Clim. Past Discuss., 8, C320–C321, 2012
www.clim-past-discuss.net/8/C320/2012/

Climate of the Past Discussions

Interactive comment on "A model-data comparison of the Holocene global sea surface temperature evolution" *by* G. Lohmann et al.

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Received and published: 27 April 2012

The first part of the paper, data mining, and analysis is fine. The resulting interpretation, however, appears strongly unbalanced and premature. Failure of the current standard climate models using typical AR4-type radiative forcing could mean two things: Either bulk climate sensitivity is too low (which then would also make CO2 climatically more powerful with still unknown additional positive feedbacks) OR radiative forcing for insolation is set too low (in that case the climatic effect of CO2 might be overestimated, because a higher radiative forcing for insolation also means a higher radiative forcing for solar activity in general). The authors do not seem to discuss the second possibility in their manuscript. This, however, would be very necessary in order to show both interpretation possibilities and the resulting implications for the role of CO2. Given that

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solar activity changes are documented to have caused major synchronous climate variations in the past 10,000 years (e.g. Bond et al. 2001, Hu et al. 2003, Marchitto et al. 2003 & 2010, Xu et al 2006, Hing et al. 2010, Pena et al. 2010, deMenocal et al 2010 and many more) there are good reasons to look more carefully at the insolation/solar radiative forcing issue. Clearly, the current solar RF in the AR4 cannot explain the high degree of synchronicity between solar and climate variations.

Interactive comment on Clim. Past Discuss., 8, 1005, 2012.