NASA PMM Science Team Meeting
16–20 October 2017, San Diego CA

CFS Hindcast Skill and MJO Propagation across the Maritime Continent

NASA PMM Grant NNX16AE33G

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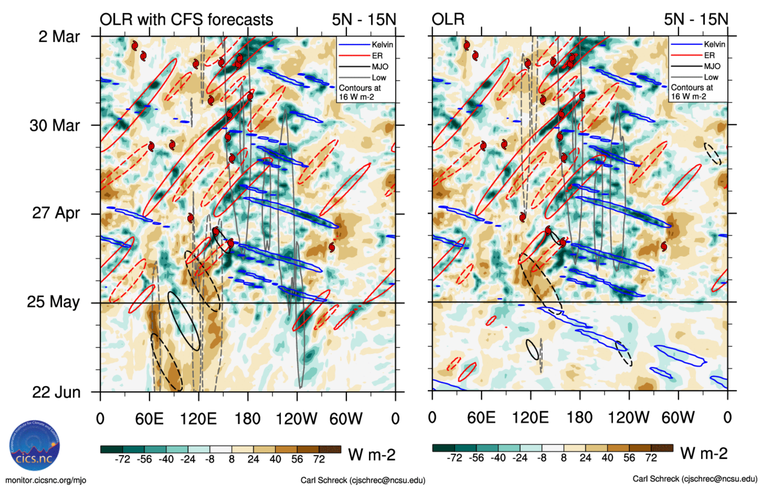
Forecasting Convective Envelopes



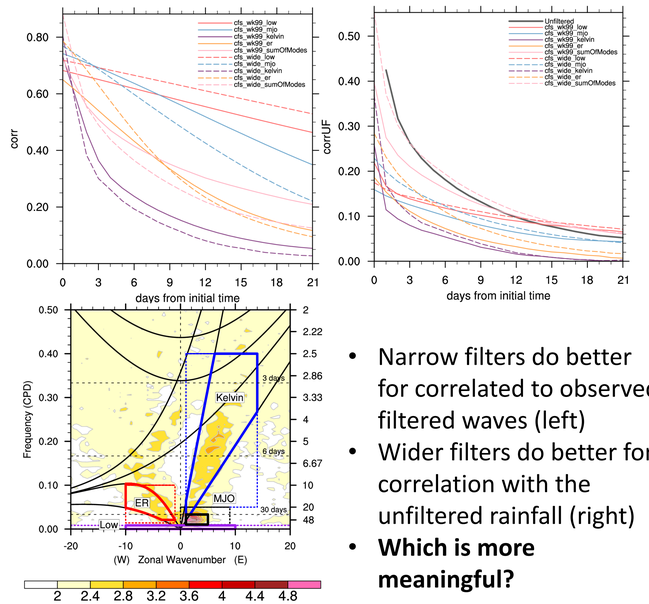
Example forecast Hovmöllers of OLR anomalies (shading) and filtered wave modes. (left) Observations are appended with climatological values for filtered (Wheeler and Wieckmann 2000). (right) Observations are appended with CFS forecasts.

- MJO and equatorial waves are best identified with Fourier filtering in space and time
- Wheeler & Weickmann (2001, *Mon. Wea. Rev.*) proposed real-time filtering by padding observations with zeros (climatology)
- Novel method on NCICS.org/mjo pads instead with CFSv2 forecasts

Methodology

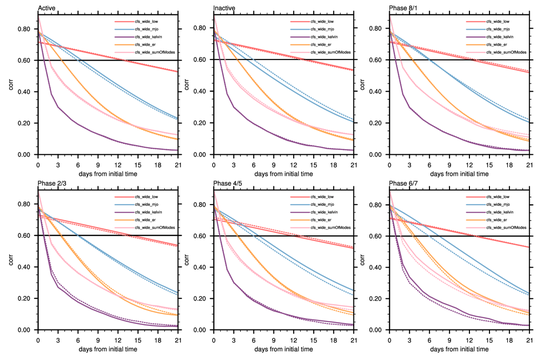
- Verifying CFSRR hindcasts from 1999–2010 against TRMM 3b42 multisatellite precipitation analyses
- Combining 1 year of 3b42 observations with 44 days of CFSv2 hindcasts
- Averaging four daily CFS runs into an ensemble mean
- Calculating correlations between filtered hindcasts and either filtered or raw TRMM3b42 over the tropical strip 20°S–20°N
- Averaging daily correlations at each hindcast lead for subsets of days

Filter Bands



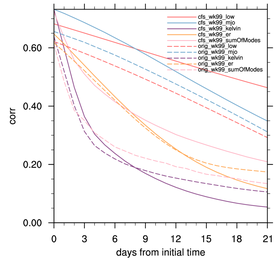
- Narrow filters do better for correlated to observed filtered waves (left)
- Wider filters do better for correlation with the unfiltered rainfall (right)
- **Which is more meaningful?**

MJO



- Dashed lines are all days, solid lines are subset by RMM
- MJO is better during active events, esp. Phases 6/7
- Not much difference for other modes

Algorithms

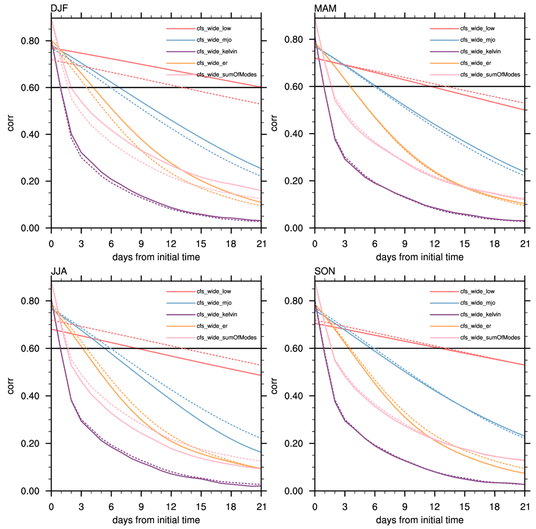


- Solid lines use CFS, dashed show original Wheeler–Weickmann
- CFS improves skill, particularly at shorter leads and lower frequencies

Next Steps

- Examine 3/5/7 day forecast windows
- Compare skill for different types of MJOs relative to the maritime continent
- Examine regional variations in skill
- Look at skill for wave variance
- Test skill of MJO-filtered RMM forecasts

Skill by Season



- Dashed lines are for the full year, solid for each season
- All modes are best in December–February (DJF), worst in June–August (JJA)