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Climate of the Past Discussions

Interactive comment on "Distinct responses of East Asian summer and winter monsoons to orbital forcing" *by* Z. Shi et al.

Anonymous Referee #1

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Comments:

This paper explores the responses of East Asian summer and winter monsoons to the orbital forcing. Although all the monsoon proxies were already published and the model outputs were from Kutzbach et al (2007), the paper brought some new insights about the mechanisms of monsoon changes, particularly for the East Asian winter monsoon. Both geological records and model outputs likely support a predominant role of the obliquity forcing ($\sim$40 ka period) on the East Asian winter monsoon. The authors further propose that the obliquity forcing exerts a more significant effect on the evolution of the East Asian winter monsoon than 'expected before', probably through controlling the meridional insolation difference.

I detected a few points that I feel deserve more supports and explanation.

It sounds necessary to add a paragraph in the Introduction Section on what were 'expected before' about the obliquity signals in the winter monsoon evolution, as the authors stated at the end of the abstract (p 944 line 13).

The authors consider that the used stalagmite delta 18O (as a proxy of summer monsoon) varied synchronously with precession, and hence, is supportive to the hypothesis of Kutzbach et al (1981) that the subtropical summer monsoon systems respond directly to precession-dominated changes in NH insolation. However, a recent work (Paleoceanography, 25, PA4207, doi:10.1029/2010PA001926, 2010) stated for a phase difference of several thousand years between stalagmite d18O and the precession. The authors should conduct a phase analysis and provide a figure for clarifying this point, because it seems to be crucial point for the statements about the summer monsoon (e.g. the statement on p950 lines 14-15).

The paper suggests that a 'large-scale cross-equatorial circulation, which is resulted from the inter-hemisphere meridional insolation contrast, also play an important role on the Asian winter monsoon' besides the local insolation forcing. This is the most significant statement of the paper, but remains speculative. This large-scale cross-equatorial circulation should be observable in the used model outputs. The authors should add a figure of wind vectors to show the circulation. The model could also analyze the sensitivity of this circulation to the inter-hemisphere meridional insolation contrast.

Interactive comment on Clim. Past Discuss., 7, 943, 2011.