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CCS | CENTER FOR COMPUTATIONAL SCIENCE
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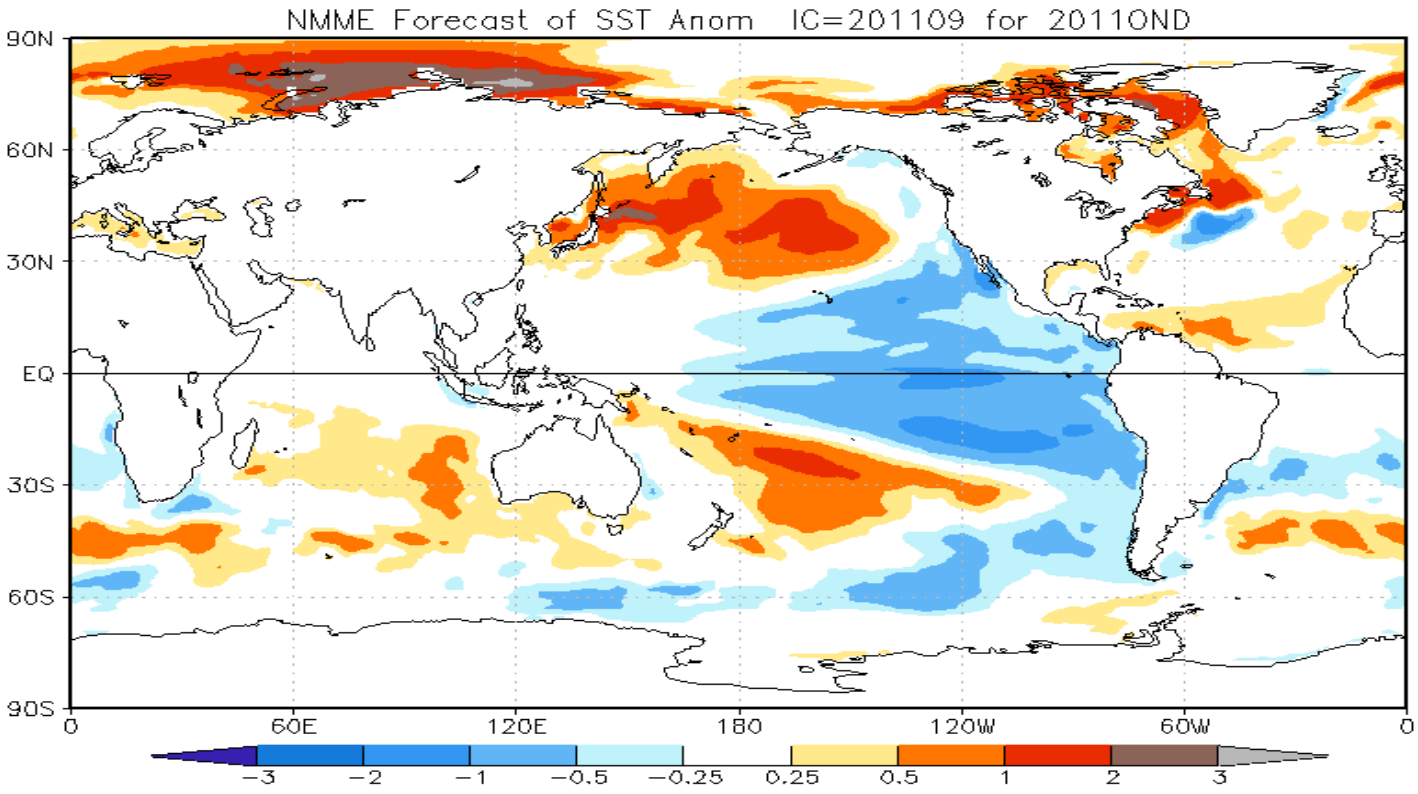
Overview of the US National Multi-Model (NMME) ISI Prediction System



NMME Partners

- University of Miami – RSMAS
- Nation Center for Atmospheric Research (NCAR)
- Center for Ocean-Land-Atmosphere Studies (COLA)
- International Research Institute for Climate and Society (IRI)
- University of Colorado – CIRES
- NASA – GMAO
- NOAA/NCEP/EMC/CPC
- NOAA/GFDL
- Princeton University (Phase-2 Only)

Phase 1 NMME

- **CTB NMME Workshops February 18, April 8, 2011**
  - Establish Collaboration and Protocol for Experimental Real-time Multi-Model Prediction
- **Protocol Developed**
- **Distributing Hindcast Data to CPC**
  - Public Dissemination via IRI Data Library
- **Became Real-Time in August 2011**
  - Adhering to CPC Operational Schedule

Hindcast/Forecast Protocol

- **Real-time prediction system must be identical to hindcasts system**
  - The number of ensemble members per forecast, however can be larger for the real-time system.
  - Model configurations – resolution, version, physical parameterizations, initialization strategies, and ensemble generation strategies – are left open to forecast providers
- **Hindcast start times must include all 12 calendar months**
  - Ensemble generation strategy is left open.
- **Lead-times up to 7 months are required - longer leads are encouraged**
- **The target hindcast period is 30 years (typically 1981-2010)**
- **The ensemble size is left open - larger ensembles are encouraged**
- **Data distributed includes each ensemble member**
  - Total fields are required
  - Systematic error corrections to be coordinated by NOAA/CPC
  - Forecast providers are welcome to also provide bias-corrected forecasts and to develop their own MME combinations
- **Required output is monthly means of global grids of SST, T2m, and precipitation rate**
  - More fields will be added based on experience and demand.
  - It is also recognized that higher frequency data is desirable and this will be implemented as feasible.

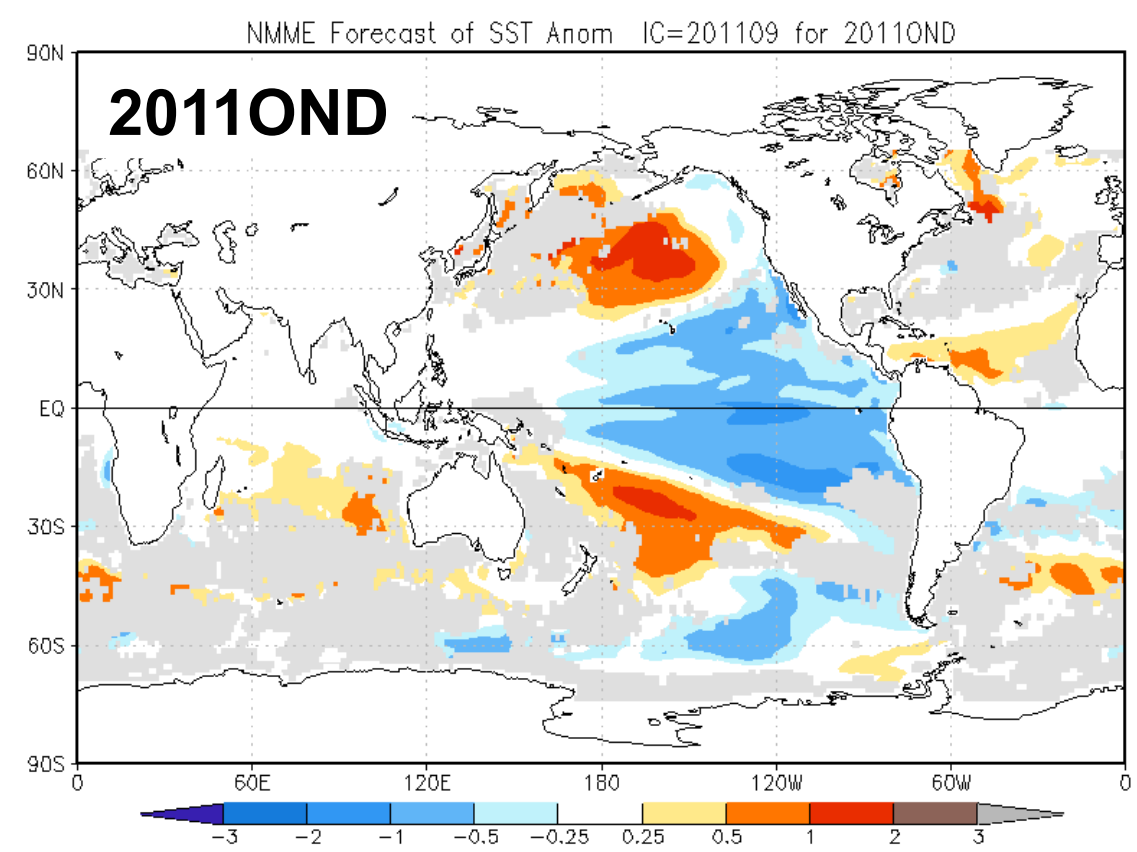
NMME Forecast Providers

Model	Hindcast Period	Ensemble Size	Lead Times	Arrangement of Ensemble Members	Contact and reference
CFSv1	1981-2009	15	0-8 Months	1st 0Z +/-2 days, 21st0Z +/-2d, 11th 0Z+/- 2d	Saha (Saha et al. 2006)
CFSv2	1982-2009	24(28)	0-9 Months	4 members (0,6,12,18Z) every 5th day	Saha (Saha et al. 2010)
GFDL-CM2.2	1982-2010	10	0-11 Months	All 1st of the month 0Z	Rosati (Zhang et al. 2007)
IRI-ECHAM4-f	1982-2010	12	0-7 Months	All 1st of the month 0Z	DeWitt (DeWitt 2005)
IRI-ECHAM4-a	1982-2010	12	0-7 Months	All 1st of the Month 0Z	DeWitt (Dewitt 2005)
CCSM3.0	1982-2010	6	0-11 Months	All 1st of the Month 0Z	Kirtman (Kirtman and Min 2009)
GEOS5	1981-2010	6	0-9 Months	1 Member every 5th day	Schubert (Vernieres et al. 2011)

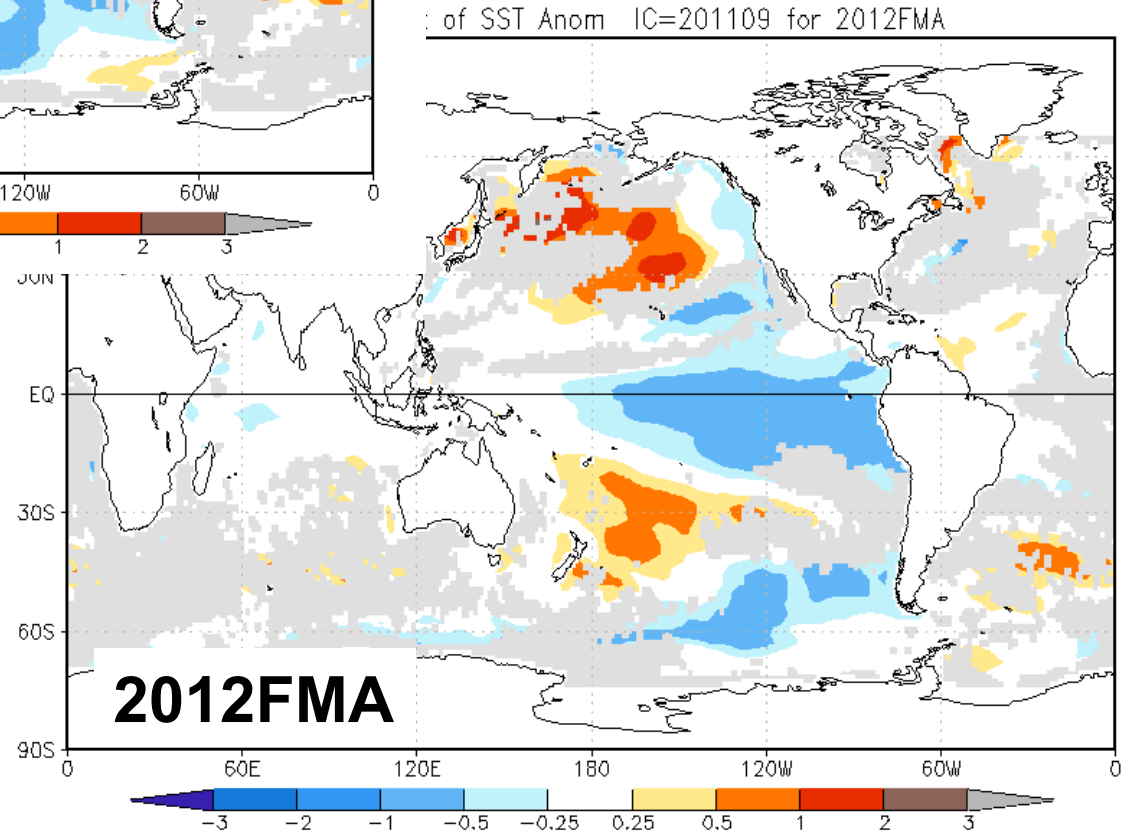
Phase-1 NMME Data Time Line

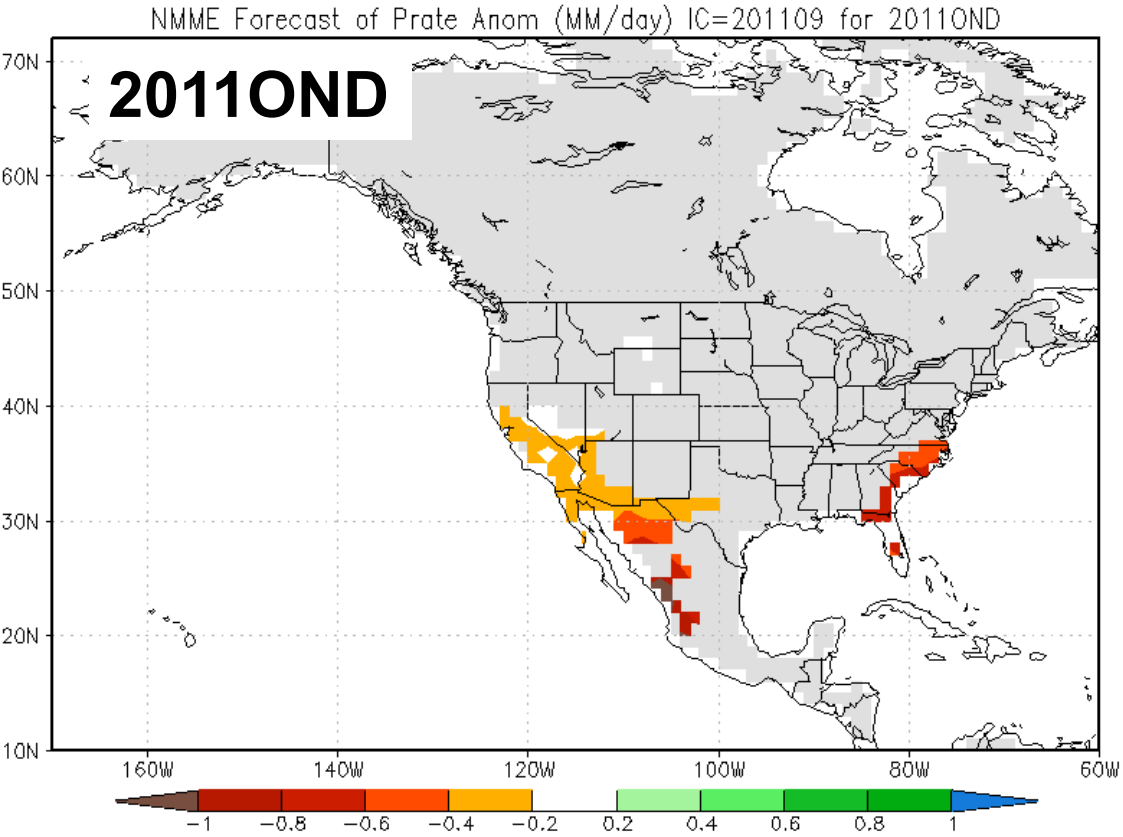
Data	End October 2011	End January 2012	End April 2012	End of July 2012
Monthly Means of T2m, SST Precipitation for all models, all ensemble members and all lead times. Data will be made available in a common format on a common 1x1 grid.	August, September and October 1982-2010 Hindcasts Available	November, December and January 1982-2010 Hindcasts Available	February, March, and April 1982-2010 Hindcasts Available	May, June and July 1982-2010 Hindcasts Available
	August, September and October 2011 Real-time Forecast Data Available	November and December 2011 and January 2012 Real-time Forecast Data Available	February, March and April 2011 Real-time Forecast Data Available	May, June and July 2011 Real-time Forecast Data Available

Graphical Output Available From CPC for Each Model and MME at http://origin.cpc.ncep.noaa.gov/products/people/wd51yf/NMME/

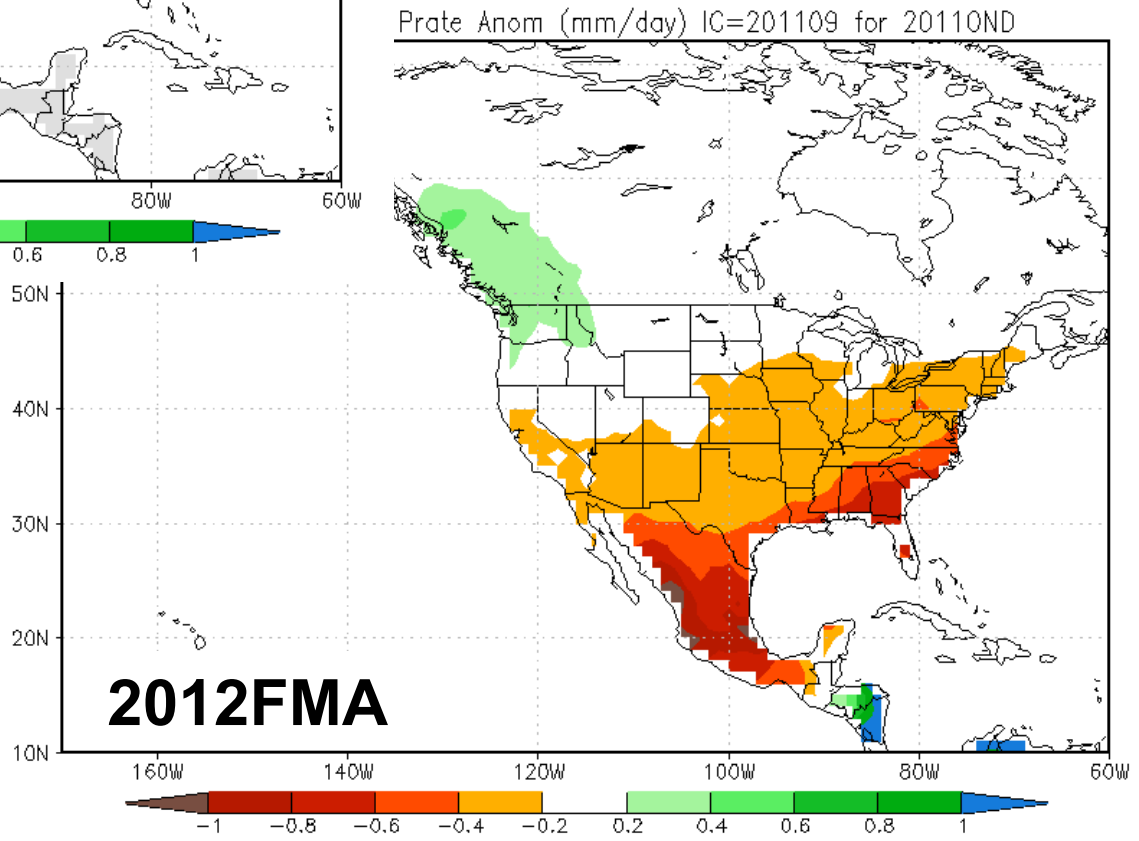


NMME SSTA Predictions September 2011 Initial Conditions





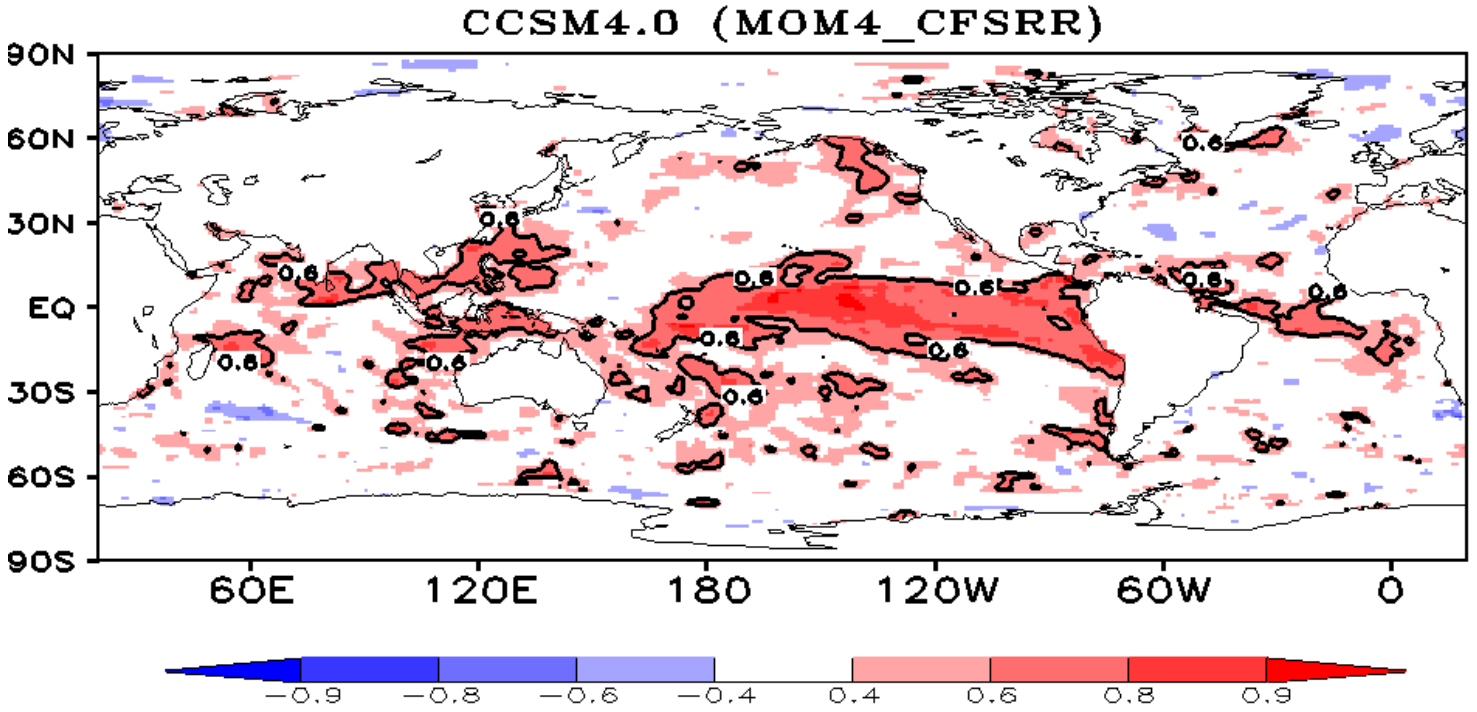
NMME Precip Predictions September 2011 Initial Conditions



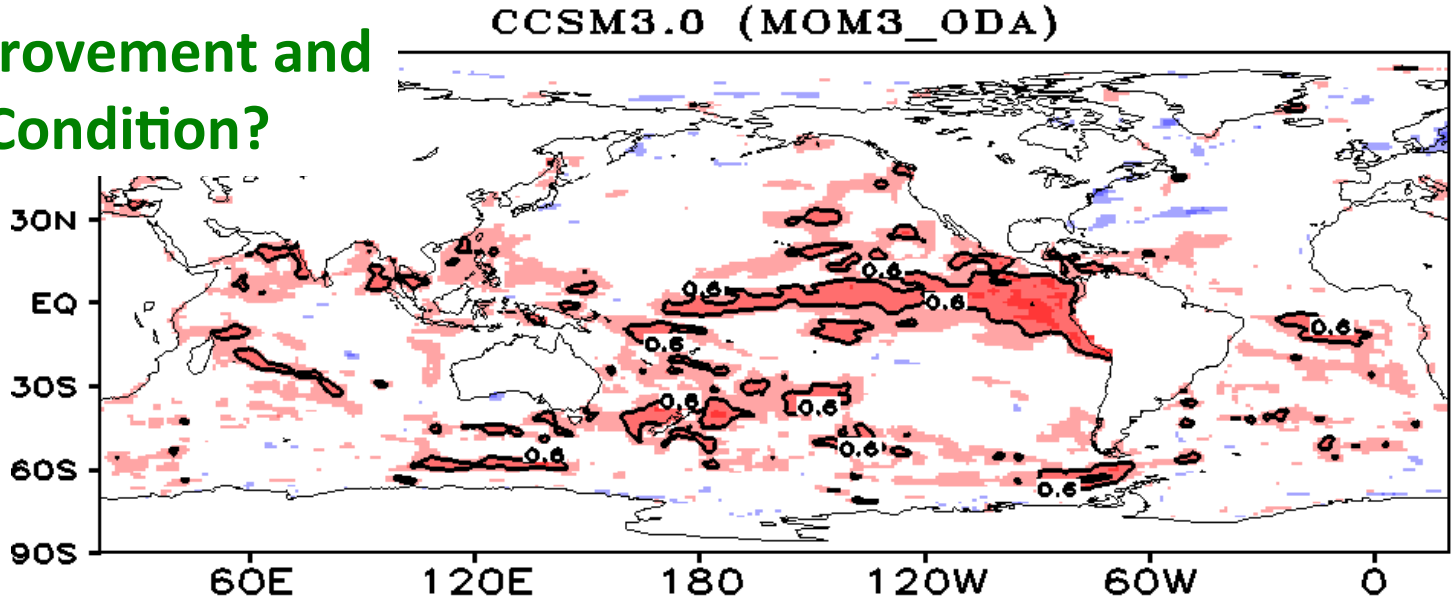
Phase 2 NMME

- **Continue Experimental Real-Time Predictions**
- **Enhancing Current NMME Capability**
  - Model Updates: GFDL-CM2.5 (20 km AGCM), IRI (T106), CCSM4, CESM1
- **Assess Forecast Quality**
  - MME Combinations, Model Independence
  - Drought Assessment
    - Include: soil moisture, runoff, evaporation
- **Sub-Seasonal Assessment**
  - Forecast Protocol
- **Initial Condition Sensitivity Experiments**
  - Ocean, Land

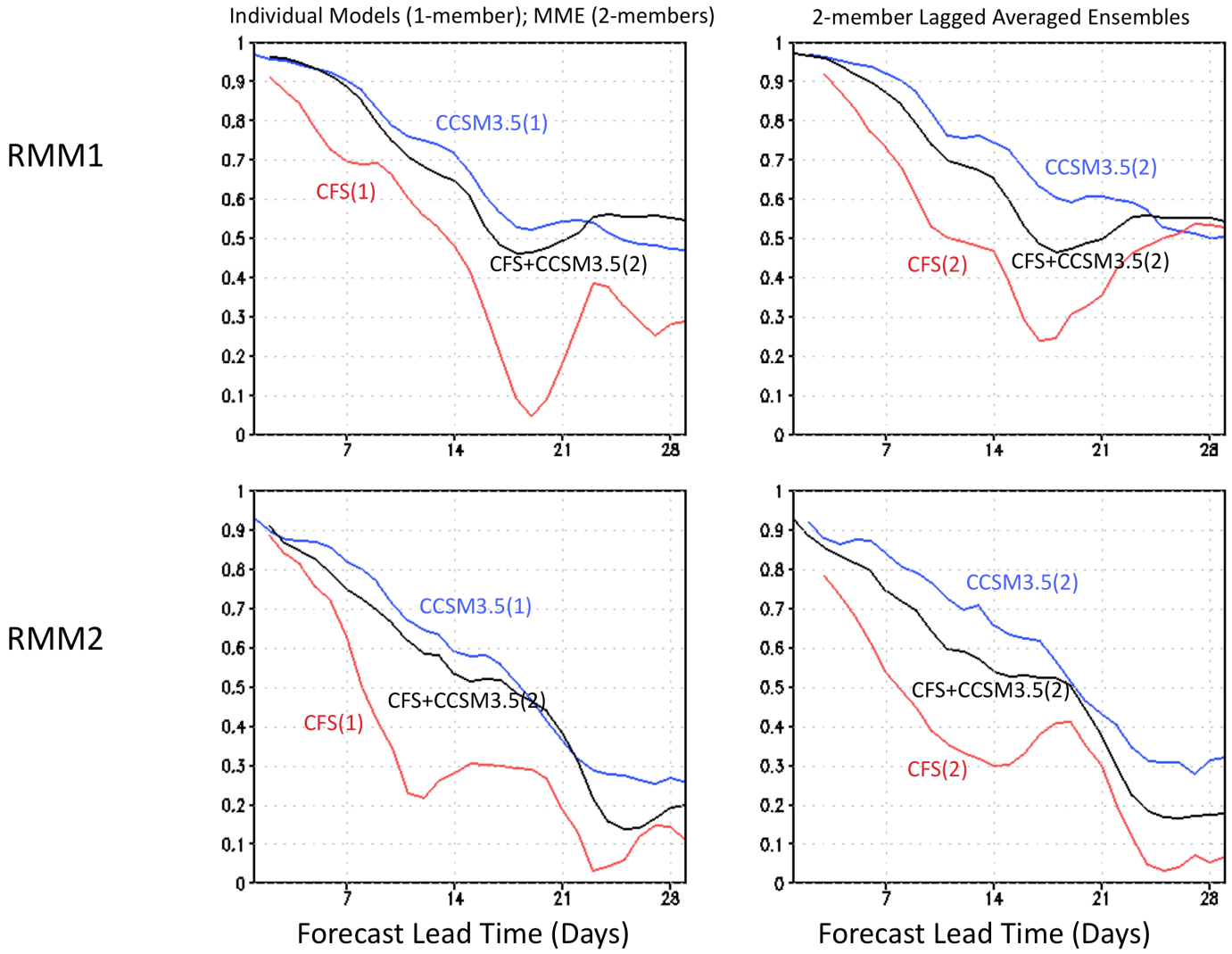
May Initial Conditions 3-Months Lead



Improved Correlation Due to Model Improvement and Better Initial Condition?



Average Anomaly Correlation Skill of MJO Index (RMM12)
Apr and Oct Initial Conditions (1981-1999) with CCSM3.5



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