

Seasonal scale forecasts for water management: What has been accomplished and what still needs to be done?

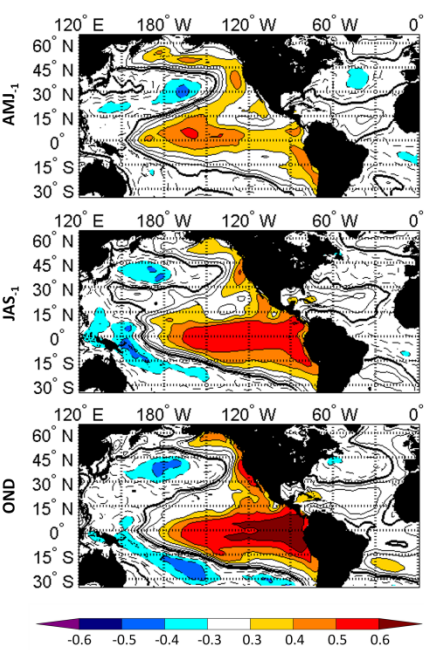
Chris Martinez

Agricultural and Biological Engineering

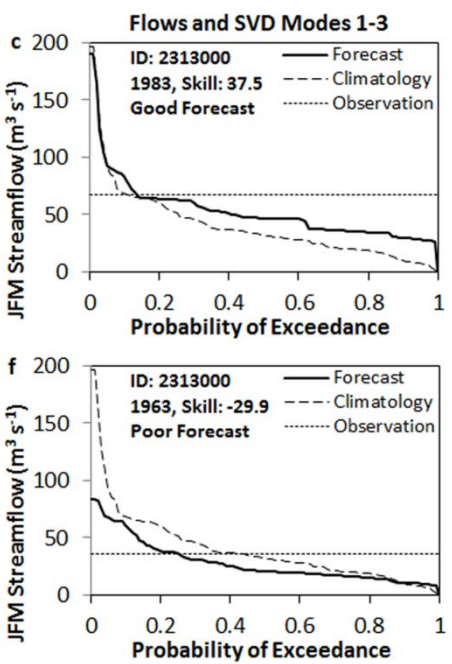
Probability of Exceedance Streamflow Forecasts

Streamflow pdfs conditioned by the value of the predictor

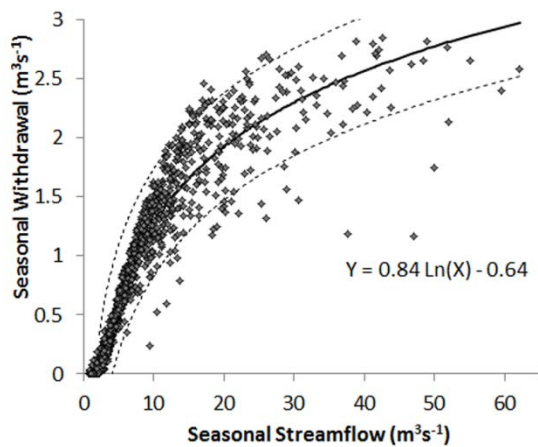
Correlation with SSTs



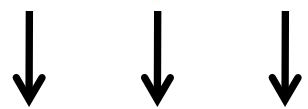
JFM Streamflow Forecast



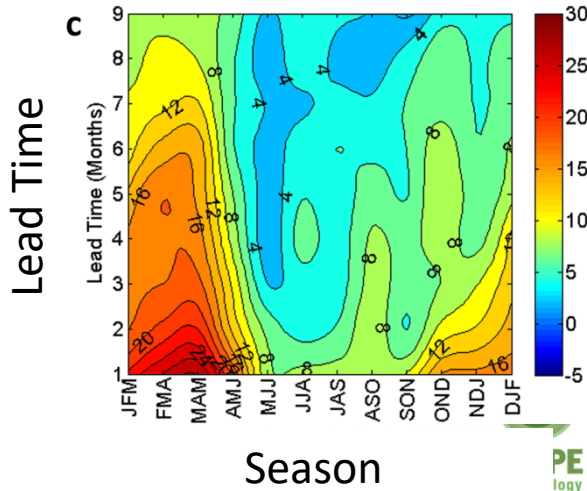
Seasonal Withdrawal



Seasonal Streamflow

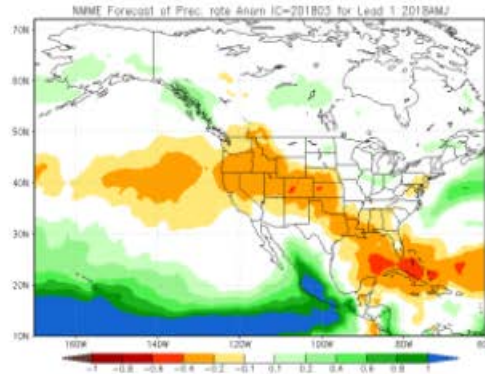


LEPS Skill Score

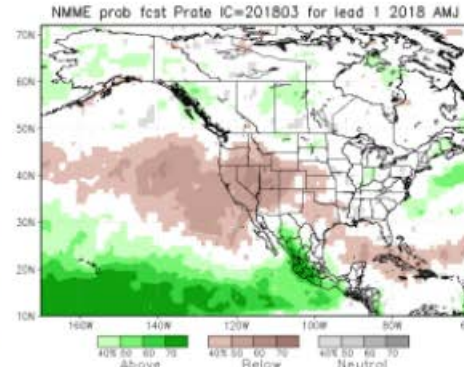


North American Multi-Model Ensemble – Research to Operations

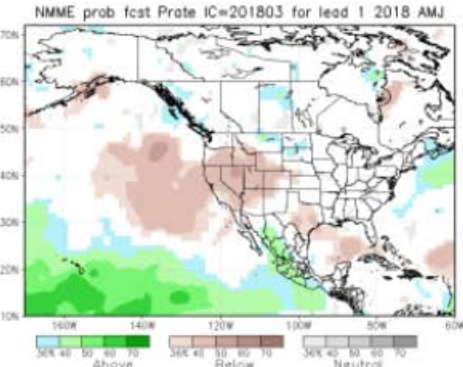
NMME



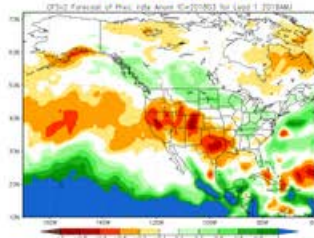
Prob fcst



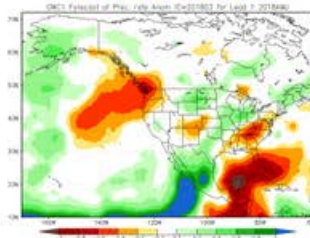
PAC calib. prob fcst



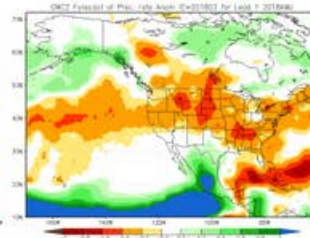
NCEP CFSv2



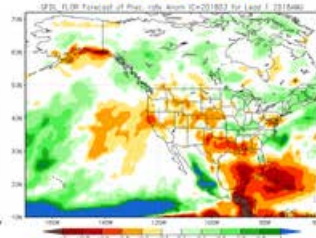
CMC1 CanCM3



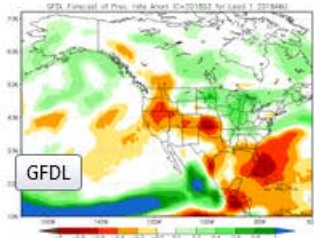
CMC2 CanCM4



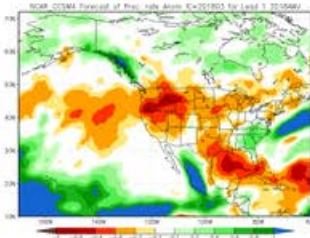
GFDL FLOR



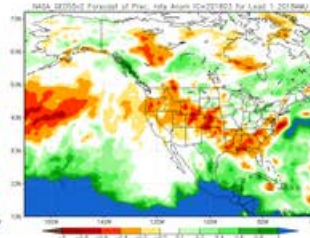
GFDL CM2.1



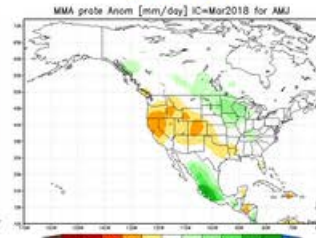
NCAR CCSM4



NASA GEOS5v2



IMME



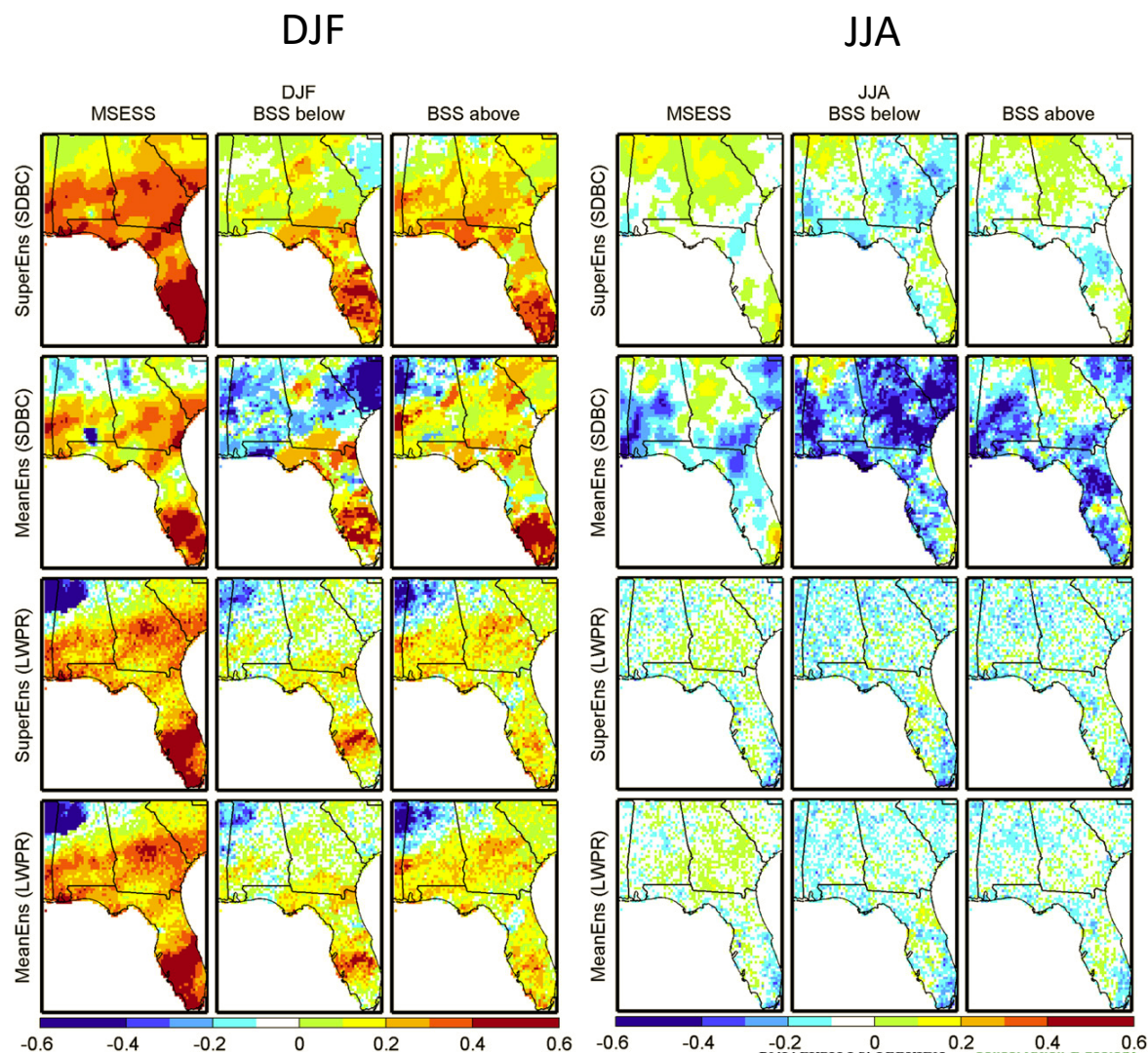
GFDL

Forecast of
April-May-June
Precipitation

Downscaled Seasonal Forecasts using the National Multi-Model Ensemble (NMME)

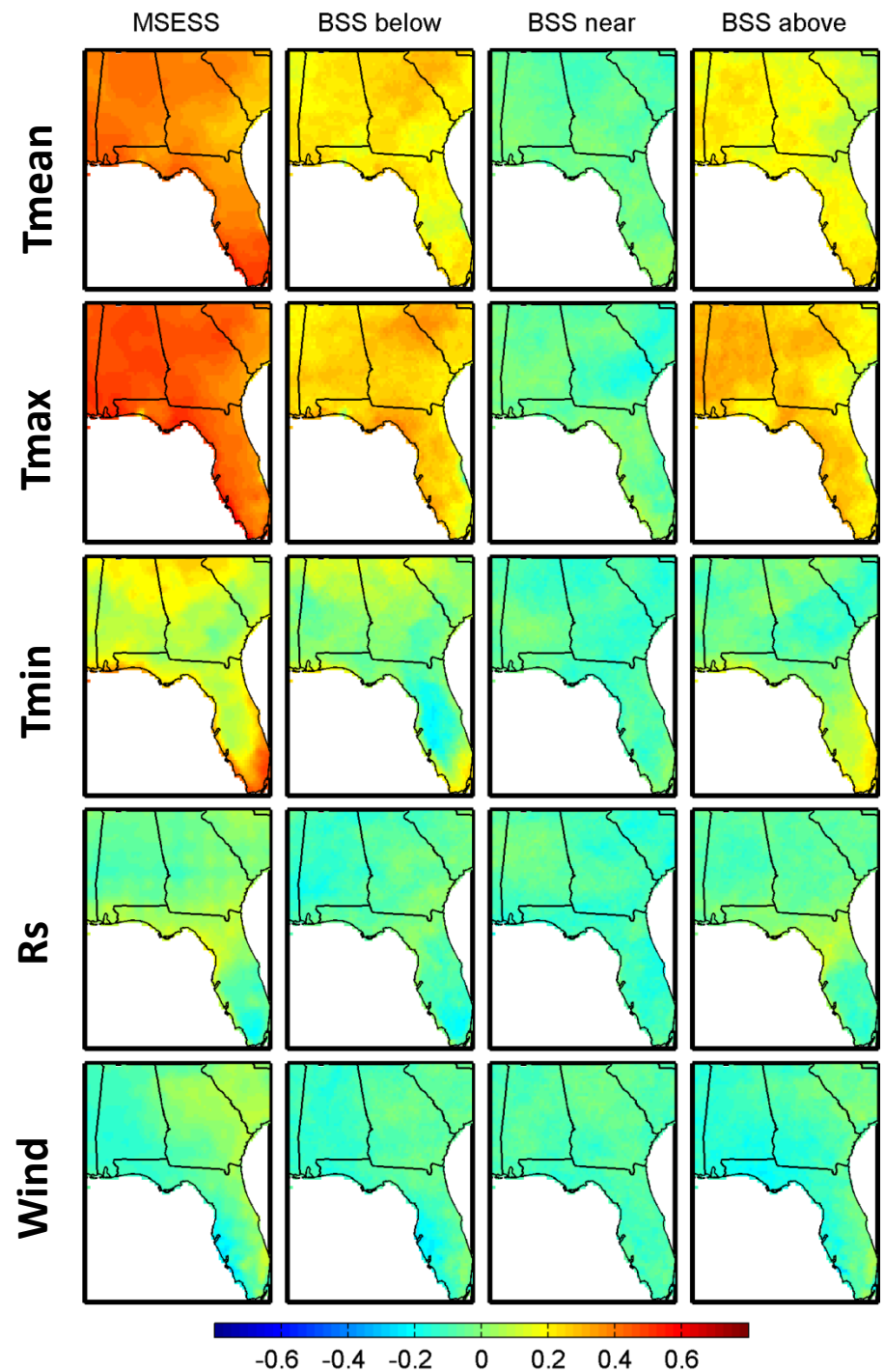
<https://doi.org/10.1175/JCLI-D-13-00481.1>

- 6 GCMs downscaled to 12 km
- Two downscaling methods
- Two ensemble combinations
- Little skill beyond lead 0



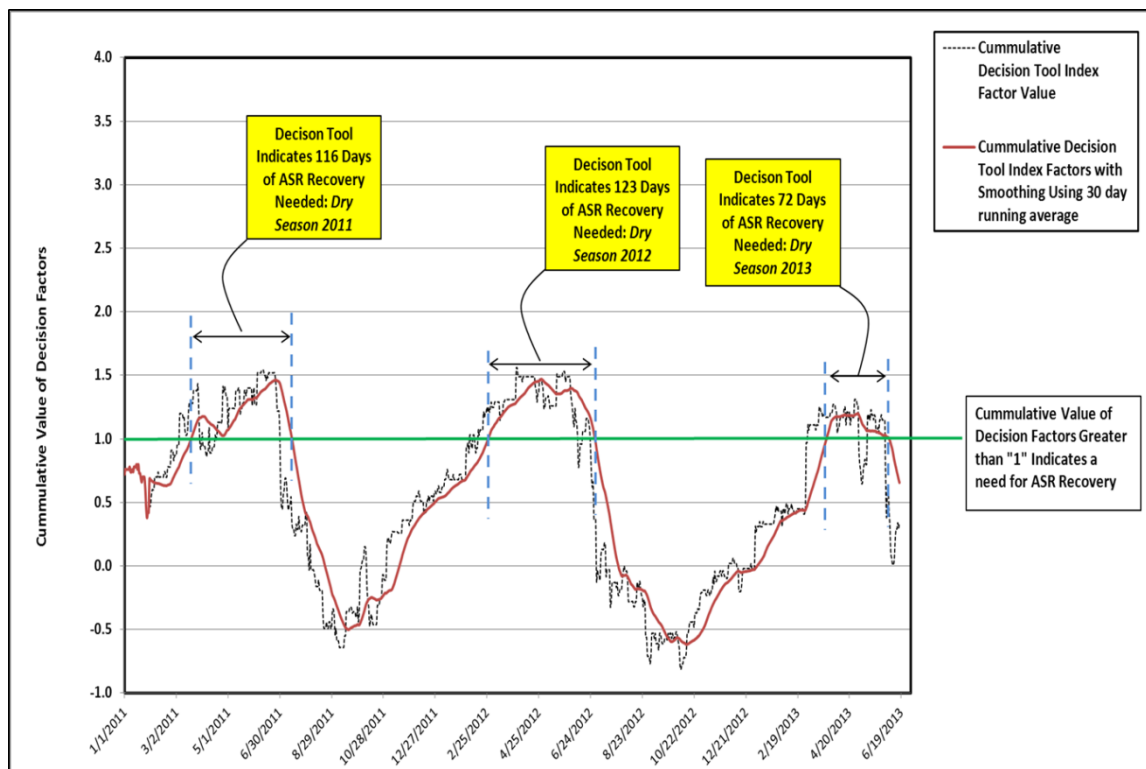
Seasonal Reference Evapotranspiration

- Climate Forecast System v2 (CFSv2)
- Downscaled to 12 km
- Penman Monteith
- Lowest skill in solar radiation and wind speed
- **Skill highest in winter & during ENSO events**



Aquifer Storage and Recovery Initiation Index

- Keetch Byram Drought Index (KBDI)
- CPC 1 Month Outlooks
- CPC 3 Month Outlooks
- Raw water reserves
- ASR reserves
- River flow



<https://toolkit.climate.gov/tool/asr-recovery-initiation-index>

Survey of Water Managers in AL, FL, and GA

- Use and awareness of seasonal forecasts is limited across states
- Greater use by larger organizations
- Watershed or county level products desired
- Difficulty understanding forecasts appears to be the biggest limit to use
- Information and communication of existing forecasts biggest need
- Interactions with scientists is critical

Questions?

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