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Climate of the Past Discussions

Interactive comment on "Historical Climate off the Atlantic Iberian Peninsula" *by* Fátima Abrantes et al.

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The authors want to express their gratitude for the detailed review and changes proposed for the entire text. It was much appreciated. The repair about the organisation of the text, wording and formatting has been carefully followed for the entire text. Request for acronyms consistency has been followed, and those were discarded in all cases considered as unnecessary by the reviewer.

- Specific Comments Material and Methods - The reviewer considers that more information is needed here regarding alkenones and pollen, i.e. Total Pollen Concentration (TPC). The authors have included a concise description of the methodologies because the detailed methodologies have been published and are referred to (e.g. pg 6, ln 8-23). Following the referee's request, the revised version will include a more detailed

explanation of each of the methodologies.

Results and Discussion – the reviewer asks for more information on the proxies used, if possible in the introduction. The information on the proxies used and the reasoning for the use of each proxy is part of the material and methods section. Furthermore, because we wanted to discuss the value of each used proxy on this regional context, we have decided to include that at the beginning of the results and discussion section before presenting the downcore data. To include information on the use of the different proxies also in the introduction will generate a duplication of information.

- Perhaps you could hypothesize on the phytoplankton blooms. You use coccoliths in this study but please also mention other members of phytoplankton that are common during the blooms and that you don't study.

Diatoms and coccolitophores are the dominant phytoplankters in the modern ocean, with diatoms dominating in regions characterized by events of major nutrient input and water column mixing, such as coastal upwelling events (Estrada and Blasco, 1985). Coccolithophores, on the other side, also respond to nutrients but tend to do better in warm and stratified waters (e.g. (Margalef, 1978; Moita, 2001)). On the Portuguese margin, coccolithophores dominate throughout the year being outcompeted by diatoms only during upwelling events (Moita, 1993; Moita, 1996) , which is confirmed by the surface sediment record (Abrantes et al., 2009; Abrantes and Moita, 1999); . Furthermore, late winter/spring nutrient input by larger rivers, such as Douro and Tagus (Cabeçadas et al., 2003. ; Cabeçadas et al., 2008) , can also generate large phytoplankton blooms, which are associated to river plume frontal dynamics (Douro (Oliveira et al., 2007); Tagus (N. Vaz et al., 2009)). In this oceanographic conditions the expected dominance by coccolithophores has been confirmed by the work of (Guerreiro et al., 2013) for the Iberian Peninsula northern winter Buoyant Plume. More information on the blooms composition will be included in the paper.

- Is there a possibility that Phaeocystis also produces alkenone-derived SST signal?

Or is it just coccoliths?

Considering the various studies on this subject, only coccolithophores are alkenone-producing algae (Marlowe et al., 1990; Marlowe et al., 1984; Volkman et al., 1995).

- Chapter 5.2 – you should clarify why you have 2 separate subchapters, one for [n-alc] and TPC and then pollen separately. What is the reason for separating description of TPC from pollen? If this is a routine procedure, please explain it in this chapter and also in methods.

The methods to prepare sediment samples for pollen analysis and counting techniques and taxonomic references are included in the paper's methods section. The use of the TPC and pollen assemblages separately, is because the Total Pollen Concentration in the marine environment represents the quantity of terrestrial input by river discharge and ultimately precipitation on land as proposed by (Naughton et al., 2009). For that reason, TPC is plotted together with the other river discharge proxy used in this study ([n-alk]). Pollen assemblages on the other hand, indicate the composition of the land-cover vegetation, which is responding to both temperature and precipitation on the continent. As such, the authors consider that they need to be plotted separately and evaluated by comparison to other continental records.

- Be consistent: Kilo years – kyr, years – yr

The paleoceanographic community uses ky as a shortcut for thousands of years, as such the authors consider that they should comply with this nomenclature and maintain the use of ky.

- Use geological instead of historical time

The authors agree that this is a geological study, however, the time-span contained in the Historical period (beginning of recorded human history, roughly 5,000 years BP with the Sumerian Cuneiform script), and the "historical time" designation is usually used not only by archeologists but also by researchers working in climate reconstruction

studies covering this period.

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