

Interactive comment on “Tracking atmospheric and riverine terrigenous supplies variability during the last glacial and the Holocene in central Mediterranean” by V. Bout-Roumzeilles et al.

Anonymous Referee #1

Received and published: 17 September 2012

This paper presents a very nice data set of the mineralogical, geochemical and grain size evolution of sediments in a core from the Central Mediterranean. However some points are to be corrected or discussed (see below). The discussion on the origin of terrigenous particles (eolian vs riverine) and its climatic implications should be presented more clearly and discussed.

MATERIALS AND METHODS - A brief presentation of the morphological setting of the core site would be interesting in order to have a look on the sedimentation conditions in the zone. - Also a brief description of the core itself would be useful along with references for more details. Is there no evidence of volcanic deposits? - At the opposite

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the description of the Mediterranean waters circulation seems too much detailed, in the text. - The clay minerals analysis protocol is also presented with too much details. Nothing is said on the determination of quartz abundance. - The elements analyzed with XRF-scanning should be presented in the methodology section (3-5) with an indication of their use in the elemental geochemistry section (4-3): especially the for Zr, Pd; the geochemical significance of K/Al, Zr/Al, Ti/Al should also be given - The grain size : do precise the “main mode” in the text; the presentation of the different size classes evolution in the core in fig 3 is not easy to read as the different classes are not displayed in a logical, progressive pattern. - The terrigenous mass accumulation rate may be slightly underestimated as CaCO₃ is present in the terrigenous eolian fraction (and probably also in the riverine one); the biogenic CaCO₃ content in the core sediments is to be checked and compared to the Ca carbonate content of different dusts to verify if the bias is negligible. - At the opposite the Ca /Fe content is taken as a tracer of sources for eolian material, but if Ca is mainly biogenic, this ratio cannot be used for that purpose in the sediment. If this ratio is meaningful for aerosols or riverine suspended matter, this is probably not the case for these marine sediments and it should not be used in the paper.

QUESTION: Is the volcanic material transformed in smectite in the marine environment as suggested 2928, line 18?

REFERENCES Any references are lacking, or seem inappropriate. - Lacking: Lojze-Pilot et al 1986 and Martin et al 1989 on the balance between riverine and eolian particles in the Mediterranean sediments -2923 line 15- Tomadin & Lenaz 1989 on clay mineralogy and origin of sediments -2923 line 17- Klein et al 1999 -2925 line 3-

- Inappropriate? Incarbonara et al 2010: concerns the Atlantic Eastern margin -2934 line 12- Lezine et al 1995, Gasse et al 2000: concerns African tropics -2935 line 4-

ERROR ? For the Late Holocene, the increase of Ti/Al, Zr/Al, quartz, kaolinite, etc. . . is given as synchronous with the rapid Climate Cooling -2940 line 8 and 9-; or this event

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peak around 1.2 kyr BP and the RCC is given at 3.5-2.5.

DISCUSSION ON EOLIAN VS RIVERINE ORIGIN of the terrigenous fraction

The possible contribution of local riverine sources is probably discarded too rapidly: the contribution of the Medjerda river extreme floods cannot be excluded (see for example: 25.106 t. in a few days: Claude et al Cah. ORSTOM 1977), the MAW flow carrying the finest fraction east- and southeastward. Moreover the clay fraction of terrigenous load of the Medjerda river is mainly smectite like the Nile river's one. . .

Clarify and discuss the term of marine supply with the support of the present day circulation of water and particles in the Mediterranean sea. If terrigenous particles from the Nile river may be brought by marine circulation to the Sicilian Strait this also the case for eolian dusts deposited in the Eastern Mediterranean, which are also smectite-rich.

As a consequence the partition between eolian and riverine material is perhaps not as simple as assessed by the authors.

PALEOCLIMATIC IMPLICATIONS OF THE PARTITION BETWEEN RIVERINE AND EOLIAN PARTICLES. If the distinction between riverine and eolian material is not so straightforward, an other difficulty could arise from the fact that eolian dust is -for the present days and also in the past ("Pluvial" phases)- mainly deposited by wet deposition (Loÿe-Pilot et al 1986, 1996, Bergametti et al 1989, Coudé-Gaussen 1987). So the link eolian deposition- climate should be considered carefully.

Finally the reader have the impression that the evolution of the different studied parameters in the core is complex and that the climatic signal is not so simple to retrieve from the data. It seems that the authors partly use the general knowledge of the climatic evolution in the last post- glacial period in the Mediterranean and northern Africa to interpret their data rather than the reverse.

This imply to re-write the paper more clearly.

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J.M. MARTIN, F. ELBAZ-POULICHET, C. GUIEU, M.D. LOÏE-PILOT and G. HAN. 1989. River versus atmospheric input of material to the Mediterranean Sea : an overview. Marine Chemistry , 28, 159-182.

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L. TOMADIN, R. LENA, 1989 .Eolian dust over the Mediterranean and their contribution to the present sedimentation. In: Leinen M. and Sarnthein M. (eds). Paleoclimatology and Paleometeorology: Modern and Past Patterns of Global Atmospheric Transport, , Kluwer A. P., Dordrecht , 267-282.

ANY TECHNICAL REMARKS

Abstract: not very well written Do not begin the abstract with "The objectives were". -2922, line 1- -2922 lines 3 and 4- : "the atmospheric versus riverine contributions to sedimentation": circular discourse (=line 1). -2922 lines 6 and 7- : "and particles provenance has been modified since Last Glacial": this sentence is strange at this place. -2922 line 26: "5.7 kyr" : add "BP"

- 2924 line 3 to 5: not very clear

Interactive comment on Clim. Past Discuss., 8, 2921, 2012.

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