Clim. Past Discuss., 5, S142–S144, 2009
www.clim-past-discuss.net/5/S142/2009/

Climate of the Past Discussions

Interactive comment on "Mid-Holocene regional reorganization of climate variability" *by* K. W. Wirtz et al.

Anonymous Referee #1

Received and published: 26 March 2009

The authors use more than 100 published proxy records in an attempt to infer differences in climate variability between early and late Holocene as well as at a regional scale. The analysis is mainly based on spectral analyses and a spatial mapping of the inferred modes of variability.

Although the approach is generally of interest, there are a number of issues associated with the analyses presented that make the conclusions overall not very convincing.

1. The notion that spectral analysis "is not sensitive against possible absolute dating errors" (2.1, line 1) is only in part correct and seems to reflect a basic misunderstanding by the authors regarding dating of paleoclimatic time series. Of course a spectrum is time-invariant. However, shifting an entire time series along the age axis is generally

not the issue in paleoclimatology. The point of concern is a shift of individual age-control points that may stretch or condense a section of a series – and this generally has a strong effect on spectral properties. The study depends crucially on the age models of the underlying time series. It is completely unclear, if the authors employed some quality control of the existing chronostratigraphies in order to ensure consistency among the proxy records.

2. From the introduction it appears that the authors are aware of the non-stationary character of some records. However, by employing spectral analysis, which provides a time-averaged estimate, they completely ignore this aspect in their analysis. The early Holocene portion of the time series may include some well known perturbations (YD-PB transition, 8.2-ka event). Spectral analysis will then likely result in peaks at millennial-to-centennial time-scales. These peaks are an artefact resulting from the "events" and should not be interpreted as modes.

3. The justification of splitting the time series at $\sim$6 ka is not well justified. If such a "turning point" in terms of the spectral character (and climate variability) does indeed exist, it should be the result of the analysis and not an input to the analysis. The study remains completely unconvincing with regard to the robustness of the timing an existence of such a turning point.

4. The assumptions underlying the spatial clustering algorithm are not well justified: Why should one expect an exponential scaling? What is the rationale for the scale length of 1500 km? Wouldn't the authors expect this scale to change if climate changes? Is it reasonable to assume that the radius is the same in all directions, given that climate zones are generally more zonally oriented?

5. In the interpretation, all proxies are considered to reflect region-specific properties. I wonder why the proxies are not grouped according to the dominant underlying climatic processes prior to the analysis.

6. The presentation regarding a potential link between cultural development and cli-

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mate variability is only very cursory and not very convincing.

7. The language lacks precision and the flow of the presentation is not very fluent.

In summary, I don't think that the results are sufficiently substantial to justify a publication in Climate of the Past.

Interactive comment on Clim. Past Discuss., 5, 287, 2009.