

Interactive comment on “Paleohydrology reconstruction and Holocene climate variability in the South Adriatic Sea” by G. Siani et al.

Anonymous Referee #1

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Overview

In their discussion paper "Paleohydrology reconstruction and Holocene climate variability in the South Adriatic Sea", Siani et al. discuss isotope and foraminifer-based temperature data analyzed for samples from a marine core (MD90-917) retrieved from the southern Adriatic Sea, covering partly the Lateglacial and the Holocene. Due to the intermediate position of the Adriatic Sea between the Eastern and the Western Mediterranean region and between different climatic zones, I regard this paper as an important contribution to the understanding of the Mediterranean climate. It is generally well written and based on a solid dataset. Most of the conclusions are convincing to me. There are several points, though, which I think have to be dealt with.

Scientific Significance: Fair

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While some of the data have already been published (Siani et al. 2010), increased resolution allowed the identification of periodicity. Furthermore, the manuscript has different foci than Siani et al. (2010). However, it should be put clearer what is really new in this manuscript, and what was already found earlier by other authors. Furthermore, some previously published proxy data from the same core as analyzed herein is not discussed, which seems a little ominous.

Scientific Quality: Good

The applied methods are generally valid, the discussion considers most of the relevant literature as far as I am aware, and the conclusions are convincing.

Presentation Quality: Good

I have made some suggestions how the presentation could be improved, but generally the figures are of high quality, the English is good, and the manuscript is well-structured.

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General points

The publication by Siani et al. (2010) on foraminifera from the South Adriatic Sea deals with samples from the uppermost 7 m of core MD90-917. The current manuscript focuses on the uppermost 3 m of the same core. It is thus probably unavoidable that some sections seem redundant, particularly when it comes to area, methods, age model, etc. Still, it should be avoided to use almost the same sentences, e.g. in the material and methods section. Additionally, it should be pointed out clearly which results are new compared to Siani et al. (2010).

One aspect which surprised me is that the results of Combourieu-Nebout et al. (1999) are not mentioned anywhere in the current manuscript, although this publication is based on the same core and contains results from the marine and terrestrial realm which could easily be compared with those presented here. This issue seems even

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a little ominous because most of the authors of the manuscript are also co-authors of Combourieu Nebout et al. (1999). In this context, it is also slightly irritating for me that in the acknowledgements the support to N. Combourieu Nebout is mentioned (see below). I also think that some other works from the Aegean region should perhaps be mentioned (see respective sections).

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General Language

I think the English is generally good, but could still need some improvement. Several sentences are difficult to understand, and there are spelling and grammar mistakes. Some examples from the first pages:

P4360, L 9: ... a high detailed... : highly

P 4360, L 11: Past circulation dynamics has... : have

P 4361, L 7: from the northeast... : Northeast

P 4361, L25: either... either... : I don't think either can be used twice this way.

The use of certain expressions is irritating:

P4360, L1: ... is an area presenting... : An area cannot "present" s.th.

P4360, L8: ... the North Atlantic one... : (Circulation is meant, but it is confusing.)

I am not a native speaker myself, thus some of my problems may be rather due to my limited knowledge of the English language, but on the other hand, even if so, it would be better to use clearer, simple sentences in some cases. It would probably be good to let a native speaker go through the manuscript.

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Abstract

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While each point mentioned may be of some importance, I would suggest to shorten the abstract and leave out some aspects of lesser importance.

The first sentence concerning the S1 interruption is confusing to me (P 4358 L 13). You can either see the S1 interval as one phase or as two phases. Generally, I am not so sure if the interruption is such a strong point of the paper that it deserves that many lines, since the interruption of S1 due to the 8.2-kyr event was already suggested/discussed by Rohling et al. (1997) and Siani et al. (2010) for the Adriatic Sea and by e.g. Kuhnt et al. (2007), Kotthoff et al. (2008) and Marino et al. (2009) for the Aegean Sea.

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1 Introduction

I generally find the introduction convincing and well-written.

I would remove the comma in L 4 (P4359).

The sentence in L 24 to L 26 (P4359) is confusing. While it may be problematic to get reliable chronologies for some terrestrial records, there are examples for records with reliable chronology for the Aegean (e.g. Kuhnt et al., 2007, Kotthoff et al, 2008a,b, 2011, Marino et al., 2009), and the comparison of terrestrial (pollen) and marine proxies (foraminifers, dinocysts) was demonstrated e.g. by Combourieu-Nebout (1998) for the Adriatic and by Kotthoff et al. (2011) for the Aegean Sea.

P4360, L 9: ... a high detailed... : highly (see above)

P4360, L10: ... less than a century... With your temporal resolution of 40/75 years, why not just write "decadal-scale"?

P4360, L18: ... benefits of... : benefits from

P4360, L21: This sentence sounds odd, like it was necessary to compare own results to marine and continental climate records because of forcing by the resolution...

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Additionally, it should be mentioned to what kind of records (from where/proxies).

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2 Studied area and modern circulation pattern...

No comments.

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3 Material and methods

As mentioned earlier, in this sections partly identical sentences are used as in Siani et al. (2010) which should be avoided. I am not an expert on foraminifers and can thus not judge on the foraminifer-based methods. I think the uncertainties of the SST and SSS reconstructions are adequately discussed. However, since you have 35 additional samples, you should show the dissimilarity coefficient, e.g. in Fig. 4 P4364, L22 et seqq.: I think this can be shortened, particularly the first sentences. If the method was not useful, it would probably not have been used...

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4 Chronological framework

No comments

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5 Results

5.1 Sea surface temperature record

P4366, L16: The impact of the 8.2 event on the Aegean region (and the S1) is also discussed in Kuhnt et al. (2007), Kotthoff et al. (2008) and Pross et al. (2009). While the records from the northern Aegean Sea (SL148, SL152) are probably not as directly connected (via currents) to the Adriatic as LC-21 from the southern Aegean, they are worth mentioning here and in the discussions since they are on almost the same lat-

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itude as MD90-917 and on a direct line to terrestrial records mentioned later in the manuscript (section 6.2).

P4366, L22: This sentence is confusing. It implicates that *N. pachyderma* causes the cooling. It is probably meant that high percentages of *N. pachyderma* indicate cooling and that the MAT-based reconstructions reveal low temperatures due to that fact. Maybe it would also be wise to give a citation how *N. pachyderma* “right coiling” is systematically used here, since some foram experts may mention that there are also “right-coiling” *N. incompta* (as far as I know, this is an old debate among foraminiferologists).

5.2

No comments

5.3

No comments

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6 Discussion

6.1

No comments

6.1.1

The discussion in 6.1.1 is generally convincing. Maybe it should be considered to show at least some of the relative foraminifer data. Though Siani et al. (2010) already discuss the assemblages, it may be helpful to have a figure showing at least important marker species., not least since there are additional samples considered in here.

P4370, L7: ... according to... : in accordance with (?)

P4370, L23: I think it is noteworthy that not only the Soreq record indicates a phase

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of increased rainfall, but also numerous pollen records from the region (compare comments to 5.1). Particularly the pollen-record of Combourieu-Neobout (1998) from the same core MD90-917 indicates increased rainfall during S1 (starting at the onset of the Holocene) and the rapid changes in the dinocyst record indicate the salinity drop. It is irritating that this is not mentioned here.

P4371 26 et seqq.: The aspect of sea-level rise made me wonder if such effects could also hamper the modern analog approach. While the dissimilarity coefficient may tell how close the analogues are to the fossil assemblage, in some cases the similarity may be artificial...

6.1.2

No comments

6.2 Holocene land-sea climatic comparisons

The discussion particularly of the “event” around 7.3 to 6.3 is well done. I generally miss some reference, though, of the discussion of the impact of these and other events on the Eastern Mediterranean in Schmiedl et al. (2010), particular since some statements of the authors fit well with the results of Schmiedl et al.. Additionally, it may be noteworthy that the decrease in precipitation around 6.5 kyr BP is also reflected in the northern Aegean region (between the Xinias and Gölhisar records; Kotthoff et al. 2008a, b).

Again, I wonder why the data of Combourieu-Neobout (1998) is not discussed here. It would be easy, I assume, to apply the newer age model to the pollen and dinocyst dataset and see how well the foraminifer/isotope-based results fit with the palynomorph data.

6.3

I find some of the statements here speculative. The comparison shown in Fig. 8 is not very convincing. However, I think it may still be legitimate to discuss the linkage to the

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North Atlantic climate as done here.

7 Conclusions

The conclusions drawn are generally convincing and differ enough from the focus of Siani et al. (2010) to justify another publication based on partly identical data. P4380 L9 et seqq.: This sentence is confusing. Additionally, the 8.2-kyr event and the related S1 interruption occurs less interesting to me (since it has been discussed by several authors for the Aegean and also the Adriatic Sea) than the deterioration around 6.5 kyr. Maybe you should mention this aspect in the conclusions.

Acknowledgements

As written above, mentioning N Combourieu Nebout here is slightly confusing. I assume it is done because M. Magny and N Combourieu Nebout are in charge of the mentioned project LAMA, but maybe this can be put clearer in the acknowledgements.

References

No comments

Figures

I think the figures are generally well done. Again, I suggest to show some “raw” foraminifer data, e.g. percentages of marker species, and to show the dissimilarity coefficient record.

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References used in Review/Comments

Combourieu-Nebout et al. 1998: A high-resolution record of the last deglaciation in the central Mediterranean Sea: palaeovegetation and palaeohydrological evolution. *QSR* 17, 303-317.

Kotthoff et al. 2008a: Late Glacial and Holocene vegetation dynamics in the Aegean region: an integrated view based on pollen data from marine and terrestrial archives. *The Holocene* 18, 1019–1032.

Kotthoff et al. 2008b: Climate dynamics in the borderlands of the Aegean Sea during deposition of Sapropel S1 deduced from a marine pollen record. *QSR* 27, 832–845.

Kuhnt et al. 2007: Deep-sea ecosystem variability of the Aegean Sea during the past 22 kyr as revealed by benthic foraminifera. *Marine Micropal.* 64, 141–162.

Marino et al. 2009: Early and middle Holocene in the Aegean Sea: interplay between high and lowlatitude climate variability. *QSR* 28, 3246–3262.

Pross et al. 2009: Massive perturbation in terrestrial ecosystems of the Eastern Mediterranean region associated with the 8.2 kyr climatic event. *Geology* 37, 887–890.

Rohling et al. 1997: A 200 year interruption of Holocene sapropel formation in the Adriatic Sea. *Journal of Micropal.* 16, 97–108.

Siani et al. 2010: Late glacial to Holocene planktic foraminifera bioevents and climatic record in the South Adriatic Sea. *JQS* 25, 808-821.

Interactive comment on *Clim. Past Discuss.*, 8, 4357, 2012.

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