

## **Minutes for the meeting of the MJO-TF on 27 October 2013.**

**Location was Macao, the day before IWM-V.**

**TF members in attendance:** Matt Wheeler, Eric Maloney, Steve Woolnough, Charlotte DeMott, Duane Waliser, Tomoki Miyakawa, Camille Risi, Rich Neale, Daehyun Kim, June-Yi Lee, Prince Xavier

**Others:** Min-Seop Ahn, Hae-Jeong Kim, Nick Klingaman, Andrew Robertson

***Note, the first half of the meeting was held in joint session with the CLIVAR AAMP Panel.***

**AAMP Panel Members in attendance:** Gill Martin, H. Annamalai, Aurel Moise, Akio Kitoh, Carlos Ereños, Tianjun Zhou, Andrew Turner

***8:30: Introduction from co-chairs of AAMP and MJOTF. Include time for quick introduction from everyone in room.***

***8:50: S2S project discussion led by Andy Robertson (with support from S2S members Duane Waliser, Steve Woolnough, June-Yi Lee, and Harry Hendon (via internet)).***

**Andy Robertson** talked about the motivation behind and implementation of S2S. S2S includes international scientific coordination efforts and a modeling database of real-time forecasts and for some systems a hindcast set.. A trust fund has been set up by WMO. 10 operational forecast centers will contribute to database. The database will use TIGGE format. The model archive will be hosted at ECMWF. Data exchange will be hosted starting in 2014.

The forecast/hindcasts will not use a standardized procedure, with each group doing their own forecast/hindcast methods.

There is a strong applications component to the project on the WWRP side. S2S is one of three post-THORPEX groups. This is a great opportunity to use information on and assess interaction across multiple timescales.

In terms of applications, a key question is what are the key phenomena? The activities of the MJOTF are highly relevant because the MJO (and monsoon ISV) is considered to be a key source of multiweek predictability and variability in the monsoon.

It is hoped a key outcome of this meeting is to have a good discussion of monsoon prediction, one of the key scientific issues of S2S. A discussion of key modeling issues is also salient.

Andrew noted that monsoon rainfall prediction is poor over land. Land-atmosphere interactions may be critical to this problem. Monsoon ISOs are a relevant process to prediction, including impacts on monsoon onset, active and break spells.

An S2S meeting will be held at NCEP in February. By then, we should have a 2-3 page document describing each of the S2S subprojects and objectives for the coming 5 years. UKMO will maintain an online database that includes post-processed fields like weekly averages, daily weather stats.

Duane and Steve framed the objective of the current joint meeting. Given mutual interests, possible collaborative activities between AAMP/MJOTF and S2S should be discussed.

Duane present a few slides. The resources we have for a joint effort include the S2S database, MJOTF-GASS hindcasts and detailed physical fields, and the ISVHE database. Possible topics for collaboration include: Maritime continent prediction barrier; Physical processes and vertical structure of boreal summer ISO; Ocean-atmosphere interactions. On the latter topic, do we have the right type of model runs/output and framework developed in S2S to pursue air-sea interactions? Maybe this topic should be matured more in the MJOTF first?

Duane also mentioned the possibility of forecast evaluation: Boreal winter MJO and midlatitude winter forecast skill; Boreal summer ISO and S/SE Asia; Applications? Duane and others questioned whether this latter topic should be a high priority given our expertise. However, Steve chimed in about possible applications to extratropical prediction and west African monsoon.

Duane presented some of Harry's ideas, who could not make the meeting. It was asked whether AAMP needs to do something jointly with the task force? Harry suggested three possible projects:

a) one focused on forecast system developments (there hasn't been any effort to address optimum configuration of multiweek systems). Specifically, an assessment of reliability of MJO/MISO predictions from ISVHE, with outcome of providing guidance for ensemble generation strategies. Could tie in with WGSIP.

b) role of land surface for monsoon ISV. Again using ISVHE, explore land surface (soil moisture) interactions with rainfall, especially ISV predictions. Outcome will be improved guidance for initialization of land surface, and understanding of role of land surface for promoting monsoon ISV, especially northward propagation of MJO/BISO. Would require access to land surface initial conditions and predictions (not sure if in ISVHE)

c) Development of monsoon specific prediction products, especially focusing on MJO/BISO: : we need to go beyond the MJO RMM phase portraits, especially thinking about likelihood of rainfall extremes, and presentation of seamless forecast products . Again, key resource could be ISVHE.

Andy noted that by the end of 2015 separate monsoon panels will not exist. Andy mentioned monsoon onset over Africa as a possible collaborative topic and verifying ISO forecasts in SE Asia. It is noted that the topic of boreal summer ISV is very commensurate with MJO TF work.

Steve asked where the low-hanging fruit might be. One option is boreal summer ISV, applying our current methodology and knowledge to the S2S database. But what about new science? Getting funding might be easier for new science. Maritime Continent prediction barrier might be good collaboration. This topic includes physics and prediction problem, and elements of air-sea and land-atmosphere interactions. Matt stated that interest exists in Australia for a Maritime Continent focus. Harry's statement agrees that the Maritime Continent is relevant to monsoon prediction. It was noted that we already have modeling resources to study the MJO-Maritime Continent (in the GASS/MJOTF database), and in ~2016-18 a Maritime Continent field project may occur. It might be useful to do some short term work to motivate the field project. The diabatic heating project database should be excellent to apply to Maritime continent given physical tendencies on timestep level. S2S database can't answer the Maritime Continent problem fully because it will simply have standard data archived by operational models (daily averages). However, maybe we can motivate process studies with the S2S dataset. Gill asked: What will this study add to what we know about Maritime continent biases? We don't have any impression yet of systematically how models do in terms of MJO over Maritime continent. Prince asked: Horizontal resolution is critical for the Maritime continent, and do we learn anything for comparing models from different resolutions? The S2S doesn't have 6 hourly precipitation yet, which might impact Maritime Continent diurnal cycle studies.

**ACTION ITEM:** Request more 6-hourly data into S2S database, especially precipitation.

The S2S database plan is essentially finalized, but often storage issues lead to constraints when someone wants to add a variable. Maybe if a priority for the addition of a variable comes out of this meeting, it could be presented to S2S. As far as AAMP interactions with the task force and S2S, AAMP might not want to be so specific to Maritime Continent. As far as Maritime Continent, Steve asked whether we might want to understand issues more generally of why the MJO does not make it across Maritime Continent in observations, in addition to in models. It was asked whether ocean-atmosphere interaction people have interest in Maritime Continent? Nick said he is not sure how much we can get out of current databases on air-sea interaction in Maritime Continent. Steve asked whether models producing large SST

anomalies in W. Pac have better predictive capability? Might we get this out of S2S database? Also, the potential for how mean state biases affect predictive capability.

The monsoon panel seems interested in how Maritime Continent affects intraseasonal variability. Aurel said it is a key and interesting questions about whether the Maritime Continent should be part of the monsoon system. Andy said the Maritime Continent is a nice example of where ISV and ENSO come together and might be opportunity for forecasts of opportunity. Aurel said on the Australian monsoon side the monsoon is intrinsically linked to what happens in Maritime Continent, hence the motivation for the upcoming field program. There is an early December workshop in Australia to discuss planning for this field program, which will include input from the US, Japan, and the UK.

Duane argued that it would be nice if by end of the week we came up with some specific questions given existing datasets to motivate upcoming field projects and to more broadly study the Maritime Continent issue.

**10:30: CLIVAR Grand Challenge on “Intraseasonal, seasonal and interannual variability and predictability of monsoon systems.” Led by Andy Turner. We need to think of ways that the AAMP and MJOTF can work together on this and other challenges.**

The discussion essentially continued along the same lines of that discussed above. Andy asked what the monsoon subproject of S2S should look like? AAMP is interested in boreal summer ISV. MJOTF is also doing this, and so there could be joint efforts in this regard. Steve said monsoon onset in Africa will likely be a big focus. There might be resources in UK to do effort on monsoon effort in Africa and Asia, focusing on predictability aspects of monsoons on seasonal to intraseasonal timescales and active/breaks, etc. And how onset affects local rainfall. June-Yi says ISHVE dataset is good resource for such studies, and June-Yi could form link between S2S, MJOTF, and AAMP. Andy said that Tianjun and he should help foster availability of ISVHE data. Tianjun thinks collaboration with MJOTF looking at relationship between diurnal cycle and MJO could be a good idea for AAMP. Regardless, the consensus of the discussion to this point seems to indicate that the MJO Task Force efforts regarding S2S, and possible collaborations with AAMP, should be initially focused on the Maritime Continent.

Key people were identified to foster links between the MJOTF, S2S, and AAMP.

For the Maritime continent: Gill, Prince, Steve, Matt and Harry, Nick and Charlotte, Duane.

For BSISO forecasts: Andy and June-Yi

The S2S project wants 2-3 page plan for subprojects by February capturing the essence of discussion here.

**ACTION ITEM:** Steve and Duane would take responsibility for drafting this plan, and identifying necessary resources.

***11:30: BSISO forecast activity at APCC (Hae-Jeong Kim with support from Matt Wheeler)***

Hae-Jeong Kim from APCC presented. The APCC boreal summer database has four modeling centers right now, with hope for participation from more centers.

A timeline for implementation of different parts of the project was presented:

2013: BSISO real-time forecast system

2014: Real-time verification system

2015: Develop MME based method.

2016: Implementation of MME forecast system.

APCC is also thinking about an S2S training program, which is a subject still under discussion. The new S2S international coordination office on Jeju Island could help foster this.

Duane and Steve argued that we might want to expand forecast metrics beyond EOF correlation, which might have greater implications for local rainfall prediction, etc.

The AAMP looks at this activity as very motivating, especially getting more people to provide output and also end-user training activity.

**ACTION ITEM:** Contact WGNE to pressure more modeling centers to get involved in this boreal summer activity. (Matt to do this).

It was noted that we did talk about S2S making some forecast products available in real time, which could link to the boreal summer forecast activity.

***13:10: Camille Risi – Use of isotopes for process-oriented diagnostics.***

Camille introduced the relatively novel concept of using water isotopes to provide additional information on the physical processes occurring in nature and models. She noted that John Warden et al (2007) already contains some process-oriented diagnostics for the mean state, which might serve as a guide to develop some MJO diagnostics.

Camille demonstrated some recent efforts to develop some isotope-based diagnostics during the DYNAMO period. Camille showed the q-deltaD cycle (HDO). She broke down HDO tendencies due to different tendencies. Right now, isotope code exists in 8 models, with about a 50% increase in lines of code with implementation. If isotopes are implemented in the Hadley Center model, it could also run in the model with resolved convection.

A possible effort to explore possible hindcast intercomparisons during DYNAMO with 8 isotope-enabled models was proposed. Duane noted that how to initialize the model fields is a big issue. Maybe initialize all models with uniform or simple distribution? It was also noted there exist possibly useful ground based measurements to assess BL variability in Maritime Continent region, which might help support S2S effort discussed above.

Matt asked what we can do to help Camille push forward with a possible hindcast intercomparison effort. Camille said it would help if the MJO task force provided impetus and backing for such DYNAMO hindcast effort as a motivation. Duane said specifications should be set before any effort proceeded. Camille said they would be able to analyze the output if an intercomparison were done, and so we would not need to go find further resources.

**ACTION ITEM:** In parallel with the existing GASS/MJOTF DYNAMO hindcast case plans, develop plans for a hindcast intercomparison with isotope enabled models. The MJOTF can help provide impetus for this effort.

***13:30: Process-oriented diagnostics. Eric Maloney, Daehyun Kim, Tomoki Miyakawa***

To save time, Tomoki gave the only presentation on cumulus momentum transport diagnostics. A plan is pushing forward with Xianan and Jihyun Oh to analyze cumulus momentum transport in GASS/MJOTF diabatic heating expt. We will see how this progresses, and maybe get Xianan to give an update at a future telcon.

**ACTION ITEM:** Xianan will give an update at a future telecon on cumulus momentum transport in GASS/MJOTF diabatic heating experiment simulations.

***15:00: Air-sea interaction. Charlott DeMott, Nick Klingaman, Steve Woolnough***

The status of task force air-sea interaction efforts was summarized. Two of our members (Surya Rao and Jerome Vialard) involved in this effort could not attend the meeting.

Charlotte DeMott and Nick Klingaman summarized the current status of the effort. Nick waiting on a fellowship proposal in the UK to fund air-sea interaction experiments with an 1D ocean model below several atmospheric GCMs, with possible funding to be known in Spring. Charlotte is active in experiments with coupled versions of SP-CCSM as well as sensitivity experiments using SPCAM with different time resolution SST fields. It was suggested that Joshua Fu might be entrained into this effort. We'll have to get an update on Surya's activities and thinking at a future telecon, for example accompanied by a presentation. Jerome is keen on an air-sea interaction review, although not sure about leadership of this effort.

Steve thinks there is merit in air-sea interaction review idea, at least to present hypotheses on how to proceed with process-oriented diagnostics or common experiments. Seems to be consensus on how we proceed.

**ACTION ITEM:** Pursue possible air-sea interaction review to develop hypotheses on how to proceed with process-oriented diagnostics or common experiments

***16:20: GASS/MJOTF diabatic heating project: Progress update. Steve Woolnough, Duane Waliser, Nick Klingaman, Prince Xavier, Xianan Jiang***

A brief update on the status of the project was given. It is anticipated that the first three papers on the project will be submitted by the end of the year. It is anticipated that the archive of experiments will be opened to the community in November. Some discussion of whether a synthesis paper should exist was conducted, although no conclusion was drawn?

We also discussed the formulation of the future DYNAMO case with 10-day hindcasts, possibly ensembles.

**ACTION ITEM:** The DYNAMO case will be finalized shortly, by Nick.

A question was also asked about how we might broaden the use of the MJOTF/GASS project to other questions, some related to ISV but also beyond.

Possible extensions and ideas include:

- CMT
- Process-oriented diagnostics in a broader sense
- Maritime continent, other S2S goals
- Extend to do isotope run intercomparison (as discussed above)
- Boreal summer ISV, multiscale interactions, processes, land coupling (engage AAMP).
- Advertise and promote dataset. (with help of WGNE, GASS, CLIVAR)

***17:00: CMIP5 analysis work of monsoons and MJO. Min-Seop Ahn with help from Ken Sperber.***

Min-Seop discussed the status of the diagnosis of the MJO in CMIP5 models. The analysis is proceeding nicely.

**Action items** for Min-Seop include:

- Assessing 30-90 day variance and not only total variance
- Separate east-west ratio into “high ratio” and “low ratio” models and not segregating them by their proximity to observations.

- Update task force occasionally for comments on the analysis, sending updates to the entire task force, but make sure that Matt, Eric, Ken, and select others at a bare minimum provide comments.