

## ***Interactive comment on “Assessment of a full-field initialised decadal climate prediction system with the CMIP6 version of EC-Earth” by Roberto Bilbao et al.***

**G. A. Meehl (Referee)**

meehl@ucar.edu

Received and published: 2 November 2020

General comments: This paper is a nice description of the characteristics of the EC-Earth initialized predictions for CMIP6 DCPP. The authors provide a welcome set of details regarding what they actually do and how they do it, something that other papers of this genre often do not do. They document features previously seen in other initialized prediction systems (e.g. better predictability in the Atlantic compared to the Pacific), and also note a difference in their system in that they have difficulties with predictions in the subpolar gyre region in the North Atlantic. They set about performing a detailed analysis to document why this difference is occurring in their model, and

C1

uncover some interesting interrelated aspects involving overturning, stratification, bias and drift, and consequences for sea ice in that region. Overall, I think this paper makes an excellent contribution to ESD, and I have only minor comments.

Specific comments:

Line 42: Researchers at NCAR have documented the prediction of aspects of the IPO (e.g. Meehl et al. 2016) and have noted that the response to volcanic eruptions could explain in part why there is less overall predictability of the IPO compared to AMV (Meehl et al., 2015).

Line 83: A paper that should be referenced here that was important for documenting one of the main methods of bias adjustment that has subsequently been used is Doblas-Reyes, et al. 2013 (already in the reference list).

Lines 279-281: The authors need to explain more clearly what a negative value of MSSS means. They say in passing that PRED has lower ACC values than HIST, but more explanation would be helpful for the reader to interpret this important result which produces strikingly large areas of negative values in Fig. 3.

Lines 370-372: The authors note a very interesting feature in that their model drifts differently in two different periods. They should elaborate a bit more about this potentially very important aspect of their simulations that has profound implications for assessing prediction skill.

References

Meehl, G.A., H. Teng, N. Maher, and M.H. England, 2015: Effects of the Mt. Pinatubo eruption on decadal climate prediction skill. *Geophys. Res. Lett.*, 42, 10,840-10,846, doi:10.1002/2015GL066608.

Meehl, G.A., A. Hu, and H. Teng, 2016: Initialized decadal prediction for transition to positive phase of the Interdecadal Pacific Oscillation. *Nature Communications.*, 7, doi:10.1038/NCOMMS11718.

C2

C3