably causing bias on the geochemical records presented in figure 5 (in this case both precision and accuracy). Ratios of elements are suggested to reduce the bias effectively as shown in figure 5b. However, this relation is not new and has already been suggested by (e.g.) Jansen et al. (1998), Richter et al. (2006) and Rothwell et al. (2006). Moreover, Weltje & Tjallingii (2008) described as bias originating by sample geometry effects and accommodated this as part of their log-ratio calibration model. Previous work on the bias generated by sediment in-homogeneity should be acknowledged.

The authors state that S can be used as a marine indicator, which I doubt is a reliable indicator due to the partly high amount of organic matter. Marine influences in coastal sediments have been described by the elements Br and Cl as these elements are contained in seawater (e.g. Mayer et al., 2007, Boer et al., 2015)

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., doi:10.5194/gi-2016-

33, 2016.