

Interactive comment on “Extreme flood events reconstruction during the last century in the El Bibane lagoon (Southeast of Tunisia): A Multi-proxy Approach” by A. Affouri et al.

Anonymous Referee #3

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The present paper by Affouri et al. deals with the identification of extreme events in the El Bibaine lagoon (SE Tunisia) based mainly on the sediment geochemical composition. The paper itself illustrates an interesting method for identifying the catastrophic events in the sediment records in lagoon settings. The study of lagoon recent sediments and its comparison with sediment series from core shows a high potential of application in the study of past flood activity. However, the result presentation and discussion need, in my opinion, to be improved before publication.

Main comments: 1) The manuscript is mainly “descriptive”, focused on the work carried out at this site, but a discussion about a possible application for identification of major floods events in the past is nearly absent. It is limited to a sentence in the Con-

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clusions, this aspect deserves to be developed in the Introduction and Discussion. In particular, it would be useful to stress on the importance of lagoon sediment series for reconstructing the flood activity in arid and semi-arid environment, since no other significant (and continuous) sediment series can be easily retrieved in fluvial valleys. The reconstitution of fluvial hydrology is essential for climate modelling.

2) The organization of the text should be revised (see minor remarks below)

3) The use of trace elements is unclear for the Fe content (5.1.2). It is reported that Fe is “totally absent in marine sediments”, but looking at Table 2 , the sediments with no Fe are defined “beach”. It is not the same; this should be clarified in the text. In addition, the authors should explain the total absence of Fe. Intuitively, it might be related to the beach sand composition (quartz and carbonate debris?), but it needs further explanation in the text.

4) The age model is problematic (5.3). Any possibility that the peak that is interpreted corresponding to the maximum of nuclear essays (1963) matches in reality the Chernobyl nuclear accident? The gap between 20 and 40 cm does not help interpreting correctly. Would it be possible to generate some more measurements?

5) I strongly recommend integrating in the core description the sedimentary structures, if visible, the nature of contacts between different layers (abrupt, gradual, etc.), and the degree of bioturbation. This would allow extending the discussion, taking in count the sedimentary processes at the origin of the coarse-grained layer. The core photo in figure 9 is useless, too small and low resolution. This figure would be much clearer if it includes: a) the granulometric profile and b) any sedimentary structure observed.

Minor remarks 1) Figures 1,2 and 4: too many. I would suggest to reduce, combining the three in one or two (maximum) figures

2) Section 4.1: in which year the core has been retrieved?

3) Section 4.2.1: change “geochemically” in “geochemical”

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- 4) Section 4.2.1: there is an inconsistency between the XRF scanner resolution given in the methods (1 cm) and the data represented in figure 13 (rather 5 cm?)
- 5) Section 4.2.1: define the granulometric classes (in μm) that are represented in figure 6 and 13
- 6) Section 4.2.2: what type of software has been used for the Statistical Analysis?
- 7) Page 8, lines 9-13: it is surprising that eolian sand grains are angular, is that right? Usually, eolian sands are rather rounded;
- 8) The pictures in figure 5 are hard to see, the label for S18 is missing on the picture and a micrometric scale is missing for all of them. I would suggest removing the panoramic pictures, leaving and enlarging the pictures showing the microfabric. Important: add a microscale!
- 9) Figure 5: the S3 seems to be heterogeneous, plurimodal sand. It does not match the particle size distribution shown in figure 6. You should check if the photo really corresponds to the right sample.
- 10) The section 6.1 should not go in the Discussion, but in the Results
- 11) Section 6.3: add references to figures
- 12) Figure 13 seems to be incomplete (FL1 is not shaded)

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