

Interactive comment on “Evidence for a widespread climatic anomaly at around 7.5–7.0 cal ka BP” by Mei Hou et al.

Anonymous Referee #1

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The paper by Mei Hou and colleagues is focused at the climate in five key regions: Asia, the Americas, Europe, the Mediterranean, Africa, and the polar regions at the time between 7.5–7.0 cal ka BP. The authors analyzed 47 previously published paleoclimatic records and identified a cold episode around this time. They diagnosed a cooling in the polar regions, north-central Europe and in western North America, a weaker Asian and stronger South American summer monsoons and contrasting patterns of precipitation in the Mediterranean. This cooling occurred in the warm period of the mid Holocene and this adds additional interest to the analysis of its forcings. The cooling roughly coincides with IRD event between 7.5 and 7.3 cal ka BP (Bond et al., 2001) and with two (out of three) spikes of the solar irradiance around this time (Steinhilber et al., 2012). The authors explain the observed climate patterns by a combination of orbital forcing,

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deglaciation, volcanic eruptions, and solar activity. I believe that the paper is interesting and is an important contribution to the study of the Holocene climate. However, I am missing a discussion with some previous papers concerning the same problem. The first one is Wanner H., Solomina O., Grosjean M., Ritz S.P. and Jetel M. 2011. Structure and origin of Holocene cold events. *Quaternary Science Reviews*, v 30, n 21-22, p. 3109-3123 doi:10.1016/j.quascirev.2011.07.010 These authors selected 46 temperature and 35 humidity sensitive time series proxies and identified six cold relapses during the last 10,000 years occurred around 8200, 6300, 4700, 2700, 1550 and 550 years BP. Thus, no cooling in the interval 7-7.5 cal ka BP was identified in this paper. I think it would be important to discuss this discrepancy, including the comparison of the time series used in both papers, the criteria of “cooling” etc. Second one concerns the global glacier variations (Solomina O., Bradley R., Hodgson D., Ivy-Ochs S., Jomelli V., Mackintosh A., Nesje A., Owen L., Wanner H., Wiles G., Young N. 2015 Holocene glacier fluctuations. *Quaternary Science Reviews Volume 111*, 1 March 2015, Pages 9–34. doi:10.1016/j.quascirev.2014.11.018). Solomina et al., 2015 in their review of Holocene glacier variations identified two advances around 7.7 and between 7.1 and 6.5 ka. I would appreciate the author’s opinion about this: which one was forced by the cooling that they are considering. Several curves (e.g. at the Figs 2, 3, 4) actually show two minima (or one but slightly outside the interval 7-7.5 cal ka BP). Is there a possibility that there were two events? When the authors refer to the glacial history they are citing Karlen, 1988 paper (“In north-central Europe, an IRD spike (Bond et al., 2001), widespread mountain glacial advances (Karlén, 1988), and higher lake levels 537 (Magny, 2004) pointed to cold–wet climate conditions.”). Although Karlén, 1988 is a very comprehensive review, but during the last 30 years a lot of new data (including new methods of dating!) appeared and I would recommend to update the reference and check the chronology of glacier fluctuations that the authors refer to. It would be interesting to analyze a little more in detail the records that have potentials for high resolution. For instance, it was noticed that the “overcooling of SSTs to below 18 C resulted in at least nine abrupt massive mortality events in reef corals (line 550-551)”.

Such analysis is important for the explanation of forcings: nine short events require another combination of forcings that one strong event of long duration.

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