IRI Activities Update for WGSIP 18

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International Research Institute
for Climate and Society
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Outline

- Real-time seasonal forecast development
- S2S work
- Tool development

ENSO Forecast Plume

Figure 1 is based on a consensus of CPC and IRI forecasters, in association with the official CPC/IRI ENSO Diagnostic Discussion

Figure 3 is purely objective, based on regression, using equally weighted model predictions from the plume

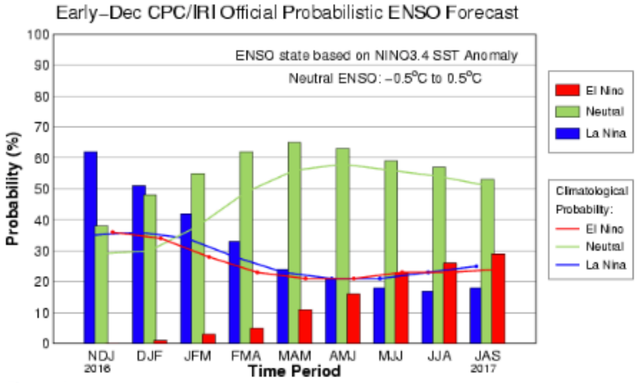


Figure 1

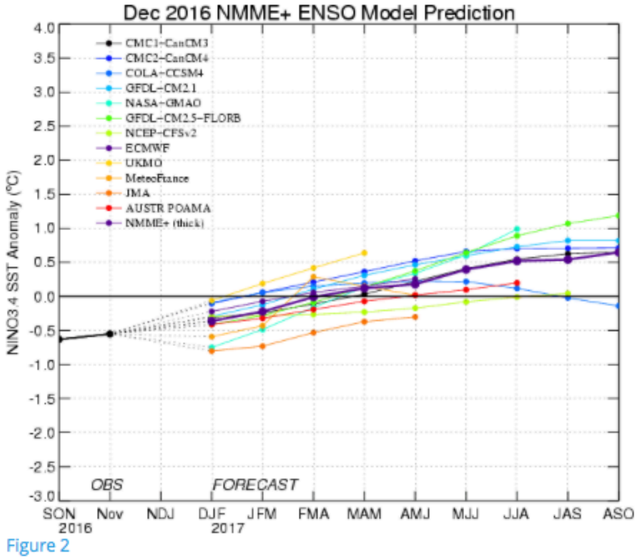


Figure 2

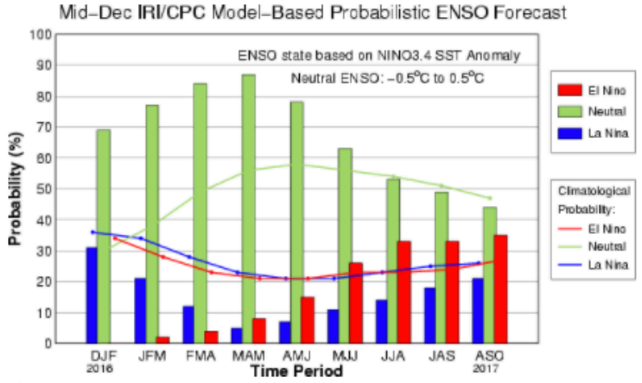


Figure 3

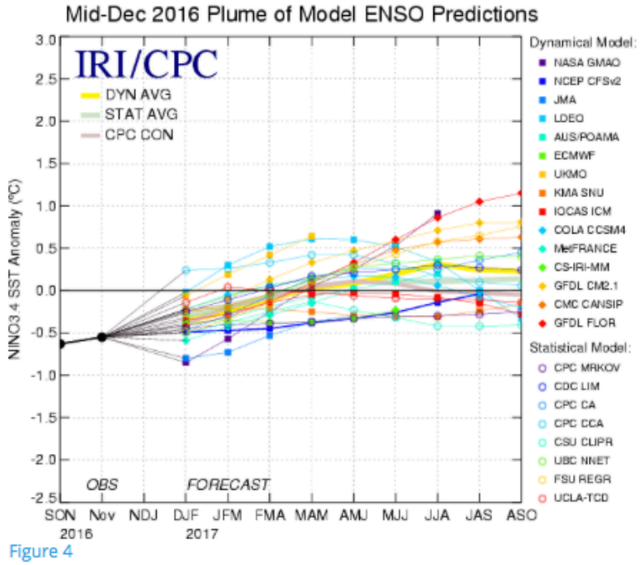


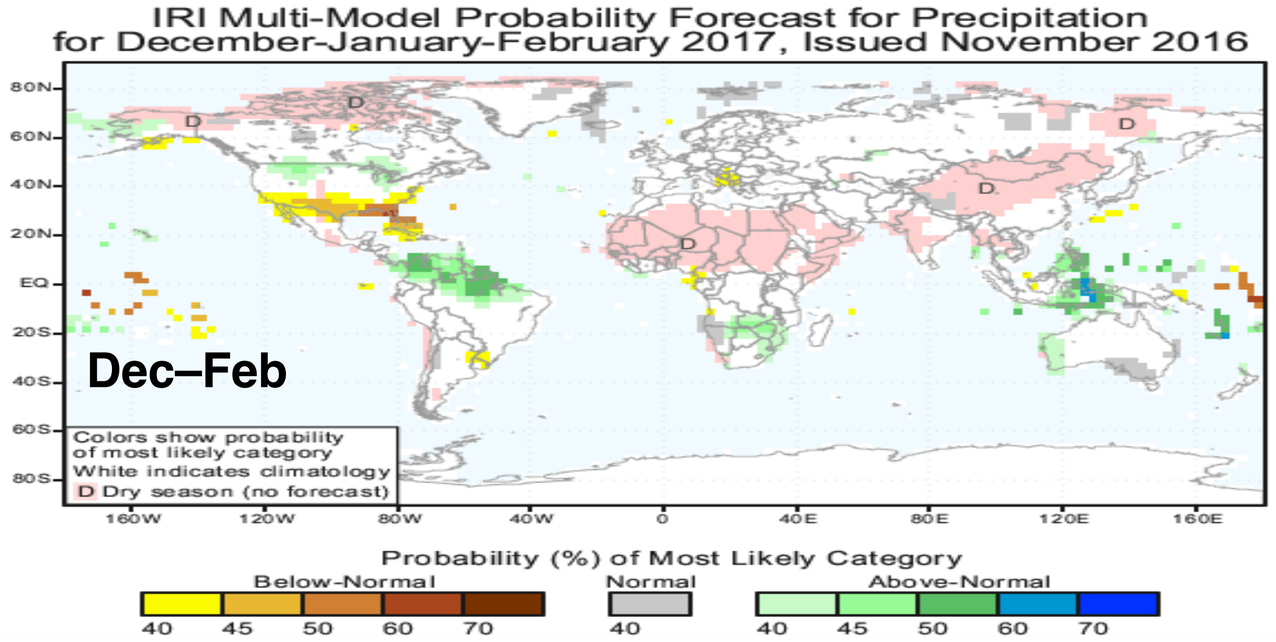
Figure 4

Current “2-Tier” IRI Seasonal Forecast System

Ocean - {LDEO + CA + CFSv2} mean & 2 additional scenarios based on historical errors
Atmos - {Echam4.5, CCM3.6, COLA, GFDL}
+ CFSv2

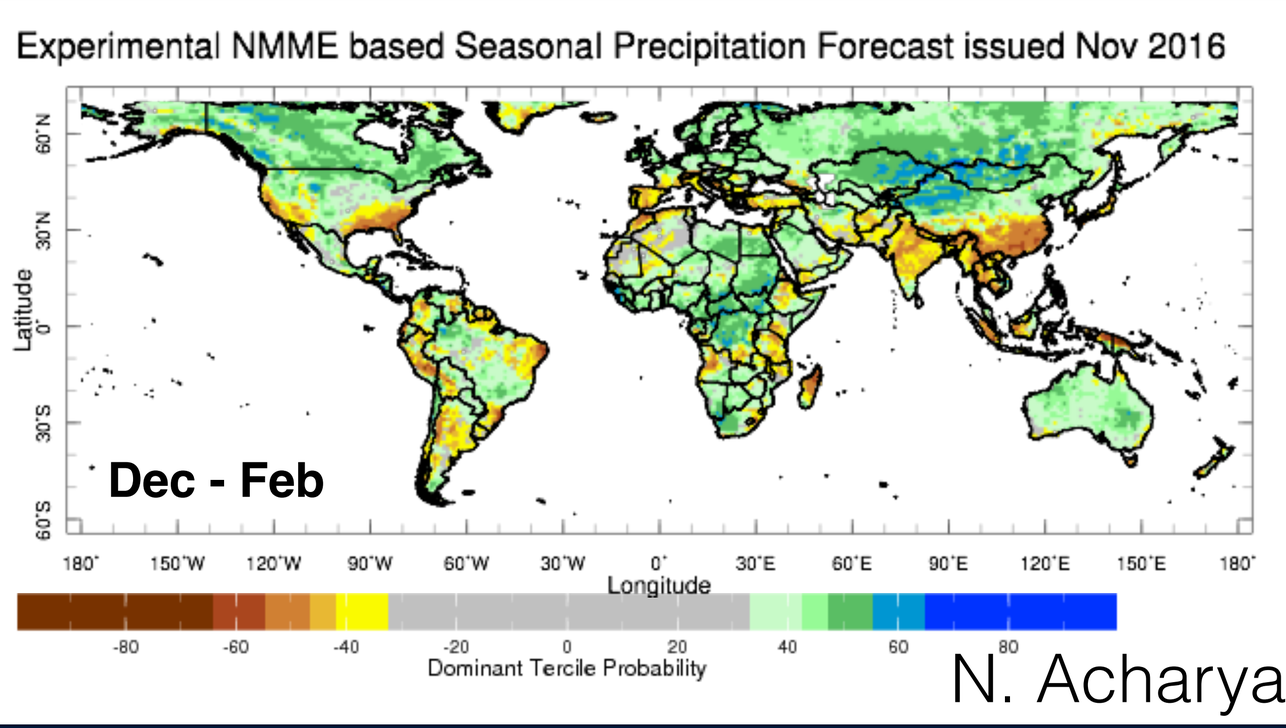
Post-Proc:

- Pattern-based correction of ensemble means
  - PC Regression based on tropical precip EOFs
  - Spread estimate from historical forecasts with forecast SST
- Equal weighting of corrected models
- Parametric forecast probabilities (T - Gaussian, P - transformed Gaussian)



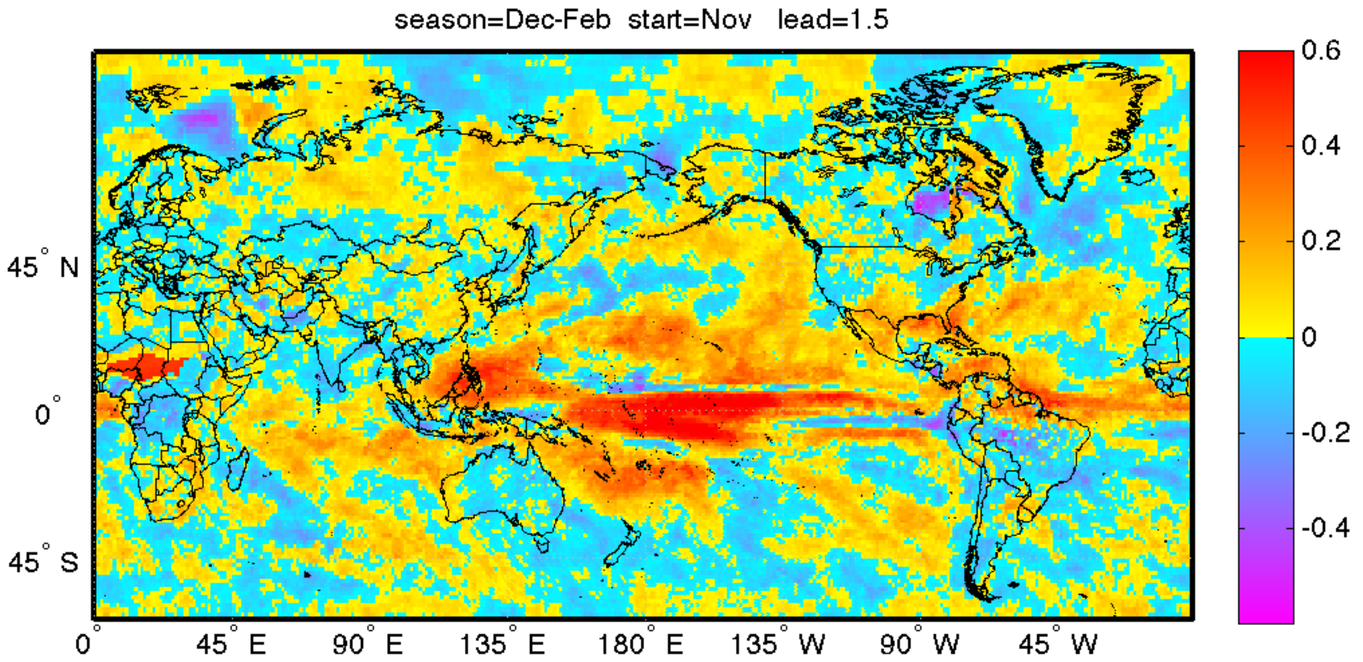
New NMME-based System

So far: Simple pooling and counting
Next:
(1) Ordinary regression of predicted versus observed probabilities for each tercile (van den Dool)
(2) Extended logistic regression or PCR



N. Acharya

RPSS Skill of Prototype NMME-based forecast



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ICPAC Climate Data Library | Data Library Portal

SCIPEA Climate Data Portal – to be hosted at ICPAC

Strengthening **C**limate **I**nformation **P**artnerships - **E**ast **A**frica is a UKaid-funded project of the WISER programme (Weather and climate Information and SERvices for Africa).

SCIPEA aims to strengthen partnerships between organisations involved in production, use, research and training activities regarding seasonal climate forecast information, toward increased capacity for national/regional early warning and effective early actions. SCIPEA is led by the Met Office (UK), together with the IRI, the IGAD Climate Prediction and Applications Centre (ICPAC), and national meteorological services and universities/training and other centres from Ethiopia, Kenya, Tanzania and Uganda.

Model Datasets

- GPC Montreal
- GPC Washington
- GPC Exeter
- NASA
- GFDL
- CCSM4

Observation Datasets

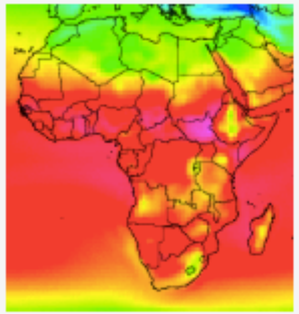
- CAMS OPI Precipitation
- GHCN CAMS Temperature
- ERSST Sea Surface Temperature
- Reanalysis Mean Sea Level Pressure

Forecasts | Observations

Forecasts

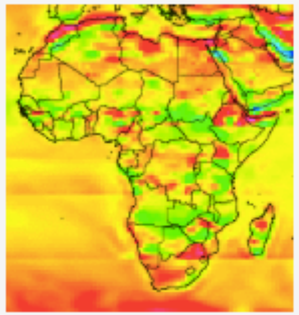
GCM Forecast Climatology

These maps display climatological values of forecast 2-meter temperature, sea surface temperature, and precipitation at multiple leads and start times during the year for a selection of climate models. The climatological base period is 1982-2010 for CFSv2 and 1981-2010 for CMC1 and CMC2.



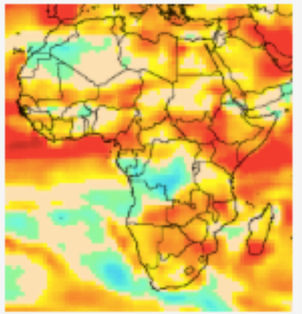
GCM Forecast Anomaly

These maps display anomaly values of forecast 2-meter temperature, sea surface temperature, and precipitation at multiple leads for a selection of climate models. The climatological base period is 1982-2010 for CFSv2 and 1981-2010 for CMC1 and CMC2.



Forecast Anomaly Correlation

These maps display anomaly correlations between hindcasts of 2-meter temperature, sea surface temperature, and precipitation and observed values of the same variables at multiple leads for a selection of climate models. The range of years over which the correlation is calculated is 1982-2010 for CFSv2 and 1981-2010 for CMC1 and CMC2.



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Portal | Forecasts: Forecast Anomaly Correlation | Region: Africa | Timescale: Seasonal | Model: CFSv2 (CMC1, CMC2) | Variable: Precipitation | Seasonal Lead Time: Seasonal Lead 1

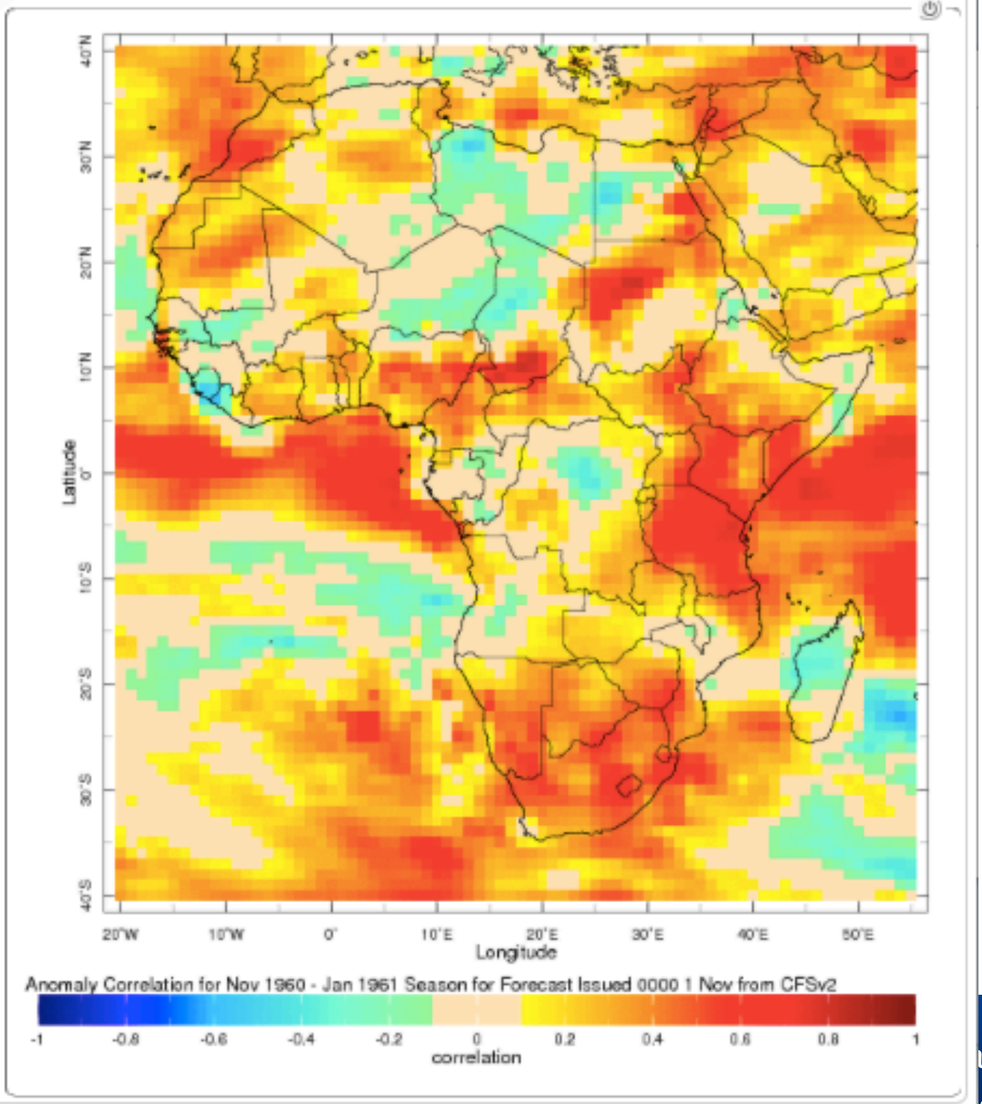
Description | Instructions | Contact Us

Forecast Anomaly Correlation

These maps display anomaly correlations between hindcasts of 2-meter temperature, sea surface temperature, and precipitation and observed values of the same variables at multiple leads for a selection of climate models. The range of years over which the correlation is calculated is 1982-2010 for CFSv2 and 1981-2010 for CMC1 and CMC2.

Use the drop-down menus at the top of the page to select the model, variable, and seasonal lead. Mouse over the map to select the forecast start time from the control that appears just above the map. Select a combination of the forecast start time and the 3-month seasonal lead time to produce a map for a target season of the year. The forecast starts occur at the beginning of a month of the year, and adding together the forecast start time and the lead time (3-month seasonal lead) determines the season for which the hindcast is valid.

For example, for a seasonal forecast, the combination of a forecast start time of 0000 1 Sep and a 3-month seasonal lead of 1.5 months (the first seasonal lead) will produce a correlation anomaly map for the September-November 3-month season. The combination of a forecast start time of 0000 1 Sep and a 3-month seasonal lead of 2.5 months (the second seasonal lead) will produce a correlation anomaly map for the October-December season. The target season and start time will appear at the bottom of the map -- note that the displayed year of 1960 or 1961 is not relevant -- the correlation is calculated over 1982-2010 for CFSv2 and 1981-2010 for CMC1 and CMC2.



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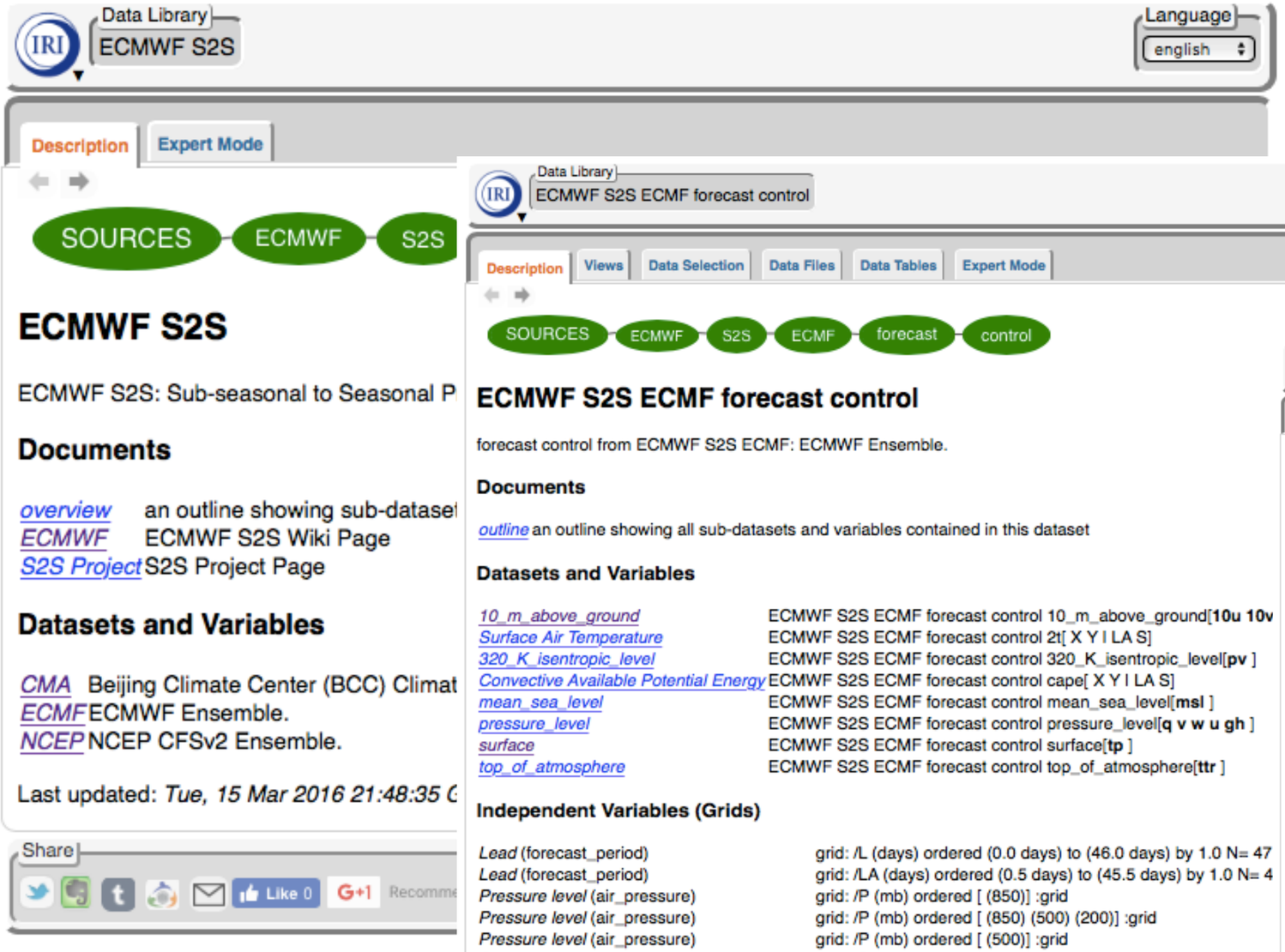
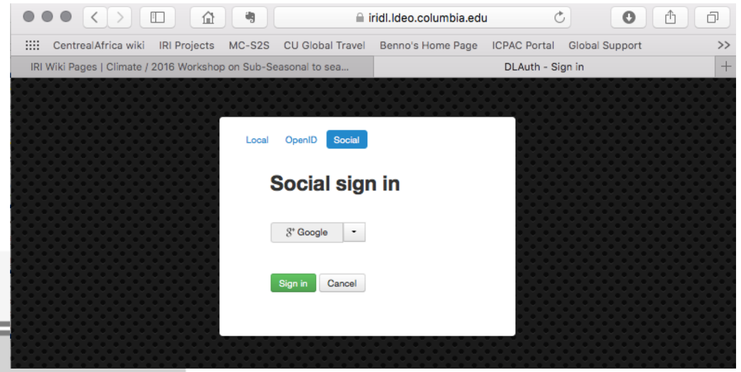
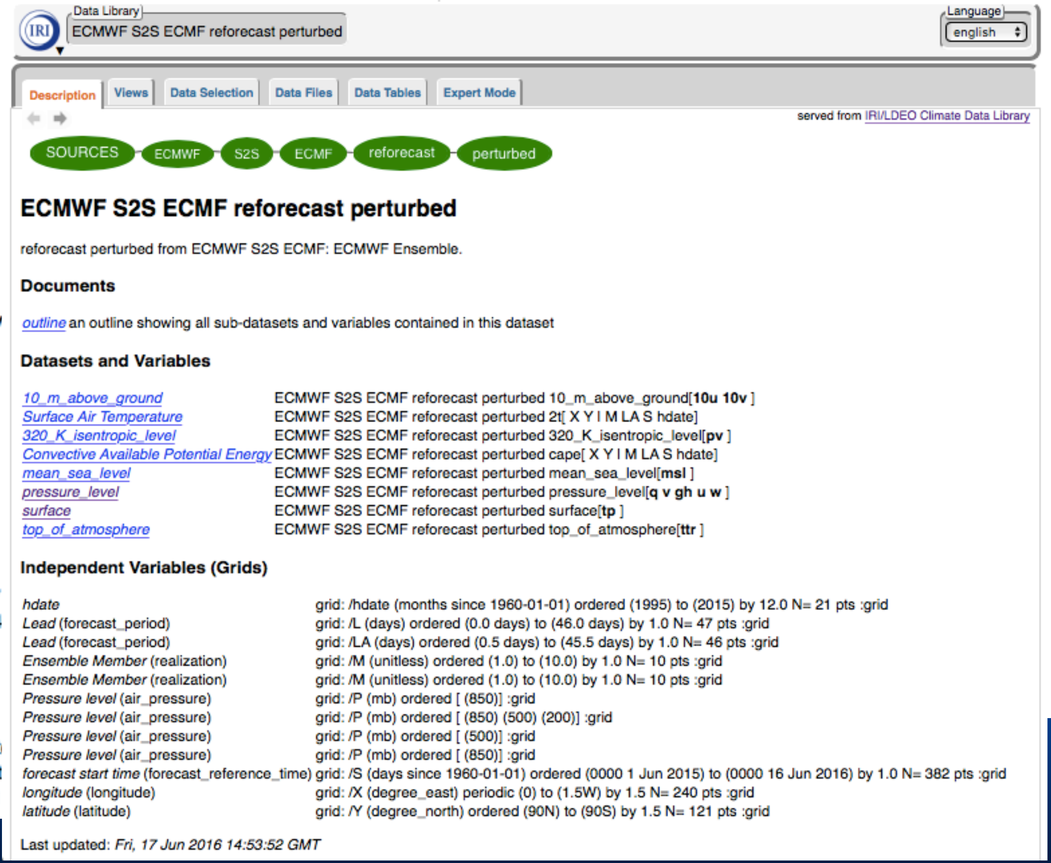
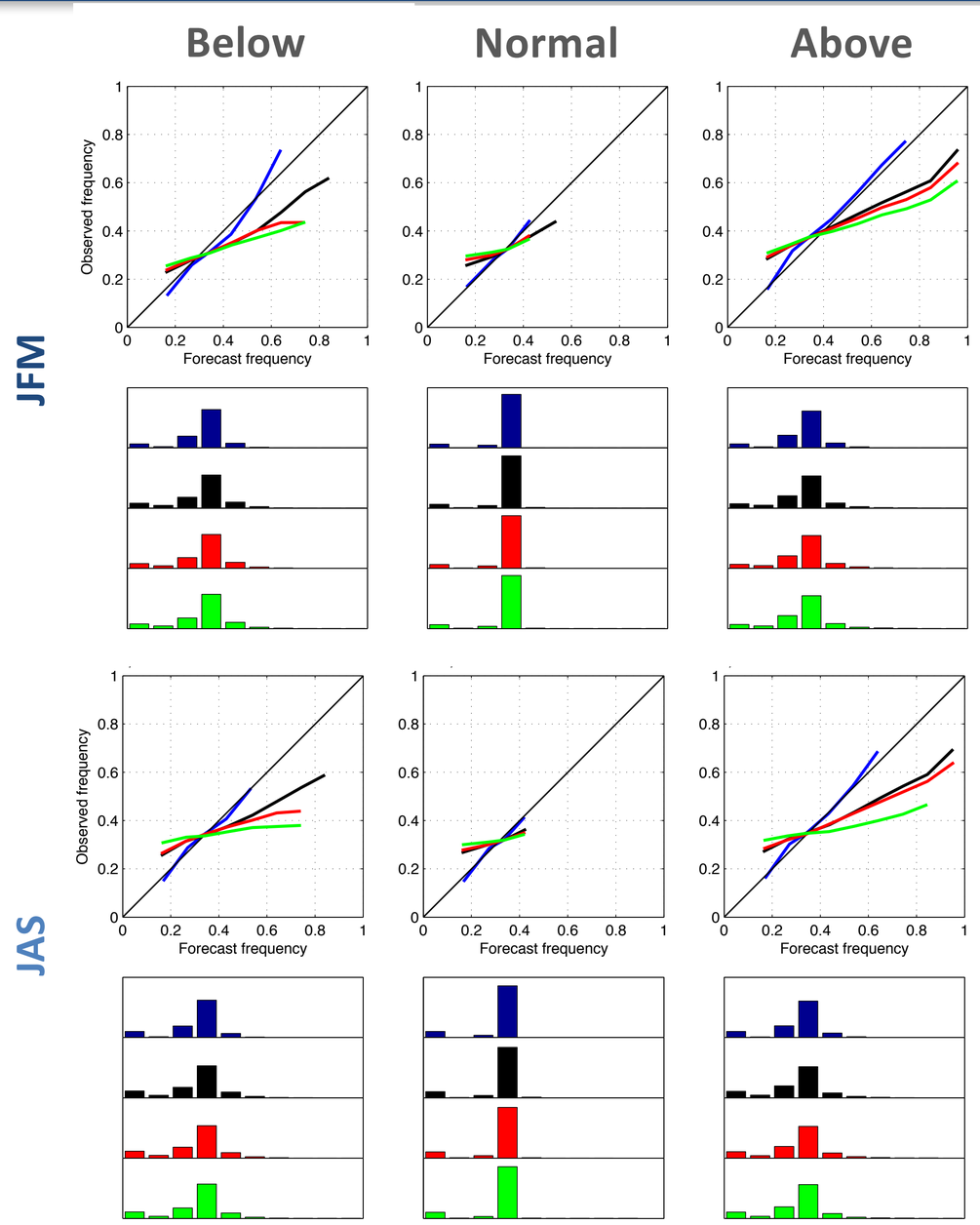
S2S Data @ IRIDL







Multi-model ensemble of S2S forecasts

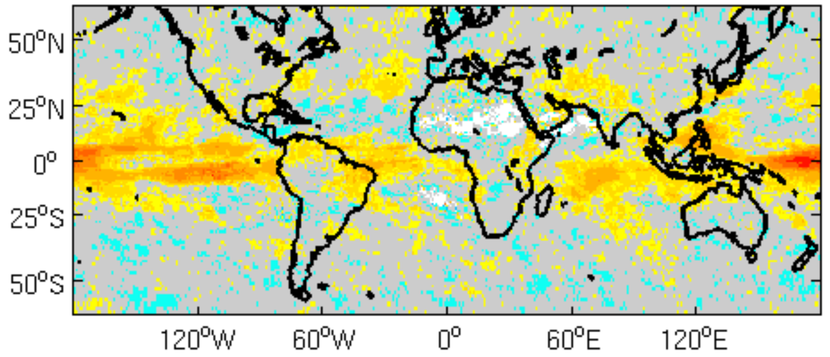


(6-week windows for terciles definition & ELR training)

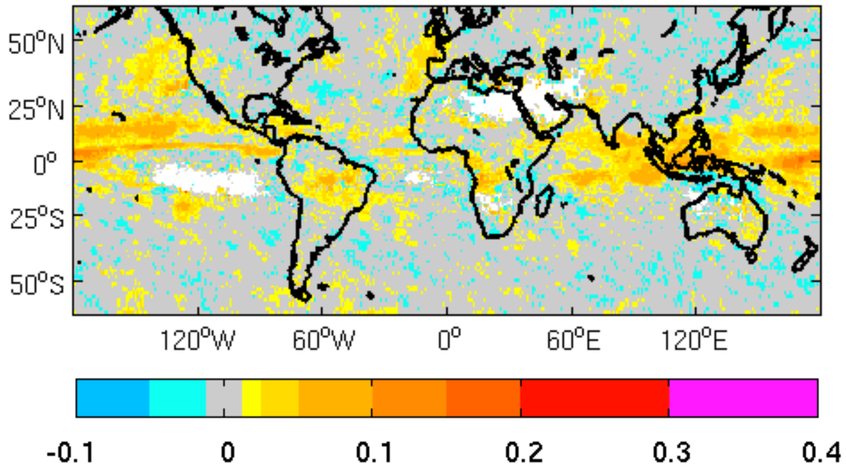
MME Week3+4
ECMF Week3+4
CFS Week3+4
CMA Week3+4

Reliability diagrams computed for all points within [60°S-60°N]

JFM MME Week 3+4 RPSS



JAS MME Week 3+4 RPSS



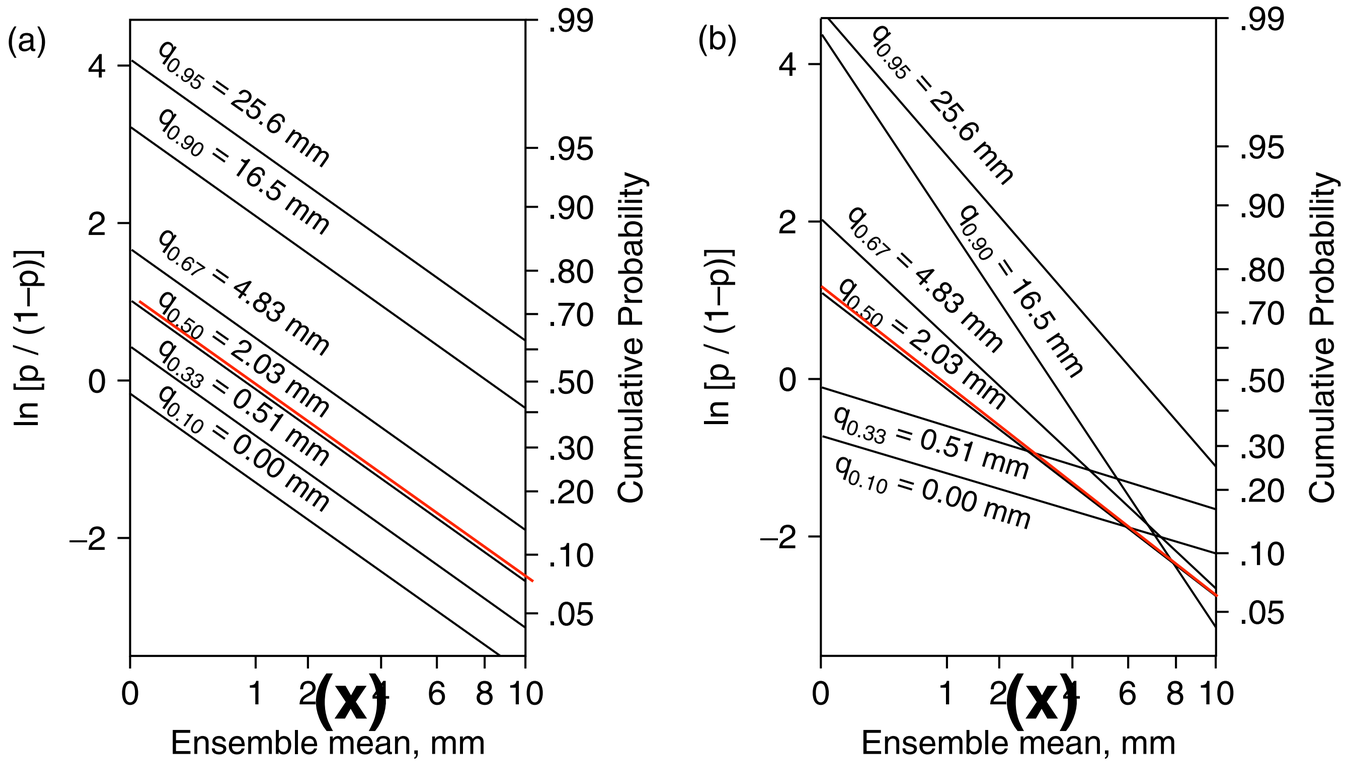
Extended Logistic Regression (ELR)

GFS Day 6–10 Precip
Forecast for Minneapolis
28 Nov – 2 Dec 2001

Wilks (2009)

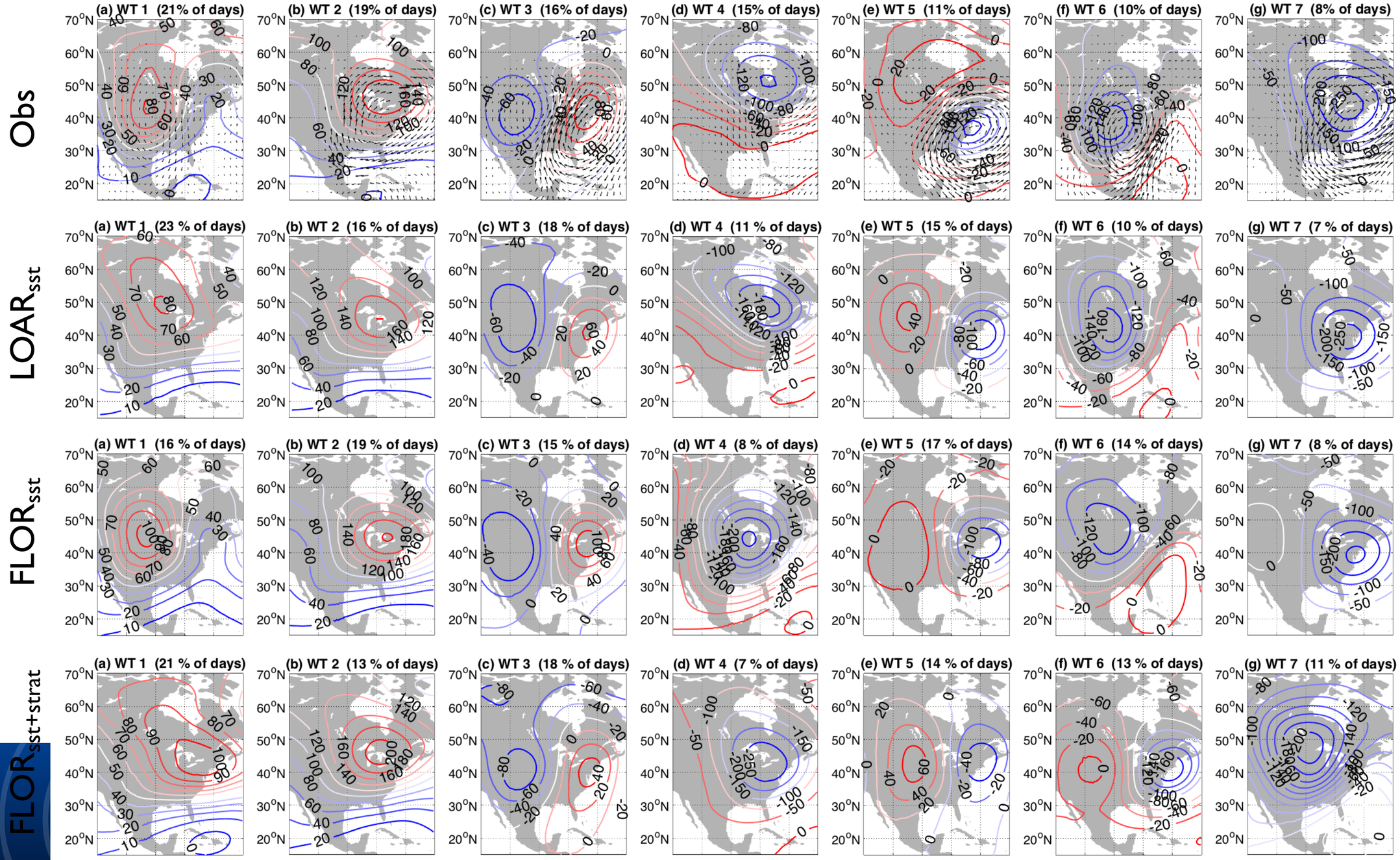
$$\ln\left[\frac{p(q)}{1-p(q)}\right] = f(\mathbf{x}) + g(q)$$

$$\ln\left[\frac{p}{1-p}\right] = f(\mathbf{x})$$



Weather Types for GCM Diagnostics (MAM, 1981-2012, z500)

Muñoz *et al.*, in prep.



Preferred transitions

1->2->1
3->1->3
3->4->3
5->1,4,6
6->4,7
7->4

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Summary

- Experimental NMME-based seasonal forecast system
- GPC portal for East Africa
- S2S data in IRI Data Library
- Extended logistic regression for S2S forecast calibration