

Interactive comment on “Sedimentary archives of climate and sea-level changes during the Holocene in the Rhone prodelta (NW Mediterranean Sea)” by Anne-Sophie Fanget et al.

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General comments

This paper provides convincing evidence of multidecadal to century-scale record of sea-level and climate change from the Holocene succession of the Rhône prodelta, in southern France. Based on a multiproxy record from a 7 m-long core, the authors provide nice documentation of transgressive and highstand sedimentation, focusing on a condensed interval that spans a 4 kyr interval of time. This study clearly documents how subtle changes in the meiofauna (benthic foraminifers and ostracods) can be used as a proxy for both sea-level and climate change. In particular, though I'm not a fossil specialist, I enjoyed the way ostracods were used on very high-resolution time scales

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as indicators of hydrological fluctuations.

Fossil analysis is very accurate, and in general, I found the data presented and the inferences drawn to be convincing. In my opinion, this paper can be published following minor revisions. A few points that might deserve further attention are highlighted below

Specific comments

The authors emphasize the multi-proxy character of their study, which includes sedimentology, paleontology, mineralogy and geochemistry. Mineralogical interpretation, however, is rather vague and geochemical analysis is restricted to a single element (Ti) profile, with no discussion/interpretation in text. The sedimentological and paleontological aspects of this paper are very robust and fully support the conclusions. Changes in sediment composition are very important, but reliable interpretations probably require a significantly larger data set (to the scale of the source-to-sink system) than the one available for this study. I think this part could be removed without detriment.

In terms of sequence stratigraphy, what the authors call the “maximum flooding surface” (MFS) should be termed more properly (at the core scale) the “condensed section” (CS). CS is the label that sequence stratigraphy uses to describe exactly what the authors see in their cores: a few dm-thick, condensed stratigraphic interval that marks the inversion from a transgressive to a “regressive” depositional trend. On a seismic scale, the authors can use the term “MFS” for this very thin stratigraphic interval. On the very high-resolution scale of their study, however, I feel that the term “CS” would be more appropriate (see comment below).

I can't see “very distinct changes in all proxy records at the maximum flooding surface”. There is clearly an inversion that can be seen across the condensed section along most profiles, but these changes seem to occur gradually. Several mineralogical proxies show remarkable changes a few dm above the condensed section, and not at its top. Similarly, changes along fossil profiles occur even below the CS, and not necessarily at its base. Given the definition of the maximum flooding surface, which simply marks

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the turnaround from transgression to regression, there is no reason to record sharp changes across this surface, while opposite trends are clearly expected above and below the MFS/CS. In this regard, the data shown by the various profiles are fully consistent with the authors interpretation.

Last point: the authors reject three “old” radiometric dates from the lower part of their core (a > 2m-thick stratigraphic interval), based on regional correlations of unit U500. For convincing the reader of their interpretation, they could probably expand slightly on this, stating how many radiocarbon dates from unit U500 are regionally available and, especially, which sedimentary facies did they find in other cores penetrating the same unit (was it the same deposits or something different?)

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