

Interactive comment on “Sea extreme events during the last millennium in north-east of Morocco” by O. Raji et al.

Anonymous Referee #2

Received and published: 6 May 2014

This paper aims to reconstruct the extreme climatic events affecting the Nador Lagoon located along the Morocco coast as recorded in a single sediment core 115 cm long. The paper is well structured and organized. Even if some weakly could be addressed in some parts. One of the main exception is that only one sediment core has been analyzed. Could be useful study other cores from different parts of the lagoon for a better evaluation of the different events. The limit to work with only one core has been already highlighted by the Authors in the last part of the paper. It would be suitable to use other proxies for better discrimination the origin of sediment inputs to the lagoon (continental/marine), among which I suggest stable isotopes of carbon and nitrogen ($\delta^{13}C$; $\delta^{15}N$)

Abstract

C556

The abstract is almost exhaustive, but the number and type of events (Tsunami or storm) should be provide.

Introduction

The introduction should be improved. In particular the description of the main events that have affected the study area during the past. Should be also increased bibliographic citations of papers discussing similar approaches to the study of these processes. Why do you chose to make these analyses and not to use another dataset? Are these the most useful proxy to obtain the information on the paleo-extreme events?

Study area

Could be helpful discuss some questions in order to clarify the chosen of the sampling site: are there some information about on the sediment accumulation rate variability in the lagoon? What are the main sources of the material? There are indications about the seabed bathymetry. Could be useful to have sismobathymetric information about the seabed morphology, for example through chirp sonar or multibeam data. Could you check if is possible to find some of these information in literature?

Methods

Please specify what kind of shell have you use to date the sediments.

Results and discussion Lithostratigraphy

A briefly discussion about the different types of the contacts between the levels could help the reader to understand the formation processes of the deposits, for example the boundary between levels 2 and 3 is very sharp on the contrary among levels 1 and 2 the transition seems to be much more gradual.

Geochemistry

In fig 3 the metals concentration in cps depth profiles are reported, I think that could be more constructive, use (and discuss) normalized profiles (i.e., vs. Aluminum), in order

C557

to discriminate the different source particles areas.

Age-depth models and sedimentation rate

^{210}Pb profile showed in fig 4 reach the natural values (0 for excess Pb) exactly at cm 30, the depth of the last sample. Some others deeper samples should be done. The short lives isotopes profiles are usually affected by mixing processes of the sediment (i.e. physical or biological mixing), but no information from x-Ray description are reported. The presence of bioturbation could influence ^{210}Pb or ^{137}Cs decay profiles, providing an over-estimate value the accumulation rate. This error should create an inaccuracy in the radiocarbon Reservoir correction.

Sediments source

About the distribution of the materials in surficial sediments the authors reports that the concentration of the different metals are "in agreement with previous studies in the area" Please report these references. Authors suggests the use of Inter-elements ratio to trace marine sediments. Should be interesting a briefly discussion of the data (please add the citation of fig.8).

Storm or tsunami events?

As previous suggested the stable isotopes profiles (or other proxies) could help Authors to discriminate events from storm or tsunami. Figures 8 figures are too much may be fig 2 and 3 merged?

References

Several papers cited in the text have not been reported in the references list: - Appelby,2000 -Croudace et al, 2006 -Goded et al, 2008 -Raible et al 2006 -Reicherter and Heidmann, 2009 -Richter et al, 2006 -Soloviev, 2000

on the contrary, the following reference is given in the bibliography but is not mentioned in the text: - Liu, K. B., Shen, C., and Louie, K. S.: A 1,000-year history of typhoon

C558

landfalls in Guangdong, Southern China, reconstructed from Chinese historical documentary records, *Ann. Assoc. Am. Geogr.*, 91, 453–464, 2001.

General comments

In summary, I suggest the paper can be accepted for publication with adequate (moderate) revisions. Even if the dataset could be consider an important improvement for the scientific community, a general revision is recommended for both scientific and formal organization.

Interactive comment on *Nat. Hazards Earth Syst. Sci. Discuss.*, 2, 2079, 2014.

C559