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Climate of the Past Discussions

Interactive comment on "Holocene changes in African vegetation: tradeoff between climate and water availability" *by* C. Hély et al.

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Holocene changes in African vegetation: tradeoff between climate and water availability C. Hély, A.-M. Lézine, and APD contributors Clim. Past Discuss., 9, 6397-6427, 2013

General comments This paper focuses on the relationship between water availability and vegetation changes in NW-Africa during the time of the Holocene "Green Sahara". The authors use statistical analyses of known and published paleo-data (hydrological and pollen) to generate and investigate spatio-temporal changes. The paper is clearly written and of interest to the scientific community as it is an approach to not only document and describe but quantify the reported spatio-temporal changes. Therefore it is definitely worth publishing subject to major changes. However, the paper discusses

interesting results but it misses to place these results into a wider paleo-climatic discussion and the spatio-temporal changes show additional results that the authors do not report or discuss.

Scientific and editorial comments Page 6398 line 23 Add reference: Hoelzmann et al. 2004: P. Hoelzmann, F. Gasse, L. Dupont, U. Salzmann, M. Staubwasser, D.C. Leuschner & F. Sirocko (2004): Palaeoenvironmental changes in the arid and subarid-belt (Sahara-Sahel-Arabian Peninsula) from 150 ka to present. In: Battarbee, Gasse, Stickley (Eds.) "Past Climate Variability Through Europe and Africa", Developments in Paleoenvironmental Research Vol. 6, Springer, 219 - 256.

Pages 6399-6400 lines 26 to 11 The following paragraph should be transferred to the 'Material and Methods' section: 'Due to the high diversity. . ..interval from 15 cal ka BP to the present'.

Page 6400 line 6 There are only 4 exclusive taxa within the Sahelian group (cf. Table B1) – this should be emphasized and whether this is relevant for the interpretation of the results.

Page 6400 line 19 In Table 1 the time range is given for the paleo-data. At least some of the mentioned sites (e.g. El Atrun, Jahns 1995) have a better dating control than just one date. This should be checked with the original references instead of referring only to the APD.

Page 6400 line 24 The two areas without hydrological data should be named.

Page 6401 lines 5 to 8 'We focused on three. . ...and grasslands' this is a repetition from page 6399.

Page 6401 lines 13 to 16 The statistical analyses performed with the paleo-data and the pollen are not described in detail – the reader would appreciate to receive more details how this was done, as this is a crucial point of the paper.

Page 6401 line 16 Gebhardt 2009 is not in the reference list

Pages 6401/6402 lines 25 to 5 The change towards more southern latitudes of the Sudanian group (0.85 isoprob.) seems to start at 8 ka cal BP and not at 4 ka cal BP (Fig. 2) or as late as 3 ka cal BP when the 0.5 isoprobability is regarded. This should be clarified. The core region of the Sahelian group is centered at 19°N – is this an effect of the paleo-data agglomeration at 19°N or can this be excluded by the authors? Table B1 shows only 4 exclusive Sahelian taxa – may this result in a biased interpretation? I do not see any 'reinforcement after 5.5 cal ka BP' of the Sahelian taxa. This group shows a relatively strong decline from c. 7 cal ka BP to 5 cal ka BP which slows down thereafter but lasts until present. The authors do not comment this!

Page 6402 lines 6 ff The core areas of the hydrological records closely match the extent only of the non-exclusive Sudanian group.

Page 6402 line 29 Gonolian => change to Congolian Page 6403 lines 1 to 13 The authors point to various interesting features within the presented curves of Fig. 3 but avoid or miss to place these in a broader paleo-climatic discussion (e.g. the rapid/dramatic increase in taxa and occurrences around 12 to 11 cal ka BP; the decline around 5.5 cal ka BP >20°N and<15°N; the increase in occurrences between 15-20°N around 3 cal ka BP...). The results should be discussed and interpreted in more detail – this accounts also to the interpretation of Fig. 4 on pages 6403 and 6404.

Figures/Tables Fig. 1 A and B should cover the same area of the map; change map B (paleo-hydrological samples) to the extent of map A.

Could it be possible to a) allocate the vegetation types of White (1983) to the vegetation groups used in the publication? b) allocate the present distribution of the used vegetation groups in the map?

As Fig. 1b uses colours – this should be possible for Fig. 1A

Fig.2 The displayed plates are very small and hardly legible => enlarge the plates – plenty of space is available and they do not necessarily need to be in quadratic form.

The (four) different grey shadings are difficult to distinguish – use colours (blue and green); and or use coloured edging of the shaded areas.

The grey dots for the pollen samples are also hard to see => use colours (f.e. red)

The axes should end at 15 cal ka BP; distinguish between minor and major ticks (5, 10, 15 cal ka BP)

Fig. 4 In the caption the expression 'humid conditions' should be checked, as 'humid' means that the annual precipitation exceeds the potential evaporation.

Fig. C1 Why has Fig. C1 not been added to Fig. 2 as it displays similar data?

Table A1 Check the represented time range of the pollen records with the original references Why are some of the sites written in capital and others not?

Table B1 There are only 4 exclusive Sahelian taxa – does this generate a bias for the interpretation/results?

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Please also note the supplement to this comment:
http://www.clim-past-discuss.net/9/C2988/2013/cpd-9-C2988-2013-supplement.pdf

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