YOTC MJO Task Force – 9th Telecon

Meeting time: 21:00 GMT, 23rd June 2011.

Participants

Task Force:

Matt, Duane, Ken, Harry, Frederic, Daehyun, Prince, Masaki, Augustin, Chidong, Eric, Joshua, Jon, Hai

Others:

June-Yi Lee, Peter Gleckler, Jon Petch, Xianan Jiang, Steve Woolnough, Kazu Kikuchi

Proposed Agenda

1. Peter Gleckler from the Cimate Metrics Panel + discussion
2. Diabatic heating MIP
3. BSISO indices for real-time monitoring and forecast verification
4. Update on WCRP OSC in Denver
5. Process-oriented metrics

Meeting Minutes (by Matt and Duane)

Before starting discussing the items on the agenda, Duane raised the issue of TF progress in the face of a number of different activities. He suggested that we should set-up formal sub-projects with designated leaders of these sub-projects to shepherd their progress. Eric agreed and pointed out that in the first TF telecon we had already outlined sub-themes with groups of people attached to each. However, there was no designation of leader with each theme, which may be hampering progress. All agreed that this was a good idea, with further discussion on this topic later in the telecom.

1. Climate Metrics Panel

Peter Gleckler of PCDMI was invited to talk to us about the Climate Metrics Panel and their need for a 1-number metric to measure the performance of climate model simulations of the MJO. The Climate Metric Panel is a joint effort between WGNE and WGCM. What is required is a "simple" 1-number metric that gives a quantitative measure of agreement between the simulated MJO and observed MJO.

Ken has already shared his suggestions for a metric with Peter (and the TF). Ken's metric idea was discussed with the TF in previous telecons and e-mails. The idea is to project model data onto the observed pair of EOFs of tropical OLR, then measure the peak lag correlation between the projection coefficients, the lag of this peak correlation, and the absolute strength of the projection. Then, the "metric" would need to be some 1-number measure of the difference between the model's values for these 3 numbers and the observed values.

Harry and Chidong suggested that the east/west power ratio (or the like) could be more or equally suitable as a means of defining a metric. This is what Daehyun and Prince have been using for comparisons with the process-oriented metrics. Ken and Peter thought that computing the 2-d power spectrum could be too complicated for modelling centers. Harry disagreed.

Further e-mail communication between Harry, Ken, Daehyun, and Prince has ensued, with agreement that a "simple" paper could be written documenting the suitability of each approach and providing a recommendation to the Climate Metrics Panel.

Peter ended saying that the time frame required for the Metric Panel was by the end of this boreal summer. Duane to stay in contact with Peter.

2. Diabatic Heating MIP

Duane summarized current status. Note the web-page description at http://www.ucar.edu/yotc/mjodiab.html. Currently there are two different types of simulations planned: (1) 20-year climate simulations; and (2) a series of daily initialized hindcasts. In previous telecons we have heard more about the thinking behind this project specification. Some feedback on this specification is still required from the GCSS.

With regards to creating and storing model output, Jon Petch and Prince have been leading the charge in this activity at the Met Office. Prince has produced 48-hr forecasts from 20 different ICs during the October 2009 case. He has output all diabatic heating terms at every time step. Harry says that his experience with creating this output with the UM would be useful for him to do the same at the Bureau.

Frederic asked whether the set of initialized hindcasts should be ensembles. Jon Petch said no.

3. Boreal Summer indices for real-time monitoring and forecast models

June-Yi Lee and Kazu Kikuchi provided powerpoint presentations on this topic for the TF to view and discuss. The have both been working on methods to diagnose and monitor the special intraseasonal variability that occurs in the Asian monsoon region in boreal summer.

June-Yi's method uses EOFs of the combined fields of OLR and 850hPa u and v during boreal summer limited to the Asian monsoon domain. Unlike what occurs for the austral summer (or all-season) analysis, there is no distinct EOF pair or set of EOFs that stand out from the others. So a question arises as to how many EOFs to retain for an index. The cross spectrum calculations between the various PCs helps to understand them. In particular, the cross-spectrum between PCs 1 and 2 shows a greater peak in coherence (coherence-squared of ~0.5) than any other combination of PCs. This peak occurs for a period range of about 30-80 days. This provides some justification for selecting only the first 2 PCs. June-Yi has created a web-page about her technique at http://iprc.soest.hawaii.edu/users/jylee/miso/miso.htm. She was also able to present the recent real-time projections, as the recent monsoon variability over India provides a good case. It appears that there may be some value with monitoring

the variability in a phase space defined by PCs1 and 2 (similar to what we already do with RMM1 and RMM2), but it is perhaps a little noisy.

Kazu has approached the problem using Extended EOFs of OLR in the tropical belt around the whole globe. This has worked well for his diagnostic studies of monsoon variability, but only recently has he tried to apply it to real-time monitoring. Since the technique was originally developed with filtered data and time-extended EOFs, it involves some assumptions for its extension to real-time. His web page is at http://iprc.soest.hawaii.edu/~kazuyosh/. He only shows the leading pair of EOFs. In the Asian domain the patterns look quite similar to those of June-Yi. His real-time monitoring phase space also looks fairly similar for the recent week or so.

Ken has a method that uses spatial patterns of OLR derived from cyclostationary EOFs that has been presented to the group previously.

Matt encouraged June-Yi to supply her EOFs to Jon G so that he may be able to apply them to the suite of NCEP models. Ken has subsequently supplied his patterns to Jon as well.

Ken pointed out that in order for Jon to be able to apply these new techniques to any of the other model data they receive from the other centres, then we will need to ask for spatial data (as opposed to latitudinally-averaged data as is used for the RMM). Jon asked whether we will need to go through WGNE to ask for this. We probably need to do more research on the techniques before making this step.

Further e-mail communications on this topic have been made by Ken, Matt, June-Yi, Kazu, and Jon.

4. WCRP OSC

Matt reminded everyone that we plan to have a TF meeting during the OSC on Thursday 27th. Harry thought it may be inappropriate to do this during the OSC, but Matt has since convinced him that this is the best option.

5. Process oriented metrics

Daeuhyun supplied some slides. Following-on from the last telecom he has made some good progress defining a process-oriented metric using a "spatial" correlation of RH between model and ERA-Interim in a specified domain of the precip vs. height plot. If one outlier model is removed (AM2 with Tok=0.1), then he gets a reasonable correlation between the process metric and the "MJO" metric of the east/west power ratio (correlation of ~0.65).

Prince will do same calculations with CMIP3 models.

E-mail discussion have since been had, mostly between Daehyun, Harry, and Prince, on ways to further improve the process metric, such as take into account the model bias (a simple spatial correlation of the RH does not do this).

Sub-groups (again)

More discussion of the proposed sub-groups. Matt suggested the following “leaders”:

1) Process-Oriented Diagnostics/Metrics for MJO Simulation - TF Lead : D. Kim

2) Boreal Summer Forecast and Monitoring Metrics - TF Leads: M. Wheeler, J. Gottschalck

3) Vertical Structure and Diabatic Processes of the MJO - TF Leads: D. Waliser, P. Xavier

4) MJO Metrics for WGNE/WGCM Climate Metrics Panel - TF Leads: K. Sperber, H. Hendon

No-one seemed to disagree.

IUGG mtg in Melbourne

Seven of us will meet during the IUGG in Melbourne next week.