[GMDD]

Interactive comment on "Effectiveness and limitations of parameter tuning in reducing biases of top-of-atmosphere radiation and clouds in MIROC version 5" *by* Tomoo Ogura et al.

Anonymous Referee #1

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PRINCIPAL CRITERIA : GMD Scientific significance: 1 Scientific quality: 1 Scientific reproducibility: 1 Presentation quality: 1

GENERAL COMMENTS:

Overall, this is a exceptionally well-written manuscript which discusses and quantifies the extent which model tuning influences long-standing biases in the TOA radiation budget. This work clearly demonstrates that 'model tuning' alone can not remove or change the sign of long-standing cloud and TOA radiative biases. The results also demonstrate the importance of an accurate representation physical processes coupling clouds and its environment, in other words, having an appropriate parametriza-

tion. These results are of vital importance to the Geoscientific Model Development community, and beyond, given that biases and radiation and clouds can affect projections of climate sensitivity.

This work also sheds light onto how low-level clouds, both in the tropics and Arctic regions react differently to parameter tuning. The ideas and approach are clearly described and thus reproducible by others.

SPECIFIC COMMENTS: - Which version of CERES-EBAF was used in the analysis? Please update it to Edition4.0 which was released on March 7, 2017. - Please include a description of the cloud parametrization used in MIROC5. Since the conclusions specify that the parametrization itself is key, it would be nice to know which one (RH vs PDF scheme) is used and future efforts that will be considered (i.e. CFMIP SPOOKIE experiments). - Please elaborate upon the description/thought processes regarding 'fractions of PPE members with bias 0 and 1' (first discussed on page 9, lines 5). I struggled slightly to follow the argument entirely. - Why do you argue "removing 'Too thick bias' by parameter tuning is only considered difficult in THIS model"? Isn't this a problem for other CMIP5 models too?

TECHNICAL CORRECTIONS: - Figure 3 c & d: Please change the limits of the color bar and remove the contour lines.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2017-117, 2017.