**Climate
of the Past
Discussions**

Interactive
Comment

Interactive comment on "An introduction to stable water isotopes in climate models: benefits of forward proxy modelling for paleoclimatology" *by* C. Sturm et al.
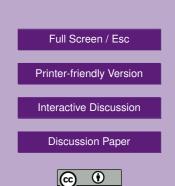
Anonymous Referee #2

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Review of the manuscript by Sturm et al. submitted to Climate of the Past:

I found this paper to be a highly useful review of the applicability of SWI-equipped climate models within palaeoclimatology, supplemented with some informative and thought-provoking sensitivity analyses. The manuscript is well written and presented at a level of detail that enables reading by non-specialists. Therefore, I consider it worthy beyond doubt of publication in Climate of the Past. I rate the contribution as grade 1, 1 and 2, respectively, for scientific significance, scientific quality and presentation quality.

Contrary to referee 1, I do not see any major problems with the experiments in spite of their shortcomings with respect to boundary conditions. The lack of realistic SST,

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ice-sheet, sea-ice and vegetation forcings is mentioned by the authors, and it should appear clear to the reader that the experiments are indeed sensitivity analyses, highlighting the effects of changing orbital forcing exclusively on temperature and d18O. As such, they are in my mind informative expressions of model behaviour, and the authors present some appropriate analyses of conceptual processes and uncertainties involved.

However, I was a bit confused about to what extent the two experiments were coupled. Was the same model used for Scandinavia as for the Northern Hemisphere? Were both experiments based on 5-year runs (stated somewhat in passing on p. 1716, l. 18)? This should be made clearer at the beginning of section 4. I would also have liked to see an additional figure illustrating the grid cells over Scandinavia and some examples of model outputs there.

Apart from these issues I have really only some technical comments: 1698, 10: govern their underlying hypotheses 1698, 13: Multi-proxy data obtained from climate archives can 1698, 14: with model outputs to produce physically 1698, 14-15: reconstructions with confidence intervals 1698, 16: mid-Holocene conditions 1698, 17: impact of changing climate 1698, 22: aspects of climate research 1698, 24: change in the future 1699, 3: of palaeoclimate research 1699, 7: in climate research 1699, 8: (GCMs) 1699, 9: GCMs 1699, 26: an example of 1699, 27-28: with measured isotopic data from climate archives 1700, 2: a historical 1700, 3: archives, highlighting some 1700, 7: GCMs 1700, 11: composition of precipitation 1701, 12: 0.7 (?) 1702, 6: the two methods 1702, 11: between the methods 1702, 14: peak today 1702, 19: are illustrated in 1703, 2: preferred palaeoclimate approach 1703, 3: post-depositional alteration 1703, 8: diatom silica or aquatic cellulose 1703, 12: d18O can therefore 1703, 16: (runoff, infiltration, evaporation) 1704, 24: palaeoclimate reconstructions 1705, 19: GCMs 1705, 21: time-step of a GCM 1705, 25: happen at much smaller 1706, 2: convection are fed 1706, 5: SWI tracers 1706, 7: SWI tracers in GCMs 1706, 13: fractionations need to 1706, 17: what a daunting 1706, 20: a good description 1706, 21:

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