Earth Syst. Dynam. Discuss., referee comment RC2
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Comment on esd-2022-26

Anonymous Referee #2

Referee comment on "The future of the El Niño–Southern Oscillation: using large ensembles to illuminate time-varying responses and inter-model differences" by Nicola Maher et al., Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2022-26-RC2, 2022

This paper examines changes in ENSO SST anomalies in a number of large ensembles. It is really a 'show and tell', looking at changing SST variability using a number of different measures. There is a significant amount of data wrangling involved in this type of work and the authors are world leading in this regard. The analysis is approached in a careful way and it supports the conclusions of the paper. Figures and text are of high quality.

Perhaps the most dissapointing thing, however, is that there is little insight provided as to why the large ensembles behave in such diverse ways. Some show increases, some decreases and some show non-linear responses in variability. Understanding this latter behaviour would be of significance scientific interest to the ENSO/climate change community. There are simple metrics available to look at mechanistics aspects of ENSO changes in models and it is a bit of a shame that the authors do not try some of these e.g. assessing the atmos-ocean coupling strength and its components. Such an analysis would significantly enhance the work.

It also seems a little odd that the authors do not make some comments on minimum ensemble size for looking at changes in ENSO.