

Interactive comment on “South-western Africa vegetation responses to atmospheric and oceanic changes during the last climatic cycle” by D. H. Urrego et al.

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Review for Climate of the Past Discussions cp-2014-152

Urrego, D.H., Sanchez-Goni, M.F., Daniau, A.-L., Lechevrel, S., Hanquiez, V., South-western Africa vegetation responses to atmospheric and oceanic changes during the last climatic cycle (cp-2015-152).

The present paper focus on the climate record of southern Africa. An analysis of modern pollen rain samples, the contribution of Poaceae in particular, shows how variation in pollen spectra are characteristic of the various biomes. This understanding is used to interpret the pollen records from offshore marine cores. Expertise of terrestrial and

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marine palynology is well covered by the authors. This paper is clearly written, makes sharp reasonings and comparisons of cores and proxies and arrives at interesting and relevant conclusions. I have enjoyed reading this paper and it needs only few corrections and additions to be ready for publication. I have pencilled corrections, suggestions, and some questions in the printed text and a scan of the annotated manuscript is part of this review report. In the following text I will focus on some issues to explain it in more detail.

Specific comments:

page 1: I have noted the first introductions of acronyms and Figures. It shows that Suppl. Fig. 4 apparently does not exist and re-numbering is required. By the way, I have not seen any of the Supplementary information, figures and tables as they were not included in the files I have downloaded.

28: The acronym 'BUS' has not been explained. Notwithstanding, I guess I have understood the text.

Most acronyms introduced in the Abstract do not repeat in the Abstract text and can be omitted.

87: Another relevant comparison of terrestrial and marine pollen spectra, and an analysis how well marine pollen spectra do reflect vegetation distributions on the adjacent continent is Lézine & Hooghiemstra 1990.

112: It is always tricky to identify who was the first. Although Goldblatt's (1978) paper differs in scope to White (1983), Goldblatt produced with his paper an impressive understanding of the biomes in southern Africa and this paper is worth mentioning.

Fig. 1c & related text: A 'Mean Annual Precipitation' map is useful for most parts of the world. However, for southwestern Africa in particular the Mean Annual Precipitation is extremely negative and the water deficit (precipitation minus evaporation) amounts between -1700 to -3800 mm/yr (see maps on p. 17 and 18 in Barnard (ed.) 1998).

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Thus, the legend in Fig. 1c “Low = 0” serves better the records of meteorological stations than the understanding of vegetation distribution.

For example Lüderlitz with a coastal location has a water deficit of -2600 to -2400 mm/yr whereas inland-located Keetmanshoop a water deficit of -3800 to -3600 mm/yr ! So all numbers are dramatically far from zero, making the current map almost ‘incorrect’ for the aim of this paper: for example, the present Fig. 1c suggests that the moisture gradient (plant available moisture) between both cities is in opposite direction. Therefore, adding a Water Deficit Map as Fig. 1d would be helpful to show the climatic constraints of biome distribution in southwestern Africa. As far as I see, such map would not lead to new arguments in reasoning and conclusions will not change.

231 and 184/185: information about the pollen sum is contradictory and needs attention.

Fig. 3: A technical issue: it takes some time to realise that the blue-hatched area is a continuation of the blue area. My suggestion is to fill the hatched area for ~ 80% with blue colour (instead of 50%) in order to show more clearly we are dealing with one unit of which the data originate from two different studies.

In conclusion, this paper needs only a number of minor corrections as indicated in the manuscript-scan and in this report. Results fit perfectly the scope of the journal and are of significant interest for a wide international audience. My advice is to accept this paper for publication after minor revision.

References mentioned in this report:

Lézine, A.M., Hooghiemstra, H., 1990. Land-sea comparisons during the last glacial-interglacial transition: pollen records from West Tropical Africa. *Palaeogeography Palaeoclimatology Palaeoecology* 79, 313-331.

Hooghiemstra, H., Lézine, A.-M., Leroy, S.A.G., Dupont, L., Marret, F., 2006. Late Quaternary palynology in marine sediments: a synthesis of the understanding of pollen

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distribution patterns in the NW African setting. Quaternary International 148, 29-44.

Barnard, P. (ed.), Biological diversity in Namibia: a country study. Namibian National Biodiversity Task Force, Windhoek, Namibia, 332 pp. ISBN 0-86976-436-5. < See in particular the difference between the 'Mean Annual Rainfall' map (page 17) and the 'Water Deficit' map (page 18). In case you do not have access to this excellent book, please ask me to send a pdf of these self explaining maps > Goldblatt, P., 1978. An analysis of the flora of southern Africa: its characteristics, relationships, and origins. Annals of the Missouri Botanical Garden 65, 369-436.

Henry Hooghiemstra, Amsterdam, 20 February 2015

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/11/C49/2015/cpd-11-C49-2015-supplement.pdf>

Interactive comment on Clim. Past Discuss., 11, 345, 2015.

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