

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

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Received and published: 2 June 2020

We thank the referee for their thoughtful comments.

Our responses to the specific points about the figure are as follows:

- 1) In the sample of models used, the lowest ECS is 2.3K so some non-monotonic behaviour in panels d,e is expected, given the lowest climate response scenario considered here is 2.0K.
- 2) We choose to retain the labels in panels d,e as they are. Changing to labelling the bid edges will not overcome the non-even spacing issue and, in our view, would be more confusing.

C1

3) Panels a,b are necessary to explain the approach used. We have attached for interest a version of the figure which shows GSAT change in 2050 and 2100 relative to pre-industrial, instead of the crossing years in panels d,e. Similar features can be seen: i.e. the same GSAT change can be realised from widely different socio-economic and climate response combinations.

Concerning use of the term scenario - this term is very widely used in problems of risk assessment to describe, and explore the consequences of, a specific set of assumptions about the future. Of course, it is true that in climate science scenarios have traditionally been concerned with socio-economic assumptions only, whereas uncertainties about the climate response have been characterised in terms of likelihood. However, it is a fundamental part of our argument 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. To quote Sutton (BAMS, 2019):

“...for the purposes of risk assessment, there is little difference between our knowledge/ ignorance of (say) future population growth and our knowledge/ignorance of (say) the future rate of global warming, so it would be helpful for decision-makers if the same tools - scenarios - were used to communicate this knowledge. Such an approach would be in line with King et al.'s (2015) fifth principle of risk assessment: take a holistic approach. Decision-relevant climate scenarios could usefully be developed to sample all the major dimensions of epistemic uncertainty (e.g., rapid economic growth, high greenhouse gas emissions, and high climate sensitivity).”

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Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2019-88>, 2020.

C2

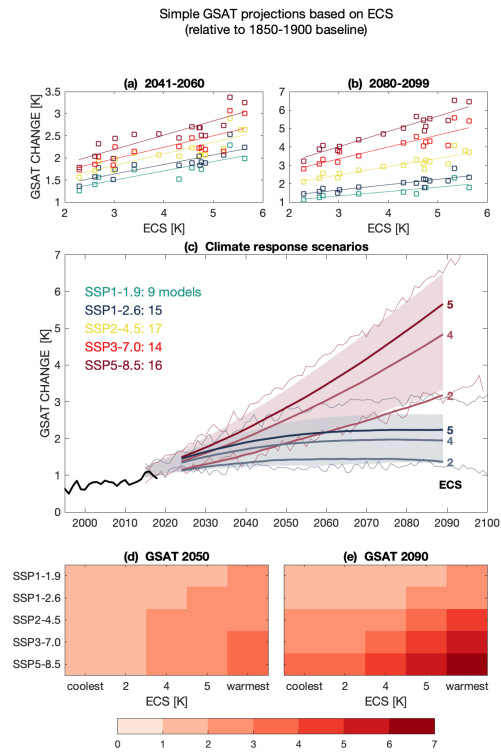


Fig. 1.