

Interactive comment on “Glacial–interglacial changes of H₂¹⁸O, HDO and deuterium excess – results from the fully coupled Earth System Model ECHAM5/MPI-OM” by M. Werner et al.

Anonymous Referee #2

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The manuscript by Werner and co-authors presents first results on the pre-industrial and LGM conditions of a coupled ocean-atmosphere model equipped with water isotopes. The spatial repartition of d18O and d-excess in the ocean and atmosphere is systematically confronted to available data for both periods with a general good match between model and data. The manuscript is very well written and provides all the necessary details in the text and in the figures for the general reader. The number of figures is quite high but I would recommend keeping all of them. I only have minor comments and I recommend publications of the manuscript:

-p. 8840, l.4: it would be nice to quote also the 2013 paper by Risi and co-authors on 17O-excess modeling.

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- p. 8843, l.22: The authors neglect as often done (but not always) the possible fractionation during evapotranspiration processes from terrestrial areas. It would be nice to expand a bit more the possible implications of such hypothesis on d18O and especially d-excess in regions where the fractionation during evaporation of terrestrial water may become important (e.g. Amazonian basin following the suggestion of Gat and Matsui (1991)).

- In general, I think that some explanations on the added value of the coupled model compared to the atmosphere only model for the modeling of d18O and d-excess in precipitation should be given in introduction of the manuscript.

- p. 8848, l. 8, replace “is” by “are”

- Figure 6a and corresponding texte p. 8854: what do you mean exactly by isotopic values in “evaporation” ? do you mean water vapor or evaporation flux ? It would be nice to clarify since only isotopic values in water vapor can be compared to data.

- p 8856, l. 6: A good way to test the Merlivat and Jouzel (1979) formulation would be to look at the modeled slope between d-excess in the water vapor above the ocean and relative humidity. How does this compare to the Merlivat and Jouzel (1979) slope ?

- I am quite convinced by the discussion on the influence of SST on d-excess presented on p. 8864. Still, it would be nice to justify further why the relative humidity of the source relative humidity was not different by more than 5% in the LGM compared to the pre-industrial situation.

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