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Earth System Dynamics
Discussions



# *Interactive comment on* "ESD Ideas: Global climate response scenarios for IPCC AR6" *by* Rowan T. Sutton and Ed Hawkins

**Anonymous Referee #2**

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Review ESD Ideas: Global climate response scenarios for IPCC AR6 by Rowan Sutton and Ed Hawkins.

This article builds on earlier articles (Sutton, 2018, 2019) that emphasize the need for climate risk assessments by the climate modelling community and specifically by WGI of IPCC. In Sutton 2019 specific priorities for WGI are outlined and one of those is to "Develop a discrete set of global climate scenarios". This article provides a methodology to generate such a discrete set of scenarios based on ECS.

To my opinion this is a very valuable contribution to this discussion that is timely needed. The proposed method can be easily applied not only to GSAT but also to other variables. The article is well written and the ideas are clearly illustrated and elaborated. The presentation of the ideas in the figure is powerful and will stimulate the



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Discussion paper

scientific debate.

There is, however, one aspect that to my opinion deserves a bit more discussion. Climate change is already happening. This means that climate models can be evaluated against their ability to simulate historical trends. How should models be treated that deviate substantially from the historical trend (e.g. high ECS models)? I realize that this is not an easy topic that involves issues as natural variability, compensating errors and warming mechanisms that may become relevant at future warming levels. Some discussion is to my opinion, however, needed because the historical warming is one of the few observational checks of the simulated greenhouse warming by the models. Scenarios do. by their nature, not involve likelyhood, but if models are unable to represent the observed past this creates a tension with the "plausibility" of the scenarios.

Typo: Line 69: Reference Hawkins and Sutton, should be 2009 and not 2019

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