

YOTC MJO Task Force – 2nd face-to-face meeting

Meeting time: 10am-4pm, 27th October, 2011

Meeting place: Sheraton Denver Downtown Hotel

Participants:

Task Force

Matt, Duane, Ken, Harry, Frederic, Daehyun, Masaki, Augustin (on phone), Joshua, Hai, Dave, Rich.

Others

June-Yi Lee (IPRC), Mitch Moncrieff (YOTC), Steve Woolnough (CASCADE, GASS), Carlos Ereno (CLIVAR), Tetsuo Nakazawa (WWRP), Hsi-Yen Ma (Steve Klein group/PCMDI).

Proposed Agenda

10:00 am – 10:30 am: Assemble and Setup

10:30 am – 10:45 am: Overview of TF Activities and Charge for Meeting
Matt Wheeler and Duane Waliser

10:45 am – 11:30 am: Boreal Summer Forecast Metrics
June-Yi Lee, (Jon Gottschalck), Matt Wheeler

11:30 am – 12:00 noon: Vertical Structure and Diabatic Processes of the MJO
Duane Waliser, (Jon Petch), Steve Woolnough, Xianan Jiang, (Prince Xavier)

12 noon – 1:00 pm: Lunch provided in room.
Frederic Vitart to discuss Subseasonal Planning Group

1:00 pm – 2:00 pm: Process-Oriented Diagnostics/Metrics for MJO Simulation
Daehyun Kim, (Eric Maloney), (Prince Xavier), Harry Hendon

2:00 pm – 3:00 pm: MJO Metrics for WGNE/WGCM Climate Metrics
Ken Sperber, Harry Hendon

3:00 pm – 3:30 pm: MJO Modulation of TCs; Prediction and other Considerations.
Joshua Fu

3:30 pm – 4:00 pm: Discussion and Way Forward
Matt Wheeler and Duane Waliser

(person) = not able to attend

Meeting Minutes (by Matt and Duane)

1. Overview, charge for meeting, membership, and co-chair change

Duane provided an overview of what the MJO-TF has achieved, and what we are currently working on. This was adapted from his recent presentation on the MJO-TF at the 36th Climate Diagnostics and Prediction Workshop (in early October).

Duane also provided a “charge for the meeting”, outlining some progress steps that could be achieved today.

Membership of the TF was also discussed. We currently have 16 members of the TF, which is already more than ideal in the eyes of our sponsors. However, there are some others that are doing significant work for the TF that would be nice to acknowledge. Further, rotation of members is often beneficial for the health of a group. We thus asked for volunteers to step down from the TF to allow room for others. (Dave and Harry have subsequently volunteered).

Further to the membership changes, Eric will be replacing Duane as co-chair. Duane will continue as a TF member and will continue his active role in the joint activity with GASS on the vertical structure and diabatic processes model intercomparison.

2. Boreal summer ISO index

June-Yi presented the new index that has been developed for real-time monitoring of the boreal summer intraseasonal variability in the Asian monsoon region. The domain 10S-40N, 40-150E is used with EOFs computed for the combined fields of OLR and u850.

Compared to the case for the RMM indices along the equator, the “MISO” indices are noisier (e.g. the coherence-squared between the leading pair of PCs is about 0.45 compared to 0.76 for RMM1 with RMM2), but they are able to account for a greater amount of variance extending northwards into Asia. Another difference is that two modes (comprising a pair of EOFs each) appear relevant.

June-Yi has compiled a set of figures for a journal paper, and will work with Matt (as well as Bin Wang, Joshua, and Duane) to write a paper. This is the most important thing to do for this activity at the moment. ACTION: continue work on journal paper (mostly June-Yi and Matt).

Case studies for periods when the MISO indices worked well for monitoring need to be provided. For example, how does 1979 look? ACTION: June-Yi to look at 1979 and perhaps other years.

What seasons should be monitored? April to October for MISO1+2; May to July for EOF3+4.

Ken has also supplied the Annamali and Sperber cyclostationary EOFs to June-Yi for comparison. ACTION: June-Yi to make comparison.

Given the results of June-Yi's investigations, those present thought that it is now time to start implementing the MISO indices at NCEP for the comparison of the operational forecast models (like what is already done for RMM1 and 2). Jon has already indicated that NCEP is happy to do this. However, it will require asking for additional data from the operational centres, since currently they only provide latitudinally-averaged data. ACTION: Matt to work with Jon on writing a new "WGNE letter".

3. Vertical structure and diabatic processes of the MJO – joint activity with GASS

This activity is progressing well. The first call for participation was sent out on 15th July, and about 20 modelling groups have volunteered to contribute to one or more of the three components. We are now at the stage of fine-tuning the data request. This is being worked on by Xianan Jiang, Prince, Nick Klingaman, Jon Petch, Steve Woolnough, and Duane. ACTION: This group to meet separately and define their next steps.

(a 2nd call for participation was sent out to a wider audience on 2nd November)

Detailed descriptions of these experiment designs can be found on both the project's web site and wiki page:

<http://www.ucar.edu/yotc/mjodiab.html>

http://climate.ncas.ac.uk/pmwiki/MJO_Diabatic_Hindcast/index.php/Main/HomePage

4. Subseasonal planning group

Frederic gave a presentation about a new WCRP/WWRP/THORPEX planning group for subseasonal prediction, led by him and Andy Robertson of IRI. This group was created as a result of discussions at the WMO Commission of Atmospheric Sciences (CAS) 15th session in November 2009 and a later workshop in Exeter in December 2010. The planning group was established in 2011.

There will be a kick-off meeting for the planning group members in December 2011. The overlap with the members of the MJO-TF is Frederic, Duane, Harry, and Hai.

The first task of the group is to prepare an implementation plan.

As the MJO is one of the leading sources of predictability on this time-scale, synergies will exist with the MJO-TF.

5. Process-oriented diagnostics/metrics

Daehyun gave a presentation which included scientific support for a process-oriented metric based on the vertical profile of relative humidity (RH) when binned as a function of precipitation rate. We have been discussing this metric in our telecons for some time. Prince and Ken also made significant contributions to Daehyun's presentation.

The idea behind the RH composite metric is that models with better MJOs tend to get a large moistening of the mid-to-lower troposphere during the transition from weak to heavy precipitation rates. The RH composite also appears to be relevant for the moisture discharge-recharge mechanism of the MJO.

The main aim of this activity is to find a process-oriented metric that is strongly related to the fidelity of the MJO in different models. Daehyun has been measuring the strength of this relationship using the correlation with 3 different “MJO metrics”: eastward power of precip in the MJO spectral region (wavenumber 1-3, periods 30-70 days), east/west power ratio, and (east/west)*east power.

There is still some debate whether these are the best “MJO metrics” – see discussion of Ken’s presentation next.

The actual RH composite metric that Daehyun has been using is the same as what Prince has used: Spatial correlation of RH between the model and ERA-Interim in the box defined by precipitation rates of 2-34 mm/day and pressure levels 900-200 hPa.

Daehyun finds the best correlations (R-squared of 0.57 without observation dot) when using the east power for the MJO metric, and smaller correlations (e.g., R-squared of 0.34) using the “projected” MJO metric suggested by Ken (see its description in next section).

However, there is a large sensitivity (of the RH metric) to the “observational” dataset used.

ACTION: Further comparison needed with Ken’s results on the MJO metrics (see also next item).

Related to this topic, Dave Raymond gave a presentation on “lessons about cumulus parameterization from TC studies”. Dave and colleagues are using results from the TCS-08 and PREDICT field programs to provide a benchmark for testing the behaviour of cumulus parameterizations in large-scale weather and climate models. The research is ongoing. For example, what the implications might be for the simulation of the MJO are still unknown.

6. MJO metrics for Climate Metrics Panel

Ken reminded us of the strong need to provide a MJO metric to the WGNE/WGCM Climate Metrics Panel. Importantly, the metric needs to be easy to calculate, reproduce, interpret, and established in the peer-reviewed literature.

To test the different metrics that have been proposed, Ken has devised a method to compare their ability to discriminate between ‘good’ and ‘bad’ MJO models, where the latter is determined by another more complicated metric computed from the pattern correlation of the eastward propagation of the life-cycle of near-equatorial OLR.

The result of Ken's analysis was that the MJO metric that he has devised, computed from the maximum correlation of the projection coefficients (PC1 and PC2) of OLR-only EOFs shows the best relationship to the 'test' metric defined above.

However, as pointed out by Harry and others, the test metric is highly related to the PC1/PC2 maximum correlation, so the result is somewhat built-in. Perhaps it is best to compare against the results of Kim et al. (2009) instead, since we have already done a comprehensive (and published!) analysis of those models.

ACTION: Ask everyone to rank the Kim et al. models according to how well they think each model does with the MJO. This should provide our "expert" assessment of these models to compare against the simple metrics. Matt to send out e-mail to MJO-TF asking for this ranking.

ACTION: How well do the different metrics perform for the Kim et al. (2009) models?

Harry also asked whether the eastward cross-power of u850 vs. precip (or OLR) could be used as yet another MJO metric to test. ACTION: Daehyun to do this?

Probably the Climate Metrics panel will be interested in more than just one MJO metric, so the coherence metric may be able to be promoted later. Importantly, however, we need to submit the first simple metric very soon!

CMIP5

There was a brief discussion regarding the WGCM charge to us and Duane's acceptance on behalf of the group that we make sure an MJO evaluation paper for CMIP5 is written and that Ken and Daehyun have agreed to lead.

7. MJO modulation of TCs: A new sub-project for the MJO-TF?

Joshua gave a presentation outlining a proposed new activity for the TF. He has already discussed this activity during a recent telecon. His proposal is:

Objective: Assess the impacts of MJO on TC predictability over Indian Ocean, Western Pacific, East North Pacific, and Atlantic Basin.

Approach: A coordinated case study using a case from the YOTC period.

The conclusion of those present was that this is not something that the TF should pursue at this time.

8. Other (Hsi-Yen presentation and next meeting)

Hsi-Yen presented 2 slides on his work on examining the relationship between MJO and other tropical convection fidelity in short term hindcasts during YOTC vs long-term integrations (i.e. climate biases).

We should have another face-to-face meeting of the TF in the latter half of 2012. It is usually best to hold these in conjunction with other meetings. Several possibilities were discussed, the best being in conjunction with the planned GASS meeting in Boulder in September 2012. However, there is potential conflict with an AAMP meeting in China which will be attended by Ken and Harry.

ACTION: Matt to make further inquiries to set a date and place for a future TF meeting.