

Interactive comment on “Holocene climate variability in the Winter Rainfall Zone of South Africa” by S. Weldeab et al.

Anonymous Referee #1

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This is an ambitious and very interesting paper on the Holocene mudbelt in the Atlantic Ocean off the south-west African coast. Dating of forams from core GeoB8332-4 is an improvement on previous problems with dating of organics in these deposits. The study includes a variety of techniques that measure the sediment sources from nearby rivers, continental dust and marine upwelling. The results of the different proxies seem to corroborate each other and are used to interpret Holocene climate change in the coastal region in relation to the rest of the sub-continent and the globe. The detailed description of methods could be tough to digest for laymen. Therefore the table summarizing the proxies and their applications is useful. The paper further provides an exhaustive overview of data and issues in the literature in connection with the history of palaeoclimate in Southern Africa and attempts to reconcile them in explanations of processes driving environmental change in the region, especially shifts in the winter-rainfall zone

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and changes in strength of the Benguela upwelling system.

Although future predictions about the effect of weakening in upwelling on fishing potential and plant life in Namaqualand may be relevant, I am not sure it belongs in the abstract without more discussion in the text.

P 2324, line 23: In connection with ^{13}C values, it may be asked if the estimate of strength of upwelling is based on the assumption that river input of C_4/C_3 plant organics is constant over time. This is hardly likely considering some terrestrial isotope records, e.g., from Cango Caves (Talma and Vogel 1992) or Wonderwerk Cave (Brook et al. 2010) and a Namibian stalagmite (Sletten et al. 1913).

Where the focus is on the Western Cape, I am not sure if all the long-distance global correlations of possible common causes for climatic events, add much to the paper. It is not that they are not relevant but they are difficult to understand without more detailed formulation of the processes involved. These are not easy to describe briefly in a paper like this, in which the discussion already seems to be too long.

In the abstract it is mentioned that the 700-100 yr period is the wettest phase reflected by the proxy data. It is, however, not clear from the text why more humid conditions occurred during this phase than during the middle Holocene period.

Since the radiocarbon dates were calibrated, and the figures are given in cal year BP chronologies, it is strange that yr BP, which usually indicates an un-calibrated scale, is used in the text instead of cal yr BP.

P 2310, 11 (Abstract): When mentioning the Antarctic, to avoid confusion it could be clarified that the data are from previous work and not from this paper. 14: In connection with enhanced leakage of warm Agulhas water into the south-eastern Atlantic, is it necessary to say again (see previous sentence)?

P 2312, 13, P 2314, 6 and P 2328, 11: I think it is customary to say Namaqualand and not the Namaqualand.

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P 2320, 16: The Karoo Supergroup is not Tertiary. On P 2313, 12 it is given as Late Triassic. In fact the Karoo deposits cover Palaeozoic to Mesozoic deposits.

P 2332, 9: owning or owing.

Caption Fig. 3 (B): buld or bulk?

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