

Interactive comment on “weather@home 2: validation of an improved global-regional climate modelling system” by Benoit P. Guillod et al.

Anonymous Referee #1

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The manuscript describes the validation of the improved global-regional climate modeling system weather@home2. Reading this manuscript has been a real pleasure! The manuscript describes in a concise and very well written way the changes compared to the previous version of the model system and their impact on the global and regional climate over Europe. Figures illustrate the important results. I can recommend this manuscript for publication after the authors have addressed a few questions and comments.

Abstract and Conclusions: I wouldn't fully agree to the statement that European biases are reduced. It is certainly true for the temperature, but precipitation? Look at Fig.9, the w@h1 0.22 deg results are often better than w@h2! I suggest you differentiate between temperature and precipitation biases.

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Sec2.3: it is not clear to me how you create the initial conditions for each simulation. Are single-year spinup simulations part of the 13-mnth long experiment (i.e. making it 25 month long), or how exactly is it done? Please explain.

Sec2.3: How good is the initialization of soil and vegetation variables? Soil has a memory in excess of 1 year, so a 1-yr spin-up may not be sufficient for soil temperature and humidity. You have made a large effort to improve the land surface and vegetation components in your model, yet an inaccurate initialization could make these improvements worthless. Could you comment on that?

Sec4.4: To be honest, I was somewhat surprised to see a section about reliability in this manuscript. Reliability is a very specific term with a precise definition in the verification of probabilistic forecasts, but I have never encountered it in the context of climate simulations. On the other hand, the reliability of climate models is often discussed (e.g. in the IPCC AR) in the casual meaning of reliability as a synonym to trustworthiness. In this second definition of reliability, one often looks at how well the pdf of a quantity from a climate model matches the observed distribution. I wonder if this latter approach was what you had in mind when you started discussing reliability. Reliability and attribution diagrams as you present them now don't make much sense in the context of climate simulations, they should only be used for the verification of probabilistic forecasts. I therefore suggest you remove section 4.4 completely.

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