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Geoscientific Model Development Discussions

Interactive comment on "An optimally tuned ensemble of the "eb_go_gs" configuration of GENIE: parameter sensitivity and bifurcations in the Atlantic overturning circulation" *by* R. Marsh et al.

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Dear Bob et al. – please go ahead and reply to the Referee comments now that both are in.

In particular – whatever you can propose in terms of adding a little more detail and substance to the paper, as touched on by both Referees, would aid the final paper. For instance, Referee #2 found your fine-scale sampling of parameter space of interest and would like to see a little further detail/analysis to more fully understand what is going on

here. There were also suggestions of developing the comparison between the tuning method and alternative methodologies.

Also please clarify whether a single parameter set, or all 5 highlighted points, is your recommendation for future work. If 5 – in what way do these 5 provide a useful hold on model 'uncertainty'? For instance – seeing the spread (between the 5) of responses of e.g. AMOC strength and Arctic and/or Antarctic sea-ice cover, under a simple global warming scenario, would be instructive and help give a sense of whether the 5 members predominantly just represent slightly different initial distributions and circulations, or whether they span a wide range of dynamical sensitivities to perturbation.

Lastly – the reference model – 'GMD11' actually generally scores 'better' in the Taylor diagrams than the 5 selected points. Why? As mentioned by Referee #1 – GMD11 is a key point of comparison and we need to have a summary description of how it was tuned. It is surprising that all this tuning effort does not produce an objectively 'better' model than (ad-hoc tuned?) GMD11. We need to have a little discussion of 'why'. I do not see this (apparent failure to create a better model tuning) as a series issue, and you many even want to argue that one of more of the 5 selected members are in fact better. For instance, the value of creating an ensemble of calibrated models might out-weight the availability of a single previous instance (GMD11), but then this does require more discussion and justification of the 5-member ensemble and what advantages it conveys in being used (instead of e.g. GMD11).

If you find it easier to revise the manuscript at the same time as you reply to the Referees, then please do, but I would prefer on balance to see the replies first if possible (we stand a better chance of a faster and overall smoother process this way).

andy

Interactive comment on Geosci. Model Dev. Discuss., 6, 925, 2013.