

Response to reviews:

Referee 1:

- 1) *Need for more than one season to establish a baseline* – the proposal now asks for an ensemble of high resolution seasonal runs with climatological SST (5 or more)
- 2) *Need to define metrics, meta data*
Appendix II now provides information on the experimental design, output (including meta data) and metrics. We have adopted the reviewer's suggestion to use the climate model output rewriter (CMOR) that was established by PCMDI and used by the IPCC modeling groups.
- 3) *Need for ensembles* – we now require 5 or more ensemble members
Use of same SST – we now recommend the use of the HADISST – but this may not be possible for everyone, especially if they already have climatology runs with other versions of the SST, or they have special high resolution versions of the SST
Use of same atmospheric data for initialization (e.g., ERA40): we do not believe that it is critical that each group use the same reanalysis data (here we defer to the TFSP protocol – see Appendix II).
- 4) *Need for a minimum criteria for MJO/ISO simulation* – we plan to work with the US CLIVAR MJO working group on this phase of the project. The proposal now asks each group to provide the output necessary to compute the level 1 metrics developed by the MJO WG. We will encourage/discourage participation in that phase of the project based on the results from the level 1 metrics.
- 5) *Should establish quantitative relationship between ACE, SGP and hurricane statistics in high resolution runs to assess performance in the coarser (2deg) runs* - the proposal now states that this will be done from the high resolution runs with observed SST or the coupled runs.

Referee 2:

- 1) *Need objective measures to assess cyclone activity* – this is now discussed in Appendix II.
- 2) *Need to analyze observed data to establish the relationships between ACE, SST and SGP with tropical cyclone statistics, so that they can be validated in the 20 year AMIP runs* – this is now included in the revised Fig. 2b.
- 3) *Need for an ensemble runs* - the proposal now asks for an ensemble of 5 or more runs
- 4) *Do coupled models have adequate skill in capturing the changes in tropical cyclone activity associated with the Madden and Julian Oscillation (MJO)?* - we plan to work with the US CLIVAR MJO working group on this phase of the project. The proposal now asks each group to provide the output necessary to compute the level 1 metrics developed by the MJO WG. We will encourage/discourage participation in that phase of the project based on the results from the level 1 metrics.

Referee 3:

- 1) *It would be good to see if the models can reproduce the correct magnitude of the modulation by the MJO. For example, to the north-west of Australia, the modulation is about 4:1 between extreme phases of the MJO* - We thank the reviewer for highlighting that result. We will certainly look at that in the model simulations.

Referee 4:

- 1) *The proposal is too independent of other projects – especially would like to see linkage with Task Force for Seasonal Prediction runs (include more emphasis on coarser res runs)*
We have changed the starting dates to be consistent with TFSP protocols (the protocols are now included in the proposal). The TFSP (coupled or predicted and specified SST) runs now can provide a natural set of 'control' integrations against which to test the impact of higher resolution, as suggested by the reviewer.
- 2) *It is our experience at ECMWF that low (~2 deg) to medium (~1 deg) resolution experiments enable much study of interannual variations in tropical cyclone numbers, genesis locations and, for ~1 deg resolution, tracks. Certainly for a 1 deg model, by far the biggest issue is the model background climate. This in itself has some sensitivity to resolution, but the physical parameterizations typically play the dominant role.* The proposal is now much more amenable to also looking at coarser resolution runs to assess the impact of resolution and for establishing some of the basic hurricane statistics.

Referee 5:

- 1) *Link to TFSP* – We have changed the starting dates to be consistent with TFSP protocols (the protocols are now included in the proposal).
- 2) *Should relax high resolution constraint – the reviewer feels that the TL159 JMA model (about 1 degree resolution) is OK at least for tropical genesis issue, from experience of the study about the global warming effect on typhoons (Sugi, 2002). For the intensity issue, even 0.5 degree model may not be sufficient.* The proposal is now much more amenable to also looking at coarser resolution runs to assess the impact of resolution and for establishing some of the basic hurricane statistics.
- 3) *Should change the period (1950-present) of AMIP-like simulations to the period (1979-present) for TFSP* – done.
- 4) *How do we get the MJO effect from these experiments? The results may be closely related to not only each model and MJO phases but also each assimilation system and created initial conditions for hurricanes. This is just a question, not necessarily against the proposal.* Yes, the initialization may be an issue, and at Goddard we may try to initialize from several different reanalyses.
- 5) *Our group of MRI/JMA is now considering joining this project. From view of cost-gain, we feel that simulations using TL319 (about 0.5 degree resolution) are*

a bit tough work at our resource. The proposal is now much more amenable to also looking at coarser resolution runs to assess the impact of resolution and for establishing some of the basic hurricane statistics.