



# NOAA's Climate Prediction Center Monthly and Seasonal Forecast Operations

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**Climate Prediction Center**  
**National Centers for Environmental Prediction**

***Acknowledgement: Mathew Rosencrans, Arun Kumar***



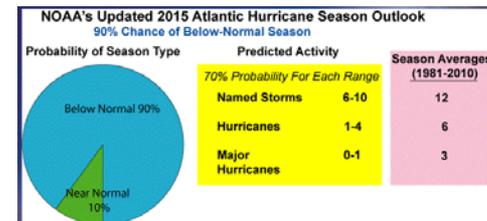
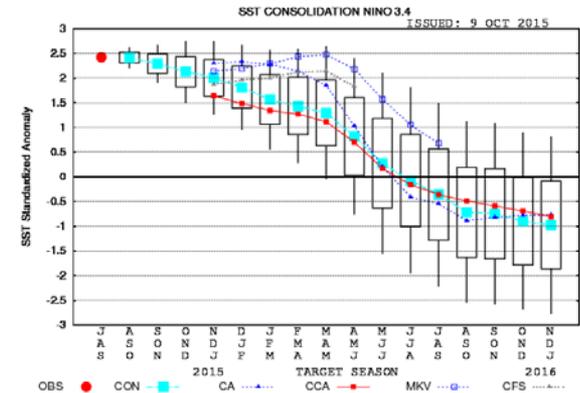
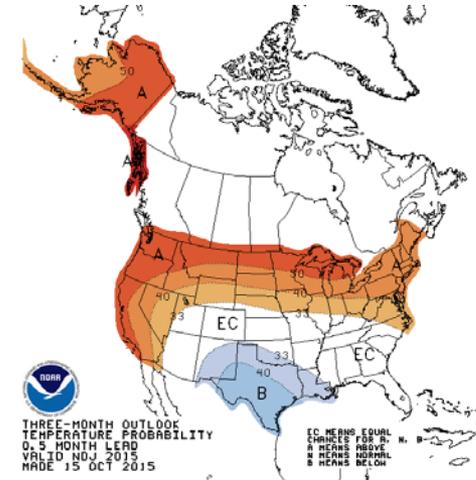
# CPC Official Outlooks and Tools

## Official Outlooks

- Week-2 to Week-4 P, T outlooks
- Monthly ENSO predictions
- Monthly and seasonal P, T Outlooks
- Seasonal Drought Outlooks
- Seasonal Hurricane Outlooks

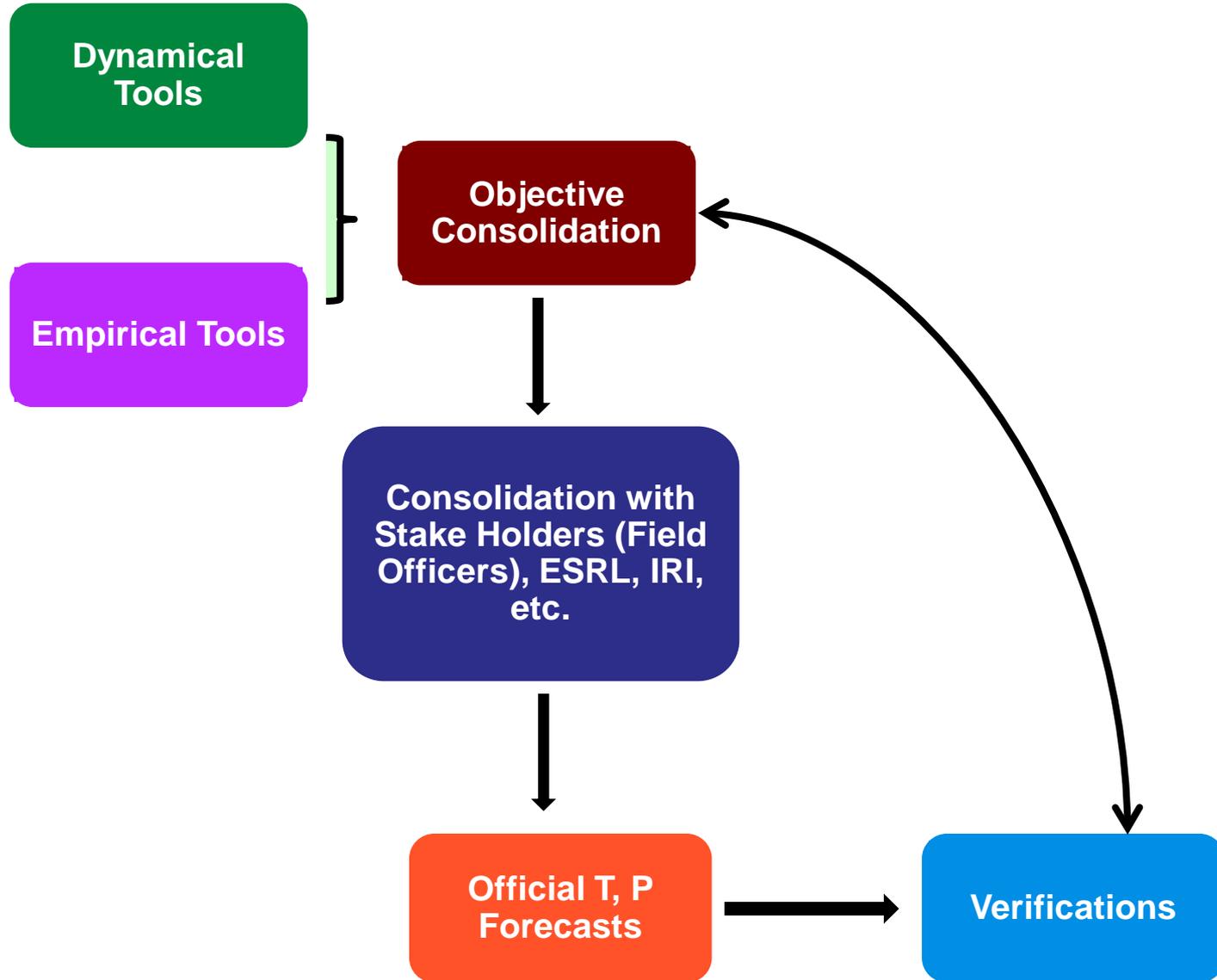
## Tools

- Dynamical & statistical models
- Historical analogs
- Historical Composites





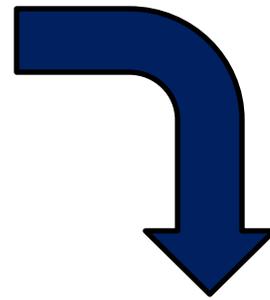
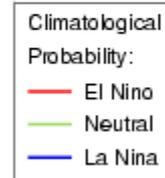
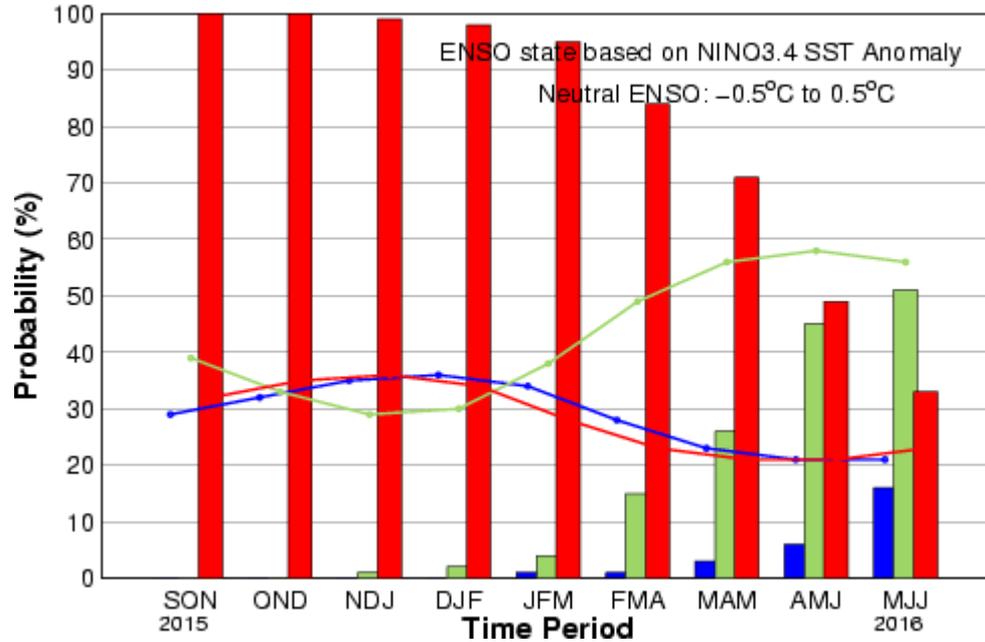
# Long Range Forecast Process



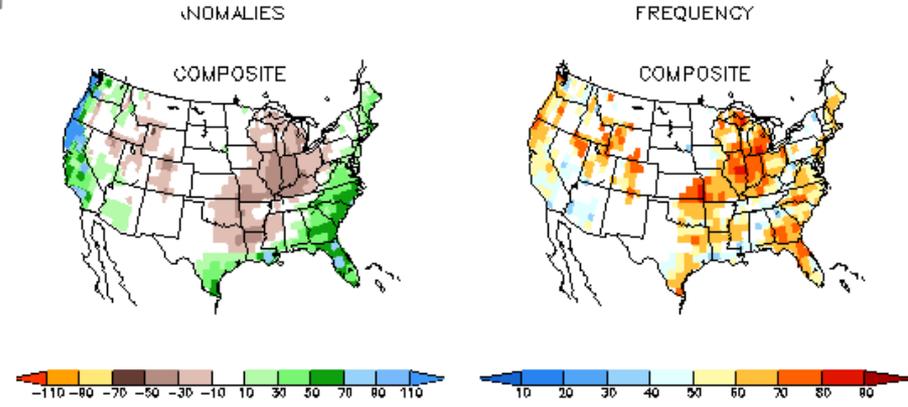


# ENSO Outlook

Early-Oct CPC/IRI Consensus Probabilistic ENSO Forecast



JFM EL NIÑO PRECIPITATION ANOMALIES (MM) AND FREQUENCY OF OCCURRENCE (%)

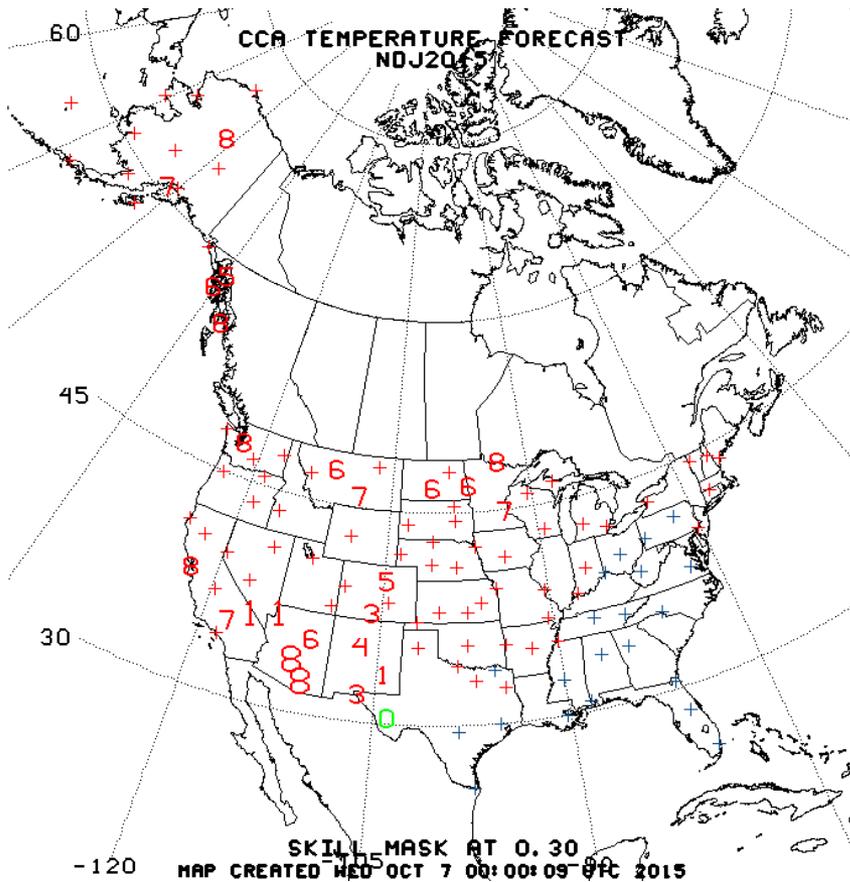




# Selected Forecast Guidance

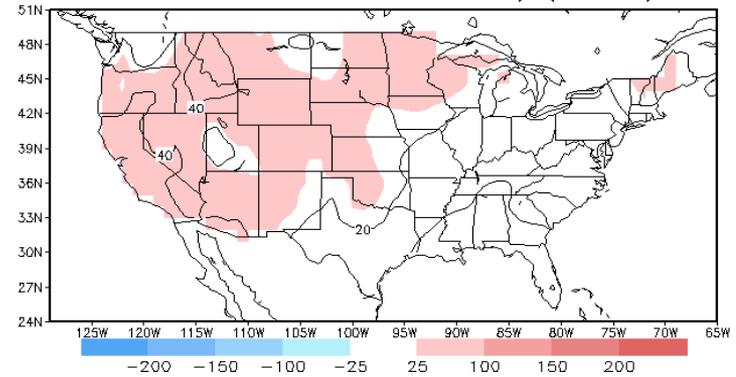


## Canonical Correlation Analysis



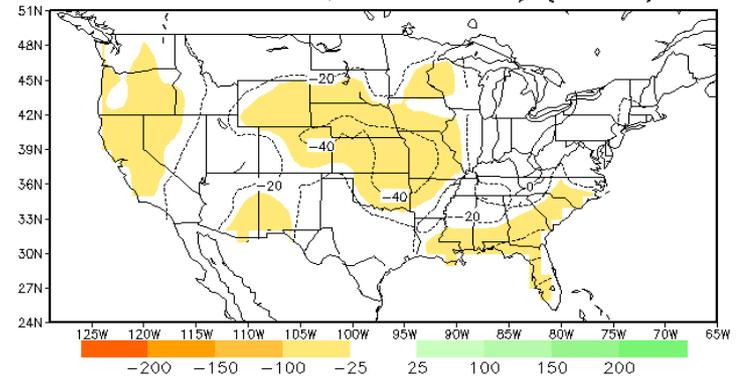
## Long term trends

hmgz temperature OCN (15 year) forecast for NDJ  
base 1981-2010; units: anomaly (sdX100)



Huang van den Dool, CPC/NCEP/NWS/NOAA; untampered OCN; data thru Feb 2015

hmgz precipitation OCN (15 year) forecast for NDJ  
base 1981-2010; units: anomaly (sdX100)

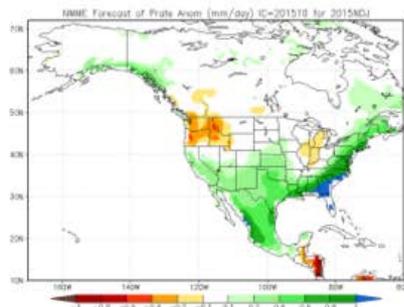




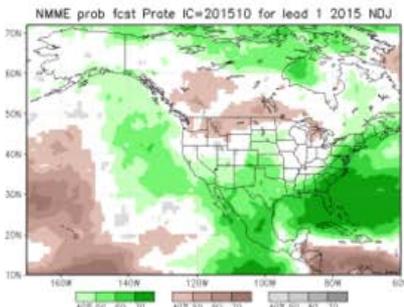
# Selected Coupled Model Guidance



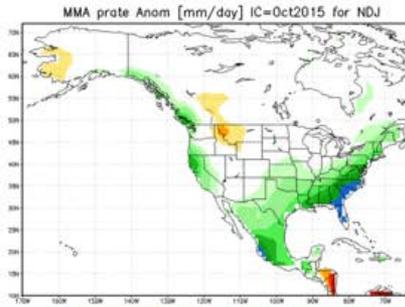
NMME



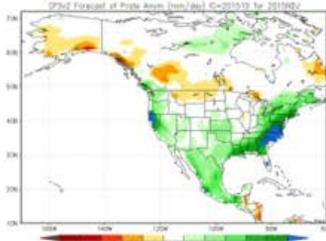
Prob fcst



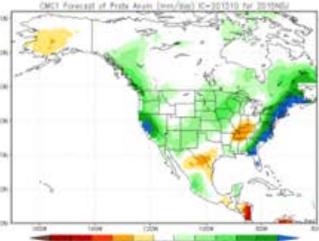
IMME



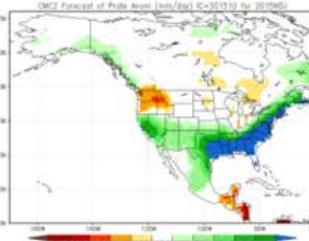
NCEP\_CFSv2



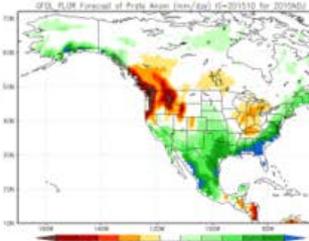
CMC1\_CanCM3



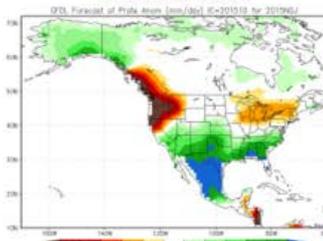
CMC2\_CanCM4



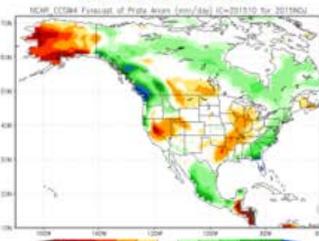
GFDL\_FLOR



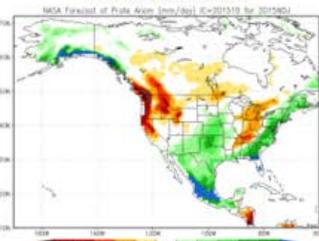
GFDL\_CM2.1



NCAR\_CCSM4

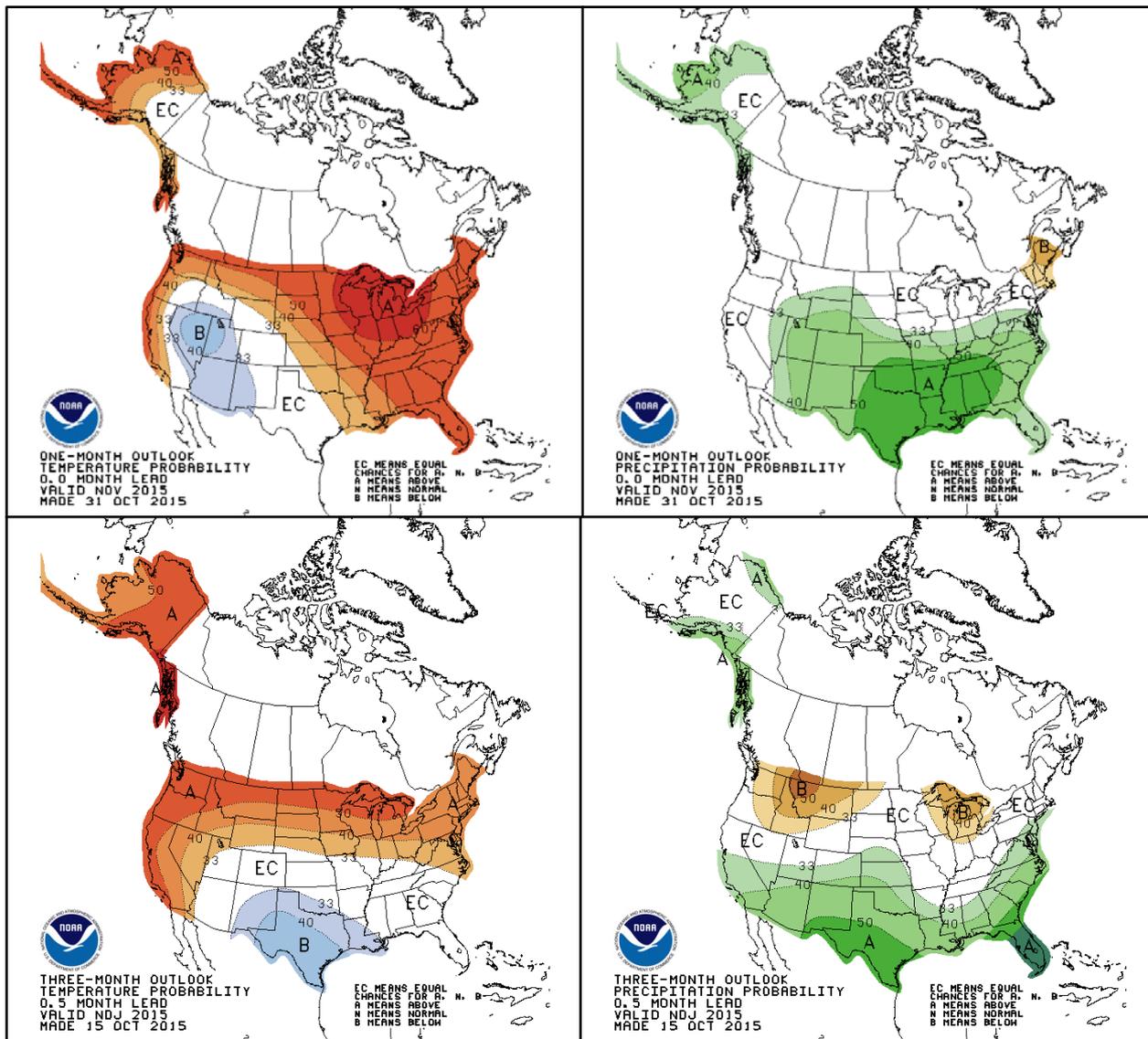


NASA\_GEOS5





# Official Monthly & Seasonal Outlooks



Month

Season



# Seasonal Forecasts Bulletin



PROGNOSTIC DISCUSSION FOR LONG-LEAD SEASONAL OUTLOOKS  
NWS CLIMATE PREDICTION CENTER COLLEGE PARK MD  
830AM EDT THURSDAY OCT 15 2015

## SUMMARY OF THE OUTLOOK FOR NON-TECHNICAL USERS

**STRONG EL NINO CONDITIONS REMAIN IN PLACE ACROSS THE EQUATORIAL PACIFIC OCEAN AS REPRESENTED BY BOTH OCEAN AND ATMOSPHERIC DATA. THE ONGOING EL NINO EVENT IS EXPECTED TO PEAK IN STRENGTH IN LATE AUTUMN OR EARLY WINTER WITH SEASONAL AVERAGE SEA SURFACE TEMPERATURE (SST) ANOMALIES IN THE NINO 3.4 REGION NEAR OR EXCEEDING +2.0 DEGREES CELSIUS, DIMINISHING IN MAGNITUDE THROUGH THE LATE WINTER AND SPRING.**

THE NOVEMBER-DECEMBER-JANUARY (NDJ) 2015 TEMPERATURE OUTLOOK INDICATES ENHANCED PROBABILITIES OF ABOVE-NORMAL TEMPERATURES FOR THE FAR WEST, ACROSS THE NORTHERN CONTIGUOUS U.S. TO THE NORTHEAST, AND SOUTHWARD TO THE MID-ATLANTIC. WITHIN THE CONTIGUOUS U.S., THE CHANCES OF ABOVE-NORMAL TEMPERATURES ARE GREATEST ALONG THE PACIFIC COAST AND ALONG THE NORTHERN TIER FROM THE PACIFIC NORTHWEST TO THE GREAT LAKES WITH PROBABILITIES EXCEEDING 50 PERCENT. BELOW-NORMAL TEMPERATURES ARE FAVORED FROM NEW MEXICO TO LOUISIANA WHILE ABOVE-NORMAL TEMPERATURES ARE ALSO MOST LIKELY FOR ALASKA.

THE NDJ 2015 PRECIPITATION OUTLOOK INDICATES ENHANCED PROBABILITIES OF ABOVE-MEDIAN PRECIPITATION AMOUNTS FOR CENTRAL AND SOUTHERN CALIFORNIA, THE SOUTHWEST, PARTS OF THE CENTRAL AND SOUTHERN PLAINS, THE LOWER MISSISSIPPI VALLEY, THE SOUTHEAST NORTHWARD TO THE MID-ATLANTIC. ABOVE-MEDIAN PRECIPITATION AMOUNTS ARE ALSO MOST LIKELY FOR THE SOUTHERN AND NORTHERN COASTS OF ALASKA. BELOW-MEDIAN PRECIPITATION AMOUNTS ARE MOST LIKELY FOR PARTS OF THE PACIFIC NORTHWEST, NORTHERN ROCKIES AND GREAT LAKES.

IN AREAS WHERE THE LIKELIHOODS OF SEASONAL MEAN TEMPERATURES AND SEASONAL ACCUMULATED PRECIPITATION AMOUNTS ARE SIMILAR TO CLIMATOLOGICAL PROBABILITIES, EQUAL CHANCES (EC) IS INDICATED.

..... Text continues



# Verification Seasonal Outlooks



## ***Practice***

- Routinely made since Dec 1994
- Issued for 13 running seasons
- Released in the middle of each calendar month

## ***Methods***

- **Categorical measures**
  - Heidke Skill Score (HSS)
- **Probability measures**
  - Ranked Probability Skill Score (RPSS)
  - Reliability Diagrams (RD)
  - Relative Operating Characteristics (ROC)

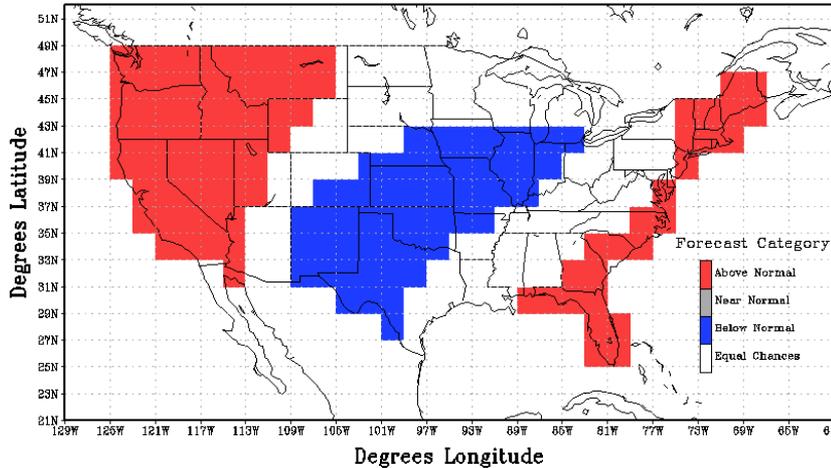


# Verification Seasonal Outlooks

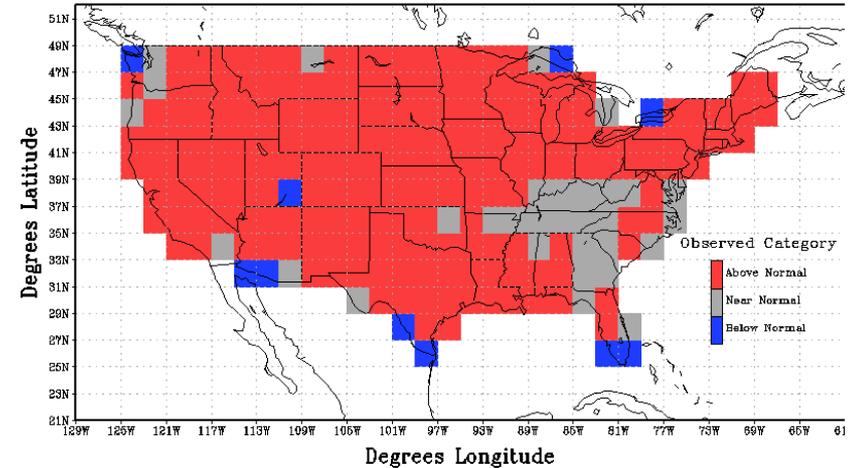
## *Temperature, Aug-Oct 2015*



Categorical Temperature Official Forecast  
Issued: Jul 2015 Valid: Aug-Sep-Oct 2015



Categorical Temperature Observations  
Valid: Aug-Sep-Oct 2015



**HSS:**

**Actual forecasts: 5.54**

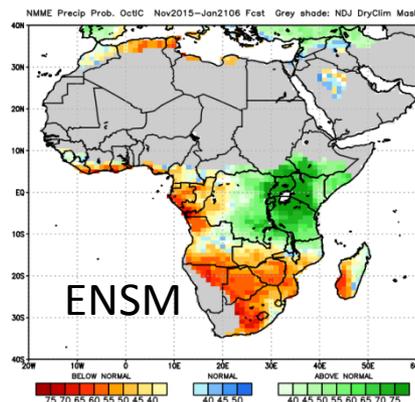
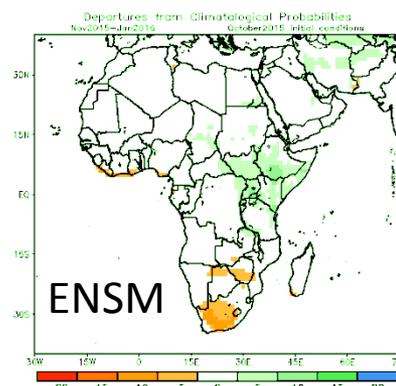
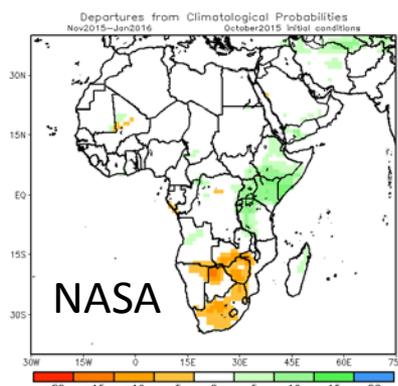
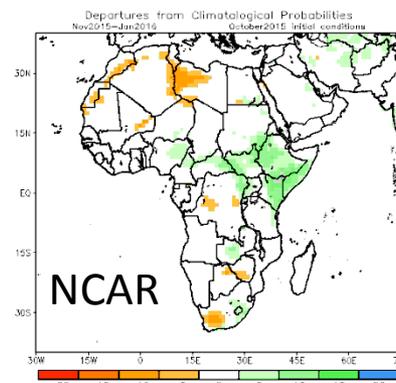
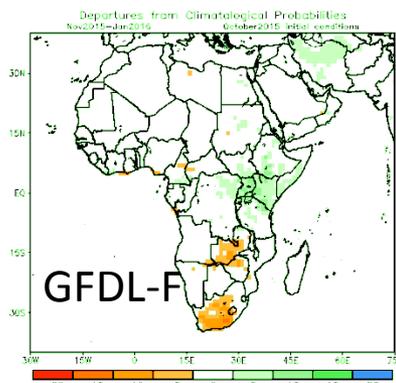
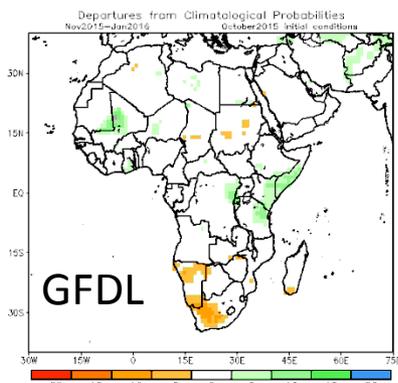
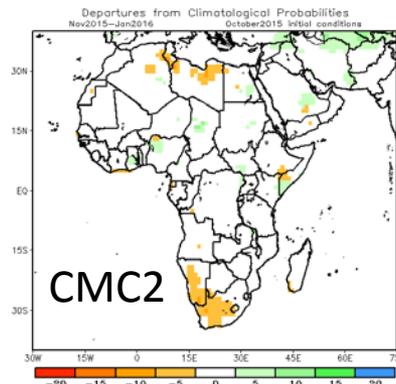
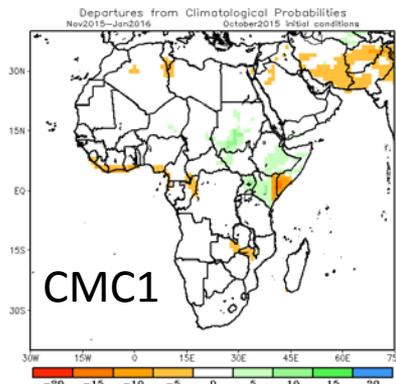
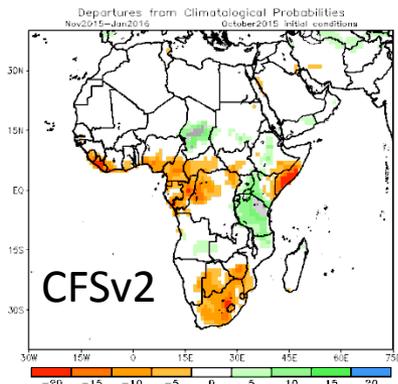
**All forecasts: 15.3**

**Forecasts Percent coverage: 59.91**



# CPC International Desks Seasonal Forecasts

## Regionalized NMME tools



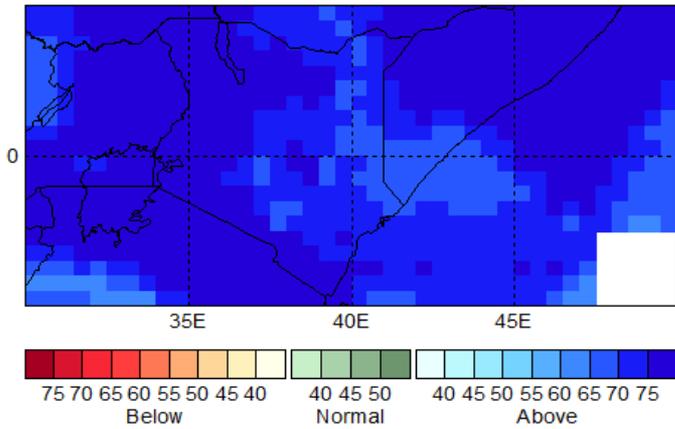


# CPC International Desks Seasonal Forecasts

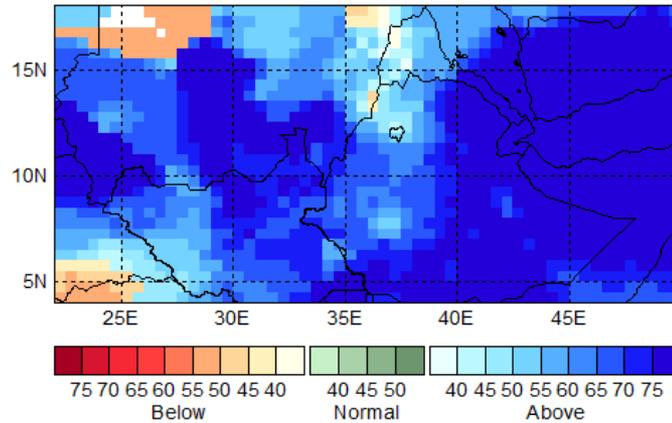
## Sample CCA tools



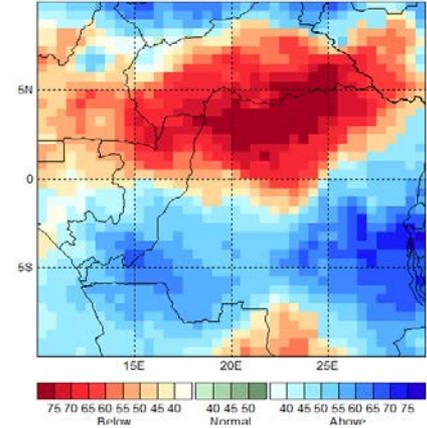
### Northern Horn of Africa



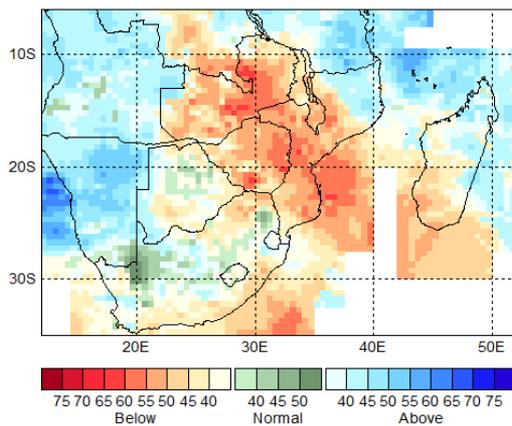
### Equatorial East Africa



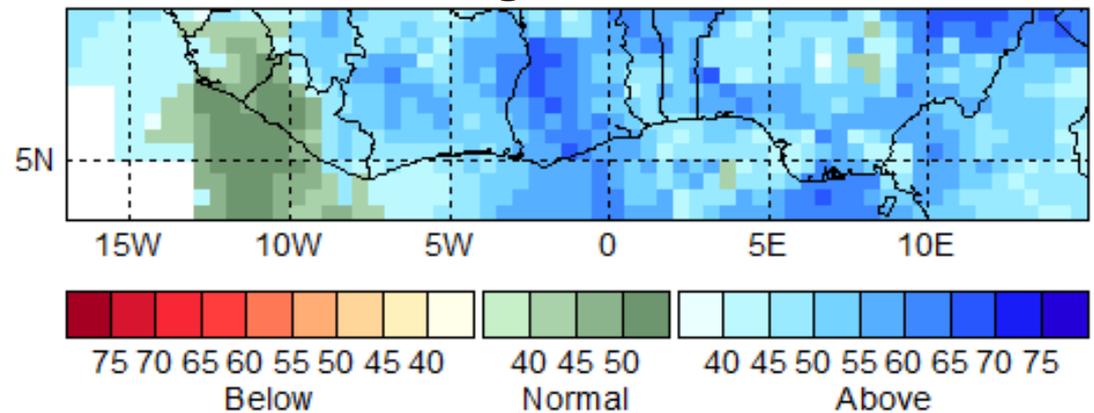
### Central Africa



### Southern Africa



### Gulf of Guinea Region





# CPC International Desks

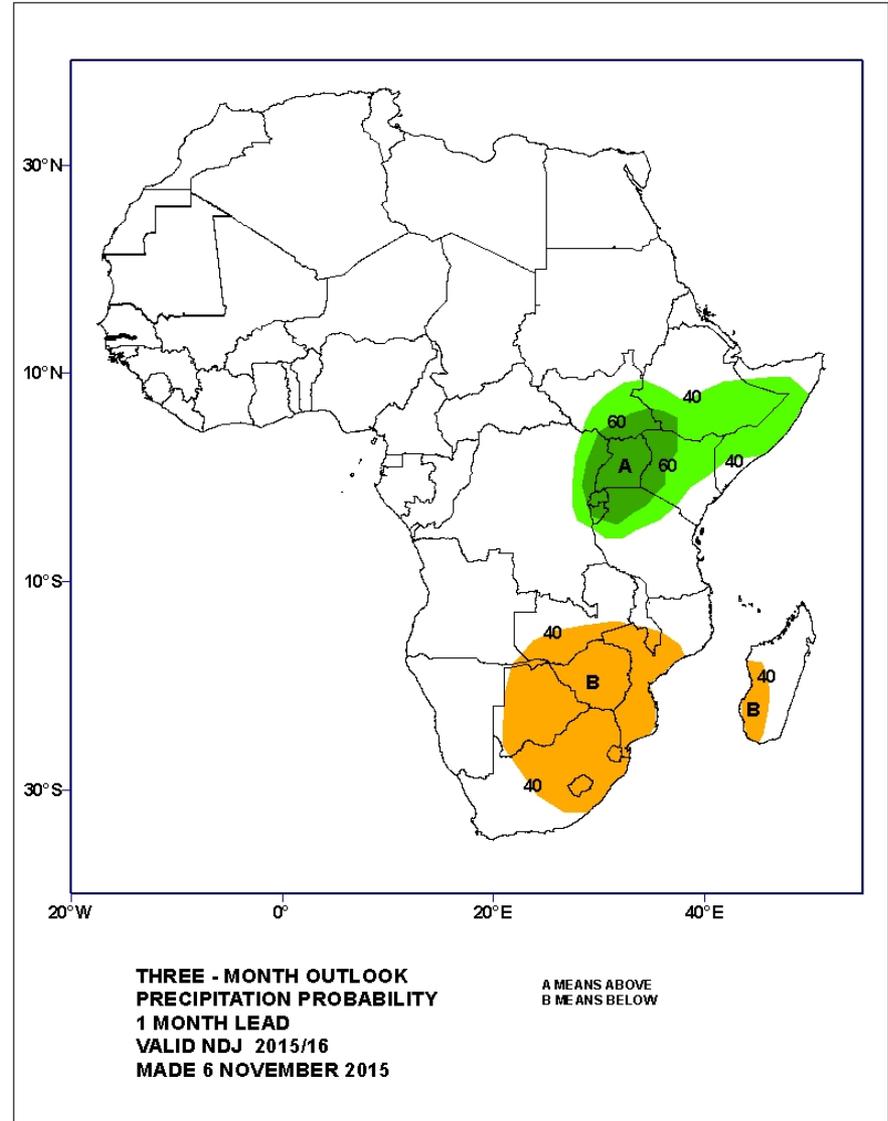
## Consolidated Seasonal Forecasts



Seasonal forecasts are prepared Based on NMME guidance tools and hybrid dynamical – statistical Forecasts.

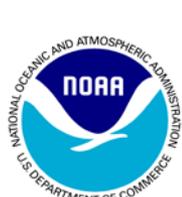
GIS is used to draw polygons for probabilistic Forecasts.

Forecasts feed into RCOFs

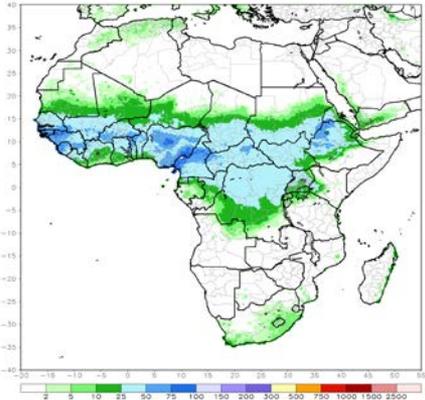




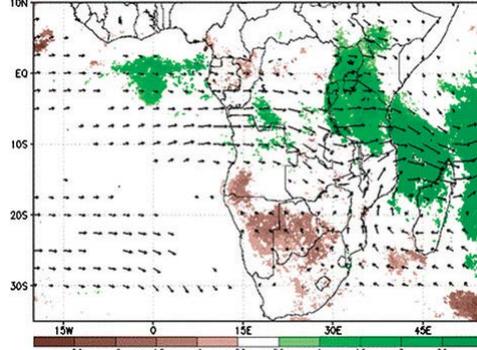
# CPC International Desks - Selected Tools for Operational Sub-Seasonal Forecasting



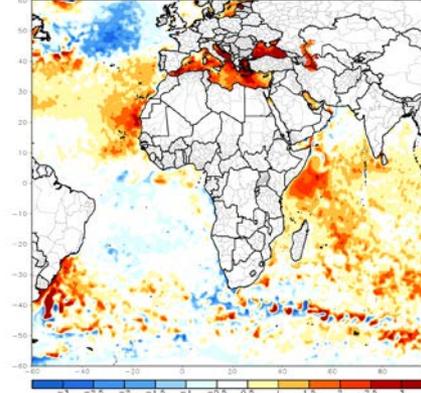
### Weekly P Climatology



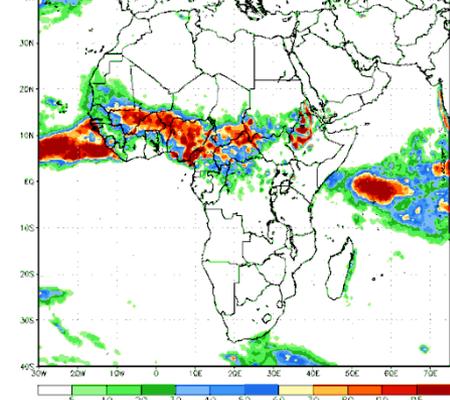
### MJO P Anom Composite



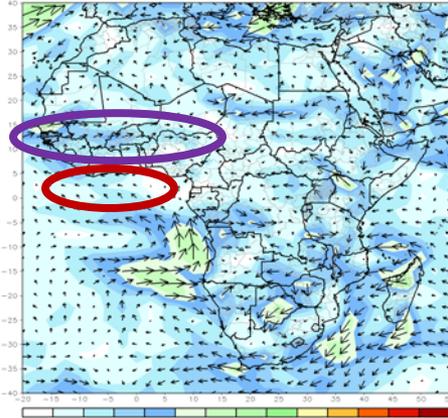
### SST Anomaly



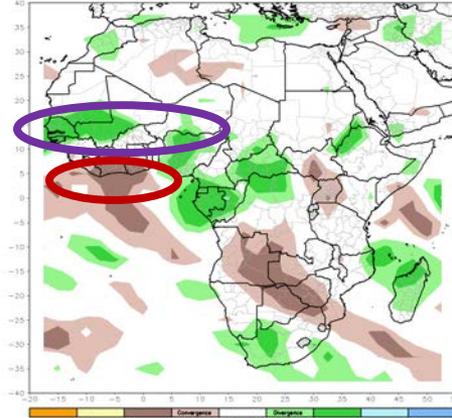
### P 50 mm Prb of Exdnce



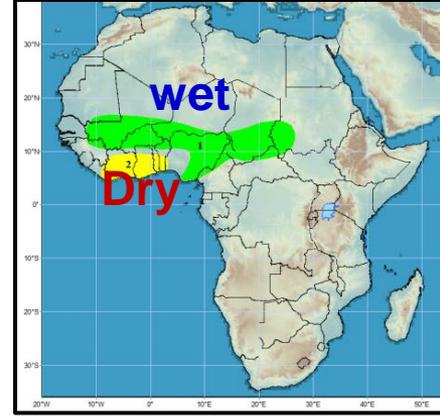
### Wind 850 hPa



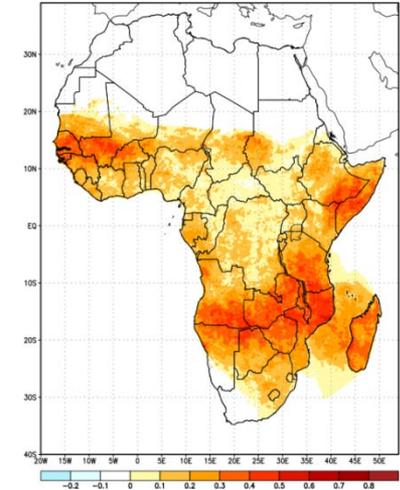
### Div 200 hPa



### Week1&2 Outlook



### Heidke Skill - W1





# Summary CPC Forecasting Activities



- Monitoring and Predicting the state of ENSO
- Statistical and dynamical tools for monthly and seasonal forecasts for the U. S.
- Official forecasts and verifications
- International Desks Seasonal climate outlooks feed into RCOFs