

Interactive comment on “Evaluating model outputs using integrated global speleothem records of climate change since the last glacial” by Laia Comas-Bru et al.

Anonymous Referee #3

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The authors used different approaches to compare the speleothem records from the SISAL database with the simulated results of the ECHAM5-wiso model for present-day, MH and LGM. Based on their analyses, they propose a protocol for using speleothem isotopic data for model evaluation. The paper is well written and the analyses could be interesting for researchers working in related field. However, it seems to me that the paper could be improved by adding more in-depth discussions/analyses.

I don't see very well what is the advancement made by this study as compared to the traditional approach for comparing the speleothem records with models. Maybe the authors should stress more why their approaches are better and what new can be

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discovered by their approaches that can not be done by traditional approach.

It is not very clear to me what is the final goal of the data-model comparison and what can be improved or learned after all the analyses. If the comparison is good, can we assume that the temperature and precipitation simulated by the model are correct and what is the uncertainty? What might be the reasons for the similarities and differences between model results and speleothem data? Can the results help to improve the model and/or experiment design and how?

The major uncertainties and biases of the ECHAM5-wiso model in simulating present-day and past climates and the experiment design of the MH and LGM simulations, the reliability of the SST and sea ice simulated by the CCSM3 and their potential influence on the data-model comparison should be discussed.

The simulations for MH and LGM are only 12 and 22 years. Are they long enough to allow the climate at different speleothem location reaching equilibrium? What is the initial state of these simulations? What might be the influence of using fixed ocean condition?

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