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Climate of the Past Discussions

Interactive comment on "A late Holocene pollen and climate record from Lake Yoa, northern Chad" *by* A.-M. Lézine et al.

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GENERAL The paper is concise and most of it is clearly written. It convincingly documents in great detail the southward retreat of the West African monsoon during the late Holocene. Additionally, the combination of modelling and pollen data elucidates the effects of changing wind direction (during part of the year) on the recorded pollen signal. It fits the scope of Climate of the Past very well and data and interpretation are novel and important to publish. The title is correct but not eye-catching. I recommend to use a less descriptive and more interesting title.

It has been change for "Late Holocene plant and climate evolution at Lake Yoa, northern Chad: pollen data and climate simulations"

The introduction is to-the-point concerning the discussion about the end of the African Humid Period. However, explicitly formulated research questions are missing. I suggest to formulate clear research questions that are answered at the end of the paper.

The introduction has been improved accordingly

The remark at the description of zone 3, that the uppermost levels greatly differ (page 2422, line 13-15), invites to formally distinguish a separate zone 4. See also Figure 8.

You are right, this has been added as sub-zone 3d

The figures need some editing. Lettering of Figures 1, 3, and 5 is far too small and also those of Figures 4 and 8 should be bigger. Figure 1 needs a map of northern Africa to help the readers'orientation of the detailed map.

Done: Figure 1 has been modified accordingly and a map of northern Africa has been added

Please state the total pollen counts in Figure 3 as they differ considerably between samples.

Done

The caption of Figure 4 is incomplete, explanation of part B is missing and the legend of part A is not clear.

Done

SPECIFICS The abstract claims that the sequence covers the entire Saharan desert (page 2414, line 4-5), which is of course not true (see for instance Lezine et al., QSR in press, showing a time lag between the east and the west). Please rephrase.

Corrected see response to M. Claussen's comment

The paragraph about the source of Artemisia and Ephedra pollen is a bit murky (page 2419, line 21 - page 2420, line 2). Supposedly, the location of the source areas be-

ing the Saharan-Mediterranean transition area is derived from the fact that Artemisia and Ephedra pollen is associated with other types of that region such as Olea, Pinus, Asteraceae, and Plantago. However, this is not clearly expressed. Please rephrase to clarify the meaning.

This has been improved

Please consider if the maximum pine pollen percentages in zone 2 are the result of low influx of any other pollen (page 2421, line 12). What does "(mea=0.4%)" mean?

The layout of Section 4.1 is scrambled. I suggest to divide section 4.1 into three sub-sections (4.1.1 Dominant monsoon influence; 4.1.2 Transition; 4.1.3. Dominant Mediterranean influence). Please also consider some discussion about the flowering season of specific taxa in connection with the prevailing wind direction.

As shown in the figure below redrawn from of Gharbi et al. (Revue Française d'Allergologie et d'Immunologie Clinique 16, 1, 1976, 25-31), plants from the Mediterranean region bloom in early winter – late spring, i.e., during a time interval characterized by intense wind circulation over Northern Chad (Washington et al, JOURNAL OF GEOPHYSICAL RESEARCH 111, D03201, doi:10.1029/2005JD006502, 2006). This agrees with our interpretation that the maximum of Saharo-Mediterranean pollen types (zone 3) were transported to Lake Yoa by dominant NE trade winds.

Section 4.2: Could the strong increase of Olea pollen in the uppermost samples of the sequence be the result of cultivation?

Yes, probably, in the Mediterranean basin where Olive cultivation occupies today 8.1 million hectares. TYPOS Page 2416, line 26. Since separate conclusions are given in section 5, this is somewhat misleading. Please change the title of section 4 into "Discussion" and correct this line at the end of the Introduction.

Page 2418, line 17. reference to STable 1 does not fit. The supplementary table does not give total counts per sample, but lists the counted taxa. Please provide this

information in Figure 4 or in a separate table. At page 2419, line 2, please change Table 1 into Supplementary Table 1. Page 2418, line 24. Fig. 8 (instead of Fig, 4). Page 2419, line 20. Kröpelin et al. 2008a is not listed in the reference list and besides I am unaware of a Kröpelin-paper that discusses Olea pollen deposition. Please correct. Page 2420, line 13. "2 grains" sounds highly unlikely. Do you mean 2%? Page 2429, line 21. Please specify that the occurrence of Hyphaene pollen is in zone 3b and c (since 1500 BP). corrected

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Interactive comment on Clim. Past Discuss., 7, 2413, 2011.

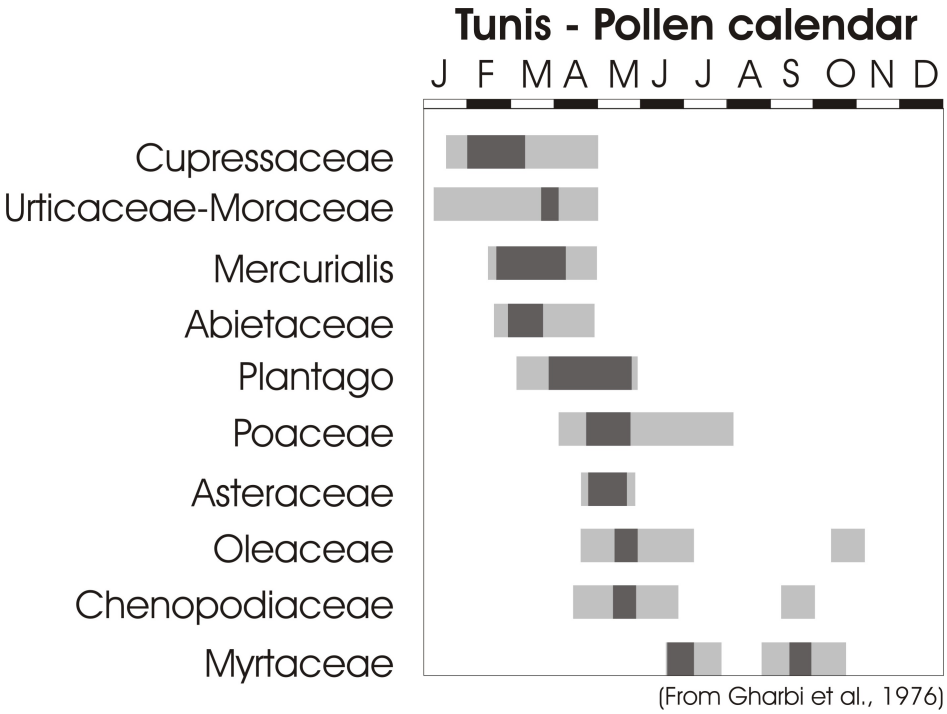

Fig. 1. Tunis pollen calendar