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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.

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Author's response to referee#2:

We thank the anonymous referee #2 for his valuable comments that help to further improve our manuscript. We incorporated the proposed changes of referee#2 and report these herewith. In the introduction we now made clear the relation between the often lower temporal resolution of terrestrial records that may justify the application of basic XRF instruments which have a much lower spatial resolution (page 1; lines 27-29).

In section 2.1 (Study Site, Material, and Methods) discarded doubling and corrected for the archaeological site which is indeed situated at the Atlantic coast (page 1; line 19).

The number of figures were not reduced as proposed by referee#2 because the editor advised to add the included figures to the first submitted version of our manuscript.

Within the methods part we added information concerning the distance between the p-ED-XRF-device and the object (split sediment core) and pointed out that the measurements can be performed with or without a foil as protection (page 3; lines 15-19).

The citation of the German Industrial Property Right No. is limited now to the Abstract and caption of Fig. 1 (page 1; line 13 / page 4; line 10).

References were added to show that ratios of elements were used to effectively reduce the bias that might be due to sediment in-homogeneity: Jansen et al., 1998; Richter et al., 2006; Rothwell et al., 2006; Weltje and Tjallingii, 2008 (page 7; line 9).

We added a second reference that shows that sulfur can be used as a marine indicator (Chagué, 2010; page 7 line 20). We thank referee#2 for the suggestion to consider Br and Cl as marine indicators in coastal sediments. Unfortunately, we could not identify the references suggested by referee#2 (Mayer et al, 2007; Boer et al, 2015) without further information (additional co-authors and/or journal information). Br was not measured with the p-ED-XRF spectrometer and therefore also not mentioned in the Method's section (2.1).

We now included Cl in Figs. 4 and 5 (page 6 and page 8) as it is often used as an indicator of marine conditions (Chagé-Goff et al., 2012) and changed the captions accordingly. However, the interpretation of Cl in our semi-terrestrial to coastal sediments is difficult, probably due to the influence of groundwater circulation and the high solubility of Cl. This is shown in relatively large changes in the Cl content throughout all units without showing any clear trend (page 7; lines 20-24 and lines 36-37). It is with referee#2 to decide if the new version of Figs. 4 and 5 (with Cl) or the former version

of Figs. 4 and 5 (without Cl) should be used.

All newly added references were also added to the list of references.

All corrections in the new version of our manuscript are marked in the attached supplementary file which was produced with the “track change mode”.

Please also note the supplement to this comment:
http://www.geosci-instrum-method-data-syst-discuss.net/gi-2016-33/gi-2016-33-AC2-supplement.pdf

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