GPC-Washington

Activities Update

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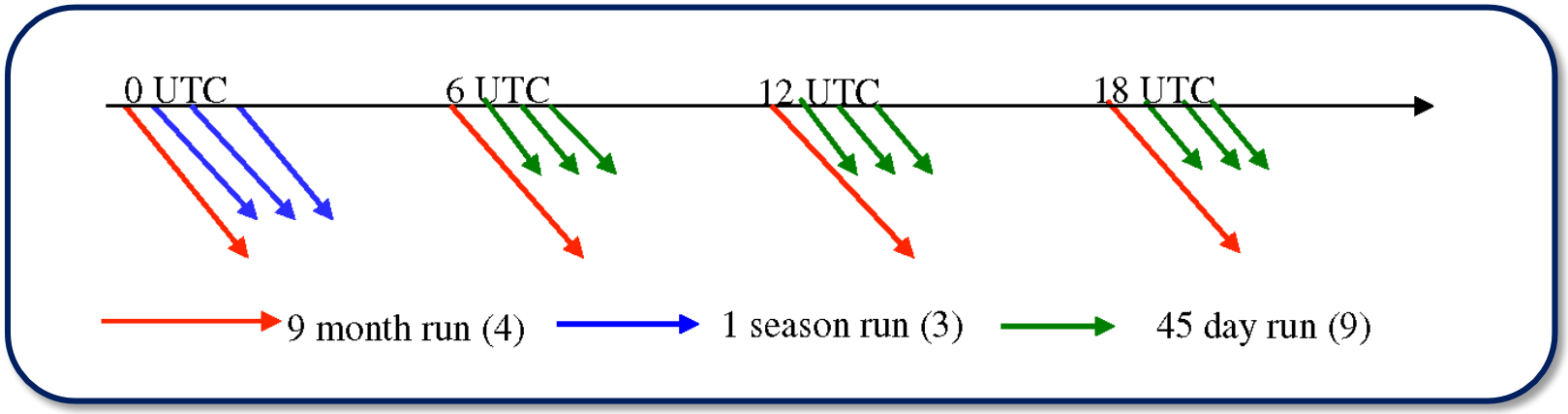
Long Range Forecast System

- Coupled Model
  - Made operational March 2011
  - Atmospheric model: T126/L64 (~1 Deg lat/lon)
  - Ocean model: MOM4 (0.5 Deg lat/lon)
- Initialization
  - Climate Forecast system reanalysis (CFSR)
    - Atmosphere
    - Land
    - Ocean

Real-time Forecast Configuration

- Forecasts done in a continuous mode
- A suite of extended-range forecasts each day
  - Four 9-month lead forecasts/day
  - Four 120 day lead forecasts/day
  - Sixteen 45 day lead forecasts/day



Hindcast Configuration

- Seasonal
  - Four 9-month lead forecasts every 5th day of calendar month
  - 1981-2010
- Monthly/Sub-seasonal
  - Four 45-day lead forecasts everyday of calendar mont
  - 1999-2010

Forecast Dissemination

- Seasonal forecast is constructed based on lagged ensemble (initial conditions from last 10-days; 40-member ensemble)
- Seasonal, monthly, and weekly forecast products are updated everyday on the web
- Deterministic (ensemble mean anomalies) & probabilistic forecasts
- Seasonal forecasts submitted to LC-LRFMME
- Real-time forecasts are available via ftp server (7-day rotating archive)
- Hindcasts available via various conduits (NCEP; NCDC; IRI)
- Hindcast skill information

Some Examples

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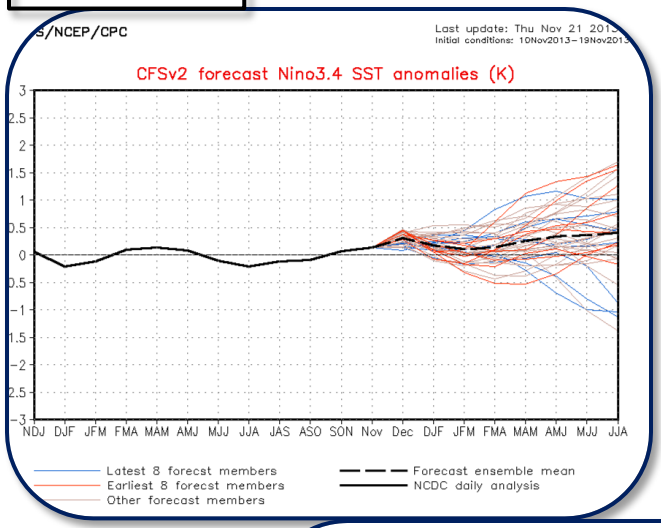
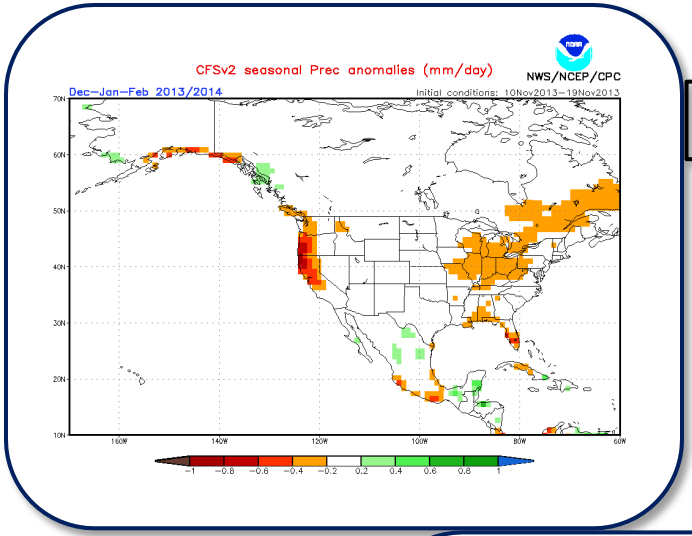
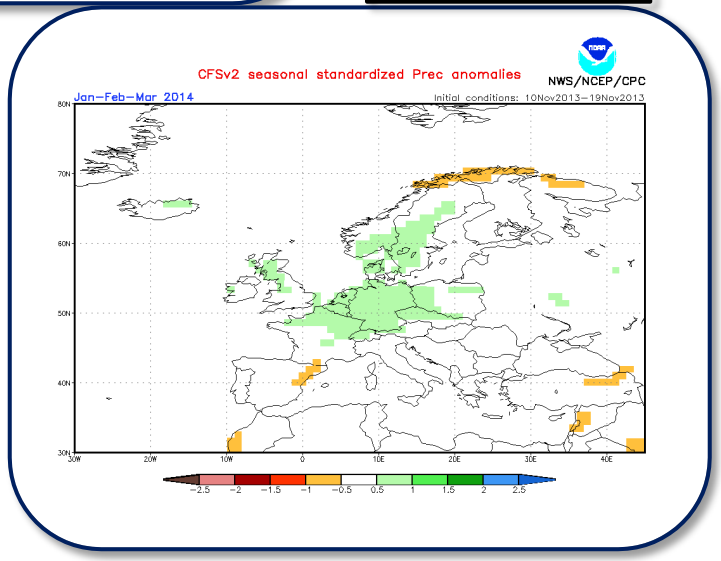


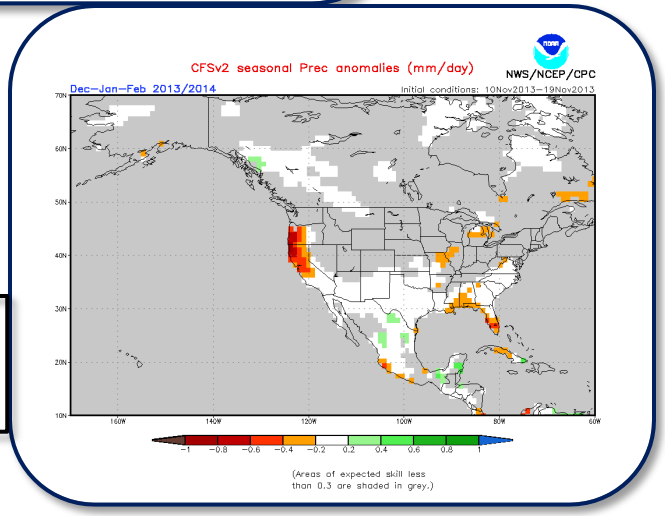
Rainfall



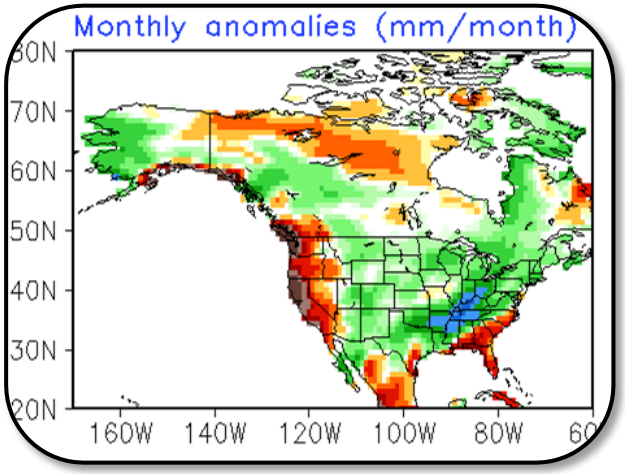
Rainfall Normalized



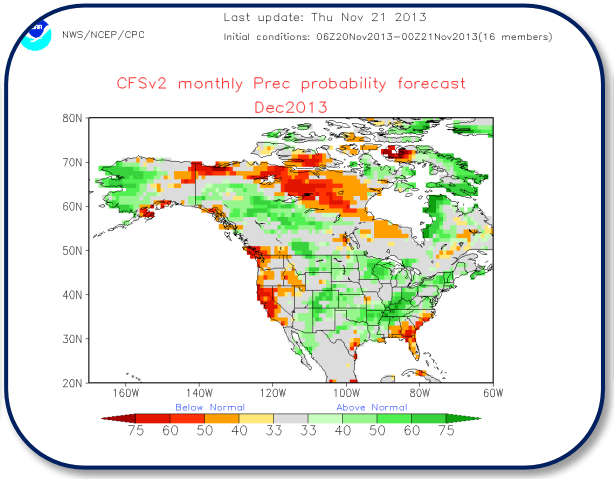
Rainfall Skill Mask



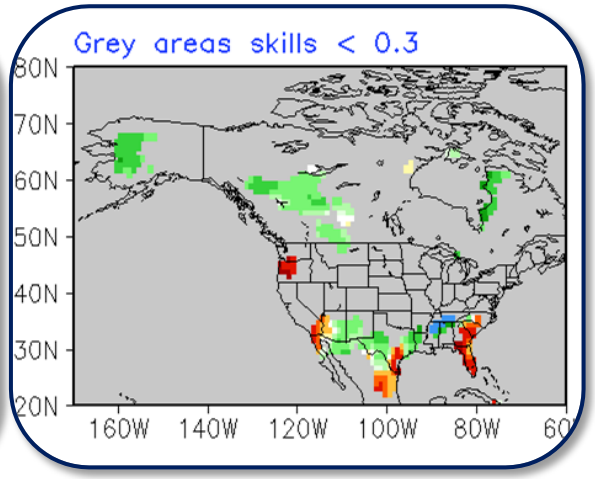
Weekly and Monthly



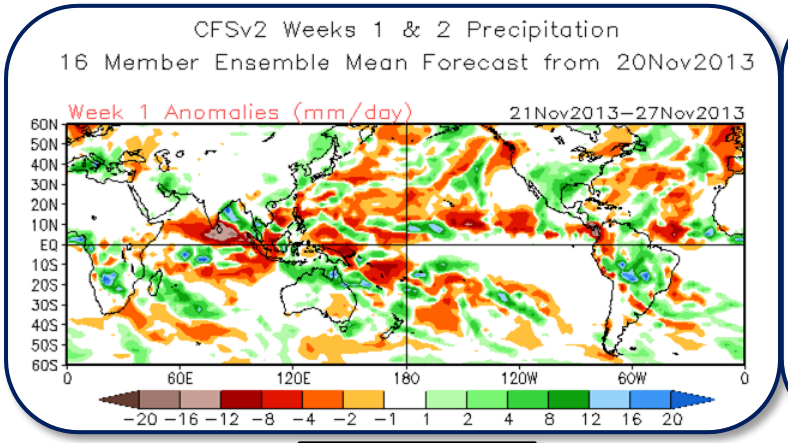
Rainfall



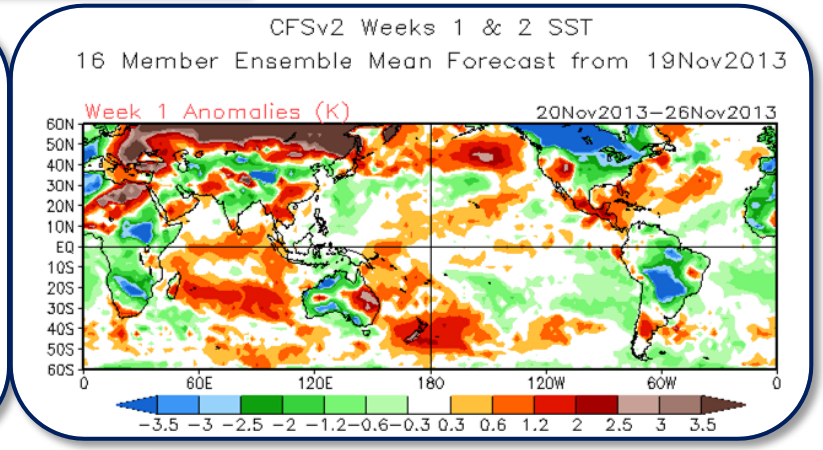
Rainfall Probability



Rainfall - Masked



Rainfall



Surface Temperature

- Wish list
  - Earlier submission of forecasts for the LC-LRFMMF to fit our schedule for operational seasonal forecasts
- Issues
  - Analysis of boundary conditions like soil moisture; learn from experience of other GPCs

Some Research Activities

- Guidance on number of initial conditions to use for lagged ensemble?
- Is conditional skill feasible?
- Interpretation of perfect skill estimates
- Analysis of hindcasts for predictability and attribution research
- Equatorial Pacific observing system; ENSO in SI prediction system

- Kumar, A., P. Peng, and M. Chen, 2013: Is there a Relationship between Potential and Actual Skill? *Mon. Wea. Rev.*, available online.

- Hoerling, M. et al, 2014: Causes and Predictability of the 2012 Great Plains Drought. *Bull. Amer. Meteor. Soc.* Available online.

- Chen, M. et al., 2013: Lagged Ensembles, Forecast Configuration, and Seasonal Predictions. *Mon. Wea. Rev*., 141, 3477-3497.

- Pegion, K., and A. Kumar, 2013: An ENSO-Conditional Skill Mask for Improved Seasonal Predictions. *Mon. Wea. Rev.*, 141, 4515-4533.

- Riddle, E., et al. 2013: CFSv2 ensemble prediction of the wintertime arctic oscillation. *Climate Dynamics*, **41**, 1099–1116, DOI 10.1007/s00382-013-1850-5.

- Kumar, A., et al. 2013: Do extreme climate events require extreme forcings? *Geophys. Rea. Lett.* 40, 3440–3445, doi:10.1002/grl.50657.