

Level 1 Metrics Intercomparison

A key action item from the 31 May 2006 MJOWG teleconference was the establishment of a preliminary intercomparison of a proposed set of level 1 MJO metrics with part of the intent being to address a number of questions that arose regarding variable choices, methodology, etc. Level 1 metrics are meant to provide a basic indication of the spatial and temporal intraseasonal variability that can be easily understood and/or calculated by the non-MJO expert (e.g., graduate student, modeler). Ease of use at this stage dictated that the analytic procedures be identical for summer and winter, with separate calculations performed for each season. Duane agreed to generate the metrics for the two precipitation datasets, Klaus the OLR, and Eric the 850hPa and 200hPa winds.

Season Definition:

Boreal summer: May-October

Boreal winter: November-April

Domain of interest:

30°N-30°S, all longitudes

Daily Datasets:

AVHRR OLR from Liebmann and Smith

NCEP/NCAR Reanalysis-1 for 850hPa and 200hPa winds

TRMM (OLR-calibrated) Rainfall

Pentad Data:

CMAP rainfall

20-100 day filter applied as necessary

The metrics to be calculated are:

- 1) (a) 20-100 day filtered variance maps
(b) 20-100 day filtered variance maps expressed as percent of unfiltered variance
- 2) (a) Use the results from (1) to isolate Indian Ocean and west Pacific variance maxima, then calculate time series in a $10^\circ \times 10^\circ$ box centered around each of the two variance maxima. It was thought these regions/boxes would be determined from the observations even when applied to models but the regions would be made relatively large to be a little forgiving to the models. Thus, we may experiment with larger boxes.
(b) Perform spectral analysis (without tapering) on the 6-month time series, separately for each year, and then calculate the mean of the spectra for each season over all years
(c) Use one year of data centered about the midpoint of the season of interest calculate spectra using tapering, then calculate the mean of the spectra for each season over all years
- 3) (a) EOF analysis of 20-100 day filtered OLR

- (b) EOF analysis of 20-100 day filtered zonal wind
 - (c) EOF analysis of 20-100 day filtered CMAP rainfall
 - (d) EOF analysis of 20-100 day filtered TRMM rainfall
- standard information to be included is percent of variability explained by each mode

4) Time-lag correlation between the two dominant intraseasonal PC's (+/- 30 days)
-this was mentioned by Duane as a metric of interest, but this was not discussed in any detail. There are two options for performing this calculation:

a) As in Sperber et al. (2005, *Clim. Dynam.*, 25, 117-140) performing the analysis separately for each winter then plotting correlation vs. time lag for each year; scatter plot of maximum correlation vs. time lag at which it occurred (this provided an observed phase space of the against which models could be compared); average the correlations at each time lag then plot correlation vs. time lag (as one did for each year separately, above) and state the maximum correlation and time lag at which it occurred

b) Perform the lag correlation using the full PC. Caution must be exercised since the PC's are from seasonally stratified data and are thus discontinuous in time from one year to the next. When doing the lag correlations one must drop the necessary starting and ending point for each separate year prior to calculating the lag correlations. Plot as in (a) and state the maximum correlation and time lag at which it occurred