Clim. Past Discuss., 7, C1238–C1239, 2011
www.clim-past-discuss.net/7/C1238/2011/

Climate of the Past Discussions

Interactive comment on "Middle Jurassic-Early Cretaceous high-latitude sea-surface temperatures from the Southern Ocean" *by* H. C. Jenkyns et al.

C. Lecuyer (Referee)

christophe.lecuyer@univ-lyon1.fr

Received and published: 15 August 2011

This study deals with the reconstruction of Mesozoic long–term evolution of marine temperatures from the Southern Ocean by using the TEX86 proxy. In my opinion, this paper definitely contains high–quality and interesting data that contribute to understand the long–term Earth's climate evolution during the Mesozoic. This work undoubtedly merits publication in 'Climate of the Past' regarding the treated topic and the quality of its scientific content. However, I would like to suggest some modifications:

1) The authors could expand the discussion about the principle and limits of the use of the TEX86 proxy, its robustness could be evaluated in more detail and compared to

other proxies (d18O values of biogenic carbonates and apatites).

2) The interpretation of author's data should be restricted to the long–term evolution of marine temperatures, thus avoiding the discussion of short–term events that would need specific sampling and complementary data. In a general way, the expression 'upper water temperatures' should be preferred to 'SST'. All known proxies (d18O of planktonic foraminifera, fish tooth enamel etc.) do not record SST but average temperatures of the upper water column.

3) These new data should be more discussed in relation to previous studies dedicated to the long–term evolution of seawater temperature (biogenic carbonates and apatites; for fish teeth look also at Pucéat et al. 2003, Paleoceanography, who proposed a low-resolution temperature curve for the Cretaceous at low latitudes; have also a look at Picard et al., 1998; Geology, for an estimation of the thermocline gradient during the late Jurassic). Temperature trends could also be compared to climate trends obtained from paleobotanical studies.

4) Combination of the TEX86 proxy with those based on oxygen isotope fractionation between minerals and water could be used to briefly discuss the oxygen isotope composition of Mesozoic seawater, hence giving the opportunity to discuss either the presence or the extent of continental ice caps for the documented periods of the Mesozoic.

5) Last suggestion: the abstract could be rewritten with a focus on the new interpretations or implications that are provided by the use of the TEX86 proxy. In its present state, the conclusions lack provocative and innovative ideas, most of them were already published decades ago.

Christophe Lécuyer

Interactive comment on Clim. Past Discuss., 7, 1339, 2011.