

Interactive comment on “The influence of internal variability on Earth’s energy balance framework and implications for estimating climate sensitivity” by Andrew E. Dessler et al.

Andrew E. Dessler et al.

adessler@tamu.edu

Received and published: 19 January 2018

The author of this comment questions our study because they do not have confidence that the relationships which we rely on are well captured by the models. Our findings are of course conditioned on the idea that the model can usefully calculate the TOA energy balance given the state of the climate system (i.e., the distribution of temperature and water vapor, etc.). The author gives several reasons why the class of comprehensive models that we use are inadequate in one respect or another, and we share their frustration regarding model failings. However none of the failings they point out, or that we are aware of, seem relevant to the key hypothesis that we use the models to help

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quantify, namely that TOA flux is more tightly tied to atmospheric temperatures than to surface temperatures. We note that this conclusion is also supported by observations, and is sensible even without having looked at a model because surface temperatures can decouple from the radiation balance as a whole quite easily, i.e., land surface temperature in winter, see e.g., (Li, Marotzke, and Stevens, 10.1002/2015GL065327, 2016).

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1236>, 2018.

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