

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

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We thank the referee for their positive comments on our article. There is an important issue underlying these comments. Scenario (or “storyline”) based approaches and likelihood-based approaches are two alternative methods for describing epistemic uncertainties about the future (e.g. Shepherd et al, 2018). In the former, no quantitative likelihood is attached to specific scenarios – they are merely plausible storylines about how the world might unfold. Nevertheless, they are very useful tools to identify vulnerabilities and risks (e.g. Bank of England “stress tests”), and to assess potential responses.

Traditionally physical climate science has used a scenario-based approach for describ-

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ing socio-economic uncertainties and a likelihood-based approach for describing uncertainties in the climate response. We argue that this asymmetric approach is not justified: future socio-economics and future climate response are both forms of epistemic uncertainty, and it is therefore appropriate to use scenarios for both (see Sutton, BAMS, 2019 for further discussion).

Consequently, it is not the case that we selected five different ECS levels “and represent them with equal weight”. We do not weight them at all, and it is not appropriate to do so. Similarly, it is not the case that the different socio-economic scenarios “are not all equally likely” – there is no quantified likelihood associated with each.

Reference: Shepherd, T. G., and Coauthors, 2018: Storylines: An alternative approach to representing uncertainty in physical aspects of climate change. *Climatic Change*, 151, 555–571, <https://doi.org/10.1007/s10584-018-2317-9>.

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