**Geoscientific
Model Development**
Discussions

Interactive comment on "Representation of climate extreme indices in the coupled atmosphere-land surface model ACCESS1.3b" *by* R. Lorenz et al.

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In this manuscript, the authors assessed the selected climate extreme indices simulated by the latest ACCESS1.3b against various global observational data sets for the past 6 decades. The topic is important, and the comprehensive evaluations of the model performance regarding the simulation of extreme events are important not only for this earth system model development but for its use in future impact assessments at different spatiotemporal scales. The manuscript is well organized and clearly stated. The following comments and questions are proposed by the reviewer for a minor revision.

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1. Section 2.1.1 needs to be shortened. Any potential reader interested in this part could refer to the Unified Model related papers directly. 2. Only the GLEAM ET was included as a benchmark for the modeled ET. The latest monthly global land ET synthesis product between 1989 and 2005 by Mueller et al. (2013) could be added to reduce the observational uncertainties. 3. In the Discussion part, by comparing the bias in TMIN and the bias in incoming long wave radiation, the authors concluded that the TMIN related differences might be associated with the errors in the cloud cover estimated by the ACCESS1.3b. To confirm this assumption, the authors are encouraged to compare directly the simulated cloud covers with the satellite cloud products like Stubenrauch et al. (2012). 4. In the Discussion part, the hydrology evaluation work of Zhang et al. (2013) was compared a little bit to understand the ET estimation of ACCESS1.3b. As you know, both Zhang et al. (2013) and this work used the CABLE2.0 as their land surface model, although the former is offline and the later is online simulation. How about doing more intercomparisons between these two results in terms of the ET, extreme temperatures and the associated driver datasets. This could be an opportunity to better understand how the errors in land surface schemes and the atmospheric variables propagate through calculations to affect the extreme climates.

References Mueller, B., et al. (2013), Benchmark products for land evapotranspiration: LandFlux-EVAL multi-dataset synthesis, Hydrol. Earth Syst. Sci. Discuss., 10, 769-805, doi:10.5194/hessd-10-769-2013. Stubenrauch, C. J., et al. (2012), Assessment of global cloud datasets from satellites: Project and Database initiated by the GEWEX Radiation Pael, Bull. Amer. Meteor. Soc., doi: 10.1175/BAMS-D-12-00117.

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