Agenda: MJO Task Force Business Meeting
14 April 2016, Singapore (Centre for Climate Research Singpaore)

Attendees: Eric Maloney (co-chair), Steve Woolnough (co-chair), Charlotte DeMott, Daehyun Kim, Nick Klingaman, Tieh-Yong Koh, Tomoki Miyakawa, Ken Sperber, Matt Wheeler,Muhammad Hassim (invited), Harry Hendon (invited), Frederic Vitart (invited).

SW & EM briefly summarized ongoing MJOTF activities

- Process oriented diagnostics
- Prediction (Jon G writing paper on medium-range predictions)
- Boreal Summer ISO monitoring
- Maritime Continent
- Air-sea interactions
- Teleconnections
- Analysis of MJO in CMIP5

There followed a brief discussion on some prediction aspects including

1) Are we using the best BSISO indices and whether alternatives may be better, including Sperber&Annamalai, Kazuyoshi,Kickuchi and Wan, or simply the Wheeler and Hendon index.
   Action: TF to consider reviewing BSISO indices
2) The relationship between skill of large scale MJO (e.g. RMM) indices and local weather e.g. precipitation (or teleconnected signals), do we need to develop some appropriate skill metrics
3) Discussion on the possibility of extending MW's probability of exceedance (of a rainfall threshold) analysis to a wider area using satellite data

Action plan after the Maritime Continent workshop
We discussed possible MJOTF activities following on from the Maritime Continent Workshop

1) Process orientated diagnostics,
   a) Application of existing diagnostics to Maritime Continent Region
   b) Development of new diagnostics related to the interaction of the Maritime Continent and the MJO, e.g. the relationship between diurnal cycle fidelity and the MJO fidelity. We noted that diagnostics solely on the diurnal cycle and not related to the MJO are probably outside of the purview of our task force
   c) Charlotte and Nick are funded for air-sea interaction process and propagation across Maritime Continent (with some mechanism denial experiments).We discussed examining 3-6 key cases that could form the basis for a larger intercomparison. Could fulfill a partial need for a YMC modeling component. FV mentioned that it may be possible to ask modeling centers to re-run a few cases to save some subsurface output variables? Harry indicated he could contribute coupled experiments to this effort
      Action: Nick and Charlotte to share plans for case studies, post 1990, common period 1999-2010.

2) MJO Initiation analysis in ensemble, systematic analysis of initiation events to look at precursors, are there cases of MJO initiation with influence from the extratropics, analysis of S2S database may be helpful
3) Teleconnections:
    a. DK askedFV forecast relevant metrics for teleconnections. I seem to recall, FV urged us to consider requesting diagnostics that could be automatically derived from the S2S database.
    b. EM, SW&FV have funded projects in this area
    c. Need to engage with S2S sub-project (EM&SW currently on that group)
4) Local datasets. There is much untapped value in locally held datasets which could be used to enhance our understanding of the interactions of the MJO with the Maritime Continent, in collaboration with local partners.
   Action: To contact local Met Agencies, consult with Kunio and Chidong, etc to find out who is the right person to contact.Mechanisms for doing this through e.g. ASEAN-COF, APCC, WMO etc.

MJO Air-Sea Interaction Update

CD presented DeMott et al submitted paper on air-sea interaction diagnostics from a MSE perspective.The diagnostics package (level 1, 2, 3) is written in ncl and will be released at some point.

NK presented results from his analysis of SPCAM-KPP simulations, and in particular with two configurations of SPCAM (with 8 or 32 columns in the CRM)

1) SPCAM(8)-KPP and SPCAM(32)-KPP have quite similar MJO propagation
    - However SSTs from SPCAM(8)-KPP produce no MJO in an atmosphere only simulation for either SPCAM(8) or SPCAM(32); SSTs from SPCAM(32)-KPP has “reasonable” MJO in both
    - SPCAM(8)-KPP SSTs have cold bias particularly on equator
    - Implies incredible sensitivity to basic state, in the absence of coupling, but not in the presence of coupling?
2) Imposing SPCCSM mean state SSTs in SPCAM(32)-KPP doesn’t recover SPCSSM MJO (in fact has westward propagating convection), likely contributing factor is SPCCSM MJO sensitivity to El Nino which is missing in SPCAM-KPP, Experiments with imposed El Nino conditions didn’t recover El Nino MJO from SPCCSM, but preliminary analysis of ongoing experiments with 3 year EN-LN-N cycle seems to have promising results.

Summary of YMC status

MW presented a summary of YMC status

- 2 years starting in mid-2017 (July)
- Not yet clear where data will be hosted
    - Singapore Met Service host ASEAN collaboration data resource. ASMC, ASEAN Specialized Meteorology Centre
    - JAMSTEC,BMKG also have some discussions about data.
- Some national proposals funded, many still waiting for funding.
- Next implementation meeting in early 2017 in Malaysia or Philippines

EM and SW have received request for letter of support for YMC from Chidong Zhang, whilst we support the YMC it was not immediately clear on the benefit of such a letter.

Action: EM and SW to discuss the appropriate level for such a letter with WGNE

Recent results with NICAM

TM presented some recent results with NICAM - a range of experiments at varying resolutions with NICAM; 870m 2 days, 1.7km 2 weeks, 14km 20years, 7 km 5 years, 3.5 km 6 months and a fully coupled version is in development. The next HPC will be 20-50 times more powerful.

Various activities in MJO, including BSISO, CMT, Aquaplanet and idealized MC, about 10,000Ms available for MJO research, (30-55Msfor 30days @14km, 1600Ms for 30days @3.5km)

Aquaplanet at 220km with Warm Pool,

- with convection scheme fast Kelvin waves dominate, with no convection scheme much slower moving variability and larger-scales (Without Warm Pool mostly moist Kelvin Waves)
- Now carrying down to high resolutions 110km -14km -3.5km

Coupled development;

- using ocean componentof MIROC, 1 deg ocean, (0.25available), will take a long time to develop climate version, so we can look at sub-seasonal events, where don't need to worry about drift.
- Some results for May 1998 MJO in coupled model, associated with El Nino termination; Good? but is it just drift?
- More initial states, El Nino 2015 triggering event
- Miyakawa original 54 MJO cases – look at impact of coupling on MJO prediction
- Can also redo these cases for QBO phase swap

Presentation on Adames and Kim (2016) paper

DK presented the Adames and Kim paper on the MJO as a convectively coupled moisture wave, incorporating moisture mode theories for the MJO

- MJO appears as a dispersive Kelvin Wave, MJO cp=5m/s, cg=-2.4m/s
- Using vertically integrated column moisture, parametrize, P and hence u,v in terms of q and then look at process associated with anomalies(including in principle zonal advection, but basic state has no zonal gradient)
- Local processes represented by effective gms, with P'
- Meff includes normal GMS (M) + effect of radiation, critical aspect for scale selection is that Radiative feedback is scale selective

Report on MJO Analysis in the CMIP5 Model

Min-Seop has drafted document, KS has commented DK is working on it very soon (next week).

Action: Min-Seop to circulate to TF, TF to comment in timely fashion

Report to WGNE

SW has to report on TF activities to WGNE next week (orally and in writing). He will focus mainly focus on Maritime Continent and air-sea interaction activities

Note WGNE Systemmatic Errors, workshop has teleconnection session
Action: Steve & Eric to update presentation from WGNE report last year.

Interaction of MJO and north easterly cold surges over the Maritime Continent
PX presented some ongoing work on the interaction of the MJO with NE cold surges

- Changes in cold surges and MJO characteristics through NE Monsoon season, explain changes in MJO amplitude (reduction) in Mar/Apr
- Rainfall variance, MJO filtered, seasonal cycle, peaks during DJF and drops in Mar, Apr, (picks up again in SW monsoon season, NPK note that this could pick up seasonal cycle), different CS structure with more Cross-Equatorial flow (CES), strong seasonal cycle in these CES.
- Seasonal Variations in ITCZ location and cross equatorial flow,
- Wavelet analysis of meridional flow, and rainfall, strong peak in meridional wind at intraseasonal timescales around end of January, just around the time MJO variance starts to decay.

Changes to task force leadership
EM took over as MJO cochair in 2011/2012 and will stand down from the beginning of May, DK will replace EM as co-chair. The TF thanked Eric for his outstanding contributions during this time.
We discussed the MJO-TF membership. JG has expressed that he should probably standdown due to time commitments.

Wrapup and Future Goals

We discussed the need for more frequent telecons
Action: SW and DK to ensure these happen

We also discussed whether the time is right for another MJOTF summary for e.g. CLIVAR exchanges, like the one that appeared in CLIVAR Exchanges issue 61.

Process Oriented Diagnostics:

- Eric continuing to develop POD related to moistening under WTG. Student Brandon Wolding has one ERA-I paper on these diagnostics and is about to submit another applying these diagnostics to SP-CESM.
- Isotopic Ratio work is on hold whilst Camille is on maternitiy leave
- Xianan is continuing POD work
- TF needs to think about links these PODs to theoretical models

Operational Prediction:

- Jon has paper in preparation
- S2S to produce MJO indices by end of year, need for similar effort for BSISO, possibly following some review of BSISO indices
  Action: FV to document method for MJO indices and the TF to review
- Development of additional forecast metrics
- Explore further the spread in ensemble forecasts, seems to have poor skill-spread relationship

Air-sea interaction:

- DeMott et al. paper on air-sea interaction diagnostics
- Application of those diagnostics to climate models
- Adapting to forecast models
- Still not clear that we have a clean framework for coupled and uncoupled experiments to diagnose impact of ocean on atmosphere at a process level
- Note James Rupperts work on the DC SST/Cu

Maritime Continent:

- See above
- Darek's analysis of MJO/MC interactions

Teleconnections

- Steve & Frederic project (links to S2S)
- Eric has a project under a NOAA program in the U.S. (MAPP). There will be an "S2S" task force that groups together PIs from the US to address common problems in intraseasonal prediction.
- S2S Teleconnections at WGNE Systematic
- Prince has China CSSP project on – Nudging experiments looking at tropical regions for teleconnections

Finally we discussed possible venues for the next face to face meeting:

- IAMAS/IAPSO; S2S session CAPE TOWN Aug 2017
- WGNE Montreal

Action: Continue discussions in TF