Clim. Past Discuss., 10, C1050–C1052, 2014
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Climate of the Past Discussions



# *Interactive comment on* "Two distinct decadal and centennial cyclicities forced marine upwelling intensity and precipitation during the late Early Miocene in Central Europe" *by* G. Auer et al.

**Anonymous Referee #2**

Received and published: 15 July 2014

General comment

The aim of this research arouses interest and represents a new approach to study these lower Neogene sediments from Paratethys.

Specific comments

Despite this interesting approach, I think that there are a couple of flaws in the study that are worthwhile to be addressed. A major flaw regards the quality and use of the obtained data on calcareous nannofossil taxa here considered as a meaningful paleoenvironmental proxy. As far as I know, in such a depositional setting ("inner and outer shelf environment") most of an observed nannofossil assemblage is made up of re-



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worked (allochthonous) specimens, that behave as clay-size terrigenous components and can be considered terrigenous input. This is clear from the quantitative (percent) evaluation of allochthonous nannofossil abundance recorded throughout the section (figs. 4 and 5). However these values are only partially representative of the real number of reworked components. The authors are aware of this problem but I think that they underestimate the amount of "noise" of allochthonous forms within the authocthonous assemblage, and this confuses the quality of the database. The taxa used as environmental proxies (e.g. the small Reticulofenestra minuta and haqii, Coccolithus pelagicus, Sphenolithus moriformis, Ciclycargolithus floridanus) are long-range species. For instance, C. pelagicus has been a major component of nannofossil assemblages since the lower Paleocene, C. floridanus occurs in the Oligocene. It is difficult to discriminate the reworked specimens from the in situ ones, as the authors note in p. 1230, but the problem should have been properly weighted. Moreover they indicate "high amounts >45% of Paleogene and Cretaceous taxa" in the "allochthonous taxa" , lumping together the Paleogene ones with Cretaceous ones: it would have been more precise to differentiate the two, in order to evaluate the amount of exclusively Paleogene taxa. This could help for interpreting if some of the abundance variability observed in the taxa (used for paleoenvironmental interpretation) was a real variability in productivity or a variability in the "clay-size" terrigenous input (calcareous nannofossil size is the same of clay size). The problem is amplified by the fact that the inferred environmental meaning for some taxa is still debated, and paleoecological preferences are not so straightforward as claimed from the authors. Another weakness of this study is the rough source of evaluation of sedimentation rate that is important for detection of periodic cycles. The authors avoided the levels of topmost samples in the section due to the presence of coarser sediments that indicates change in sed rate. . .but what about the levels with high abundance of allochthonous taxa (at 70 sample interval and between 80 and 90 sample intervals in fig.4)? These peaks of allochthonous taxa are signs of clay-size terrigenous input, therefore of variability in sed rate.

I do not add technical corrections in the English.



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Interactive comment on Clim. Past Discuss., 10, 1223, 2014.