

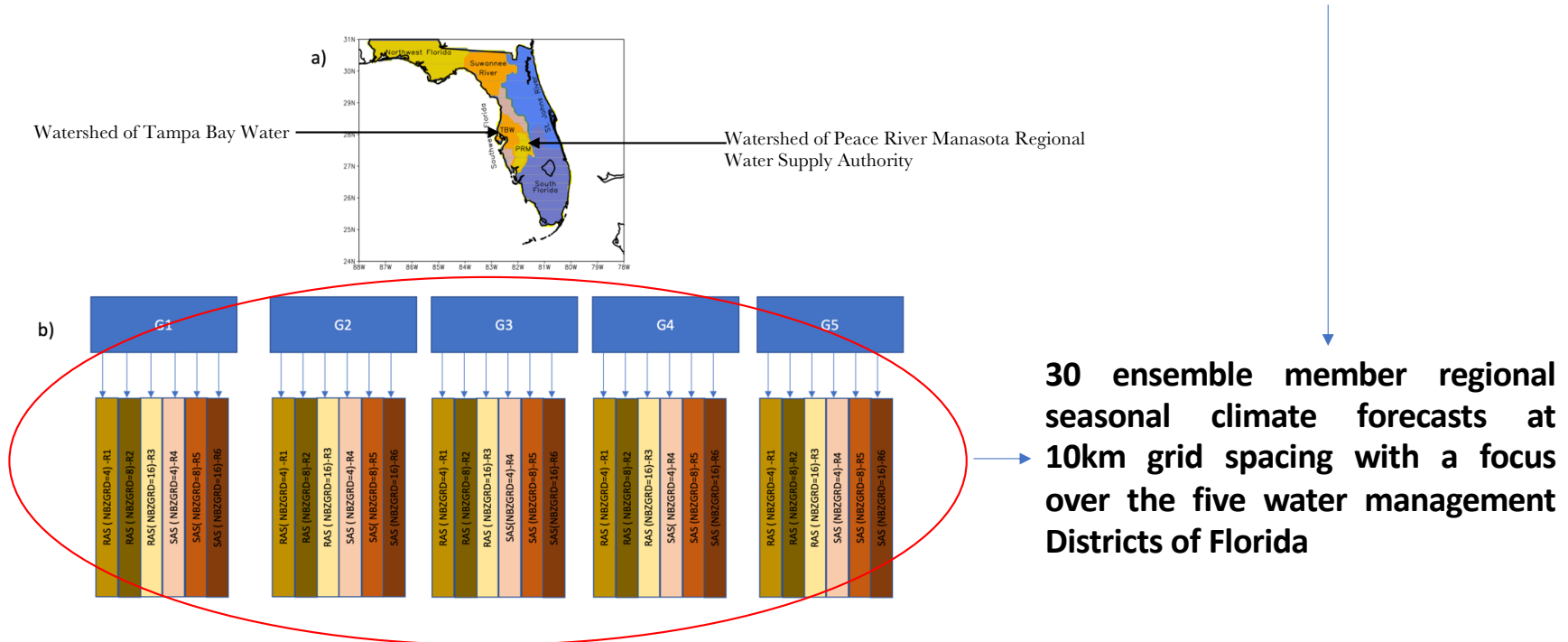
# Forecast for: November-to-February 2020- 2021

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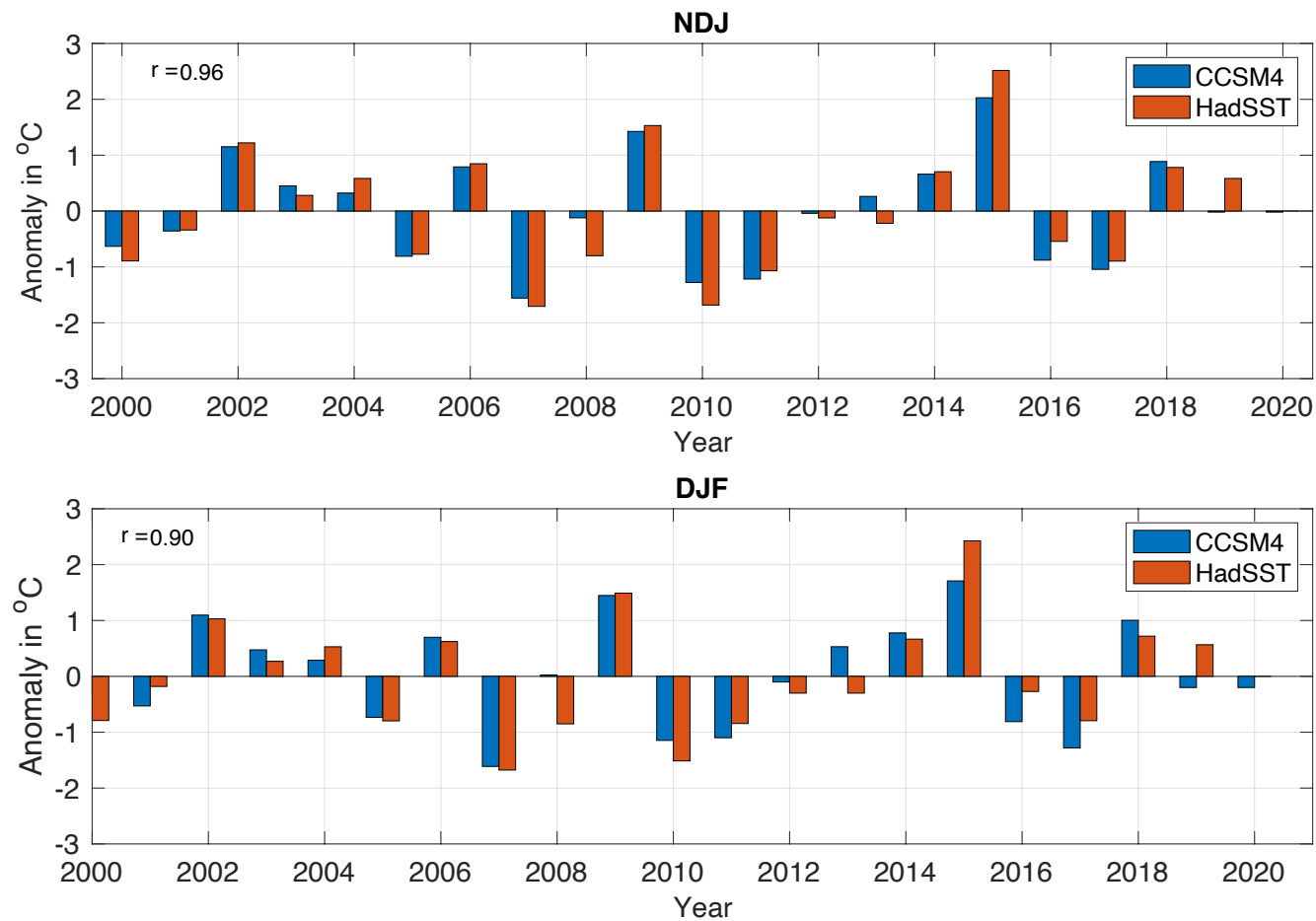
Florida Water and Climate Alliance ([FloridaWCA.org](http://FloridaWCA.org))

**Disclaimer:** This is an experimental seasonal forecast. The forecasts are solely of the individuals and do not reflect the views, information or the opinion of the affiliated institutions. The affiliated institutions and the associated personnel producing these forecasts bear no responsibilities for the decisions you make based on these forecasts.

# Experimental Seasonal **CL**imate **F**orecasts for Florida (**CLIFF**)

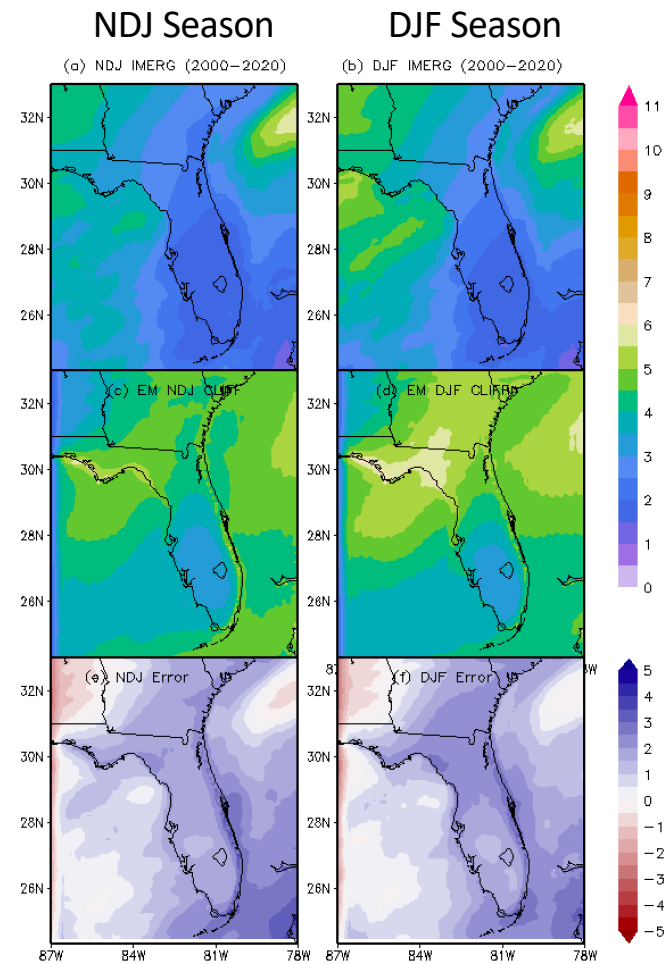


a) The sub-domains outlining the five water management districts and the two water utilities (TBW and PRM) in the Southwest Florida water management district. b) A schematic of the setup of the high resolution experimental seasonal **CL**imate re**F**orecasts for **F**lorida (**CLIFF**). G1 through G5 are the five global model seasonal reforecasts with November 1 start that differ in model physics (convection scheme) and perturbations to the initial conditions of the atmosphere. R1 through R6 are the RSM reforecasts conducted for each global seasonal reforecast, which differ in the width of the sponge zone (number of grid points in the sponge zone [NBZGRD]) and the convection scheme.



Anomalies of the Nino3.4 SST from the SST forecast field used in CLIFF. This SST forecast field is provided by U. Miami (courtesy Ben Kirtman). HadSST is the corresponding observed Nino3.4 SST anomalies from UK Hadley Center.

# Systematic Errors of CLIFF

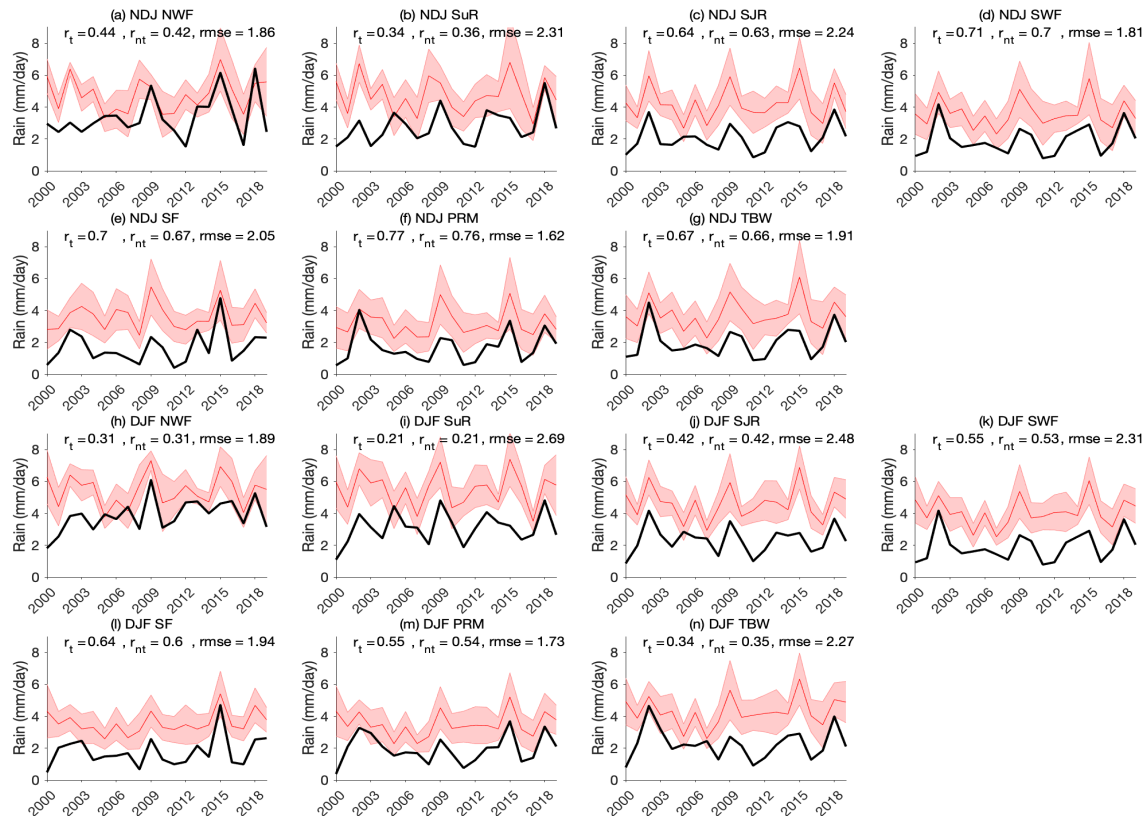


**CLIFF displays a systematic wet bias.**

Climatological seasonal mean precipitation (mm/day) for (a, c) November-December-January (NDJ) and (b, d) December-January-February (DJF) from (a, b) GPM and (c, d) ensemble mean CLIFF. Note that NDJ and DJF are at 0-month and 1-month forecast lead, and DJF is a 1-month forecast lead, respectively, in CLIFF. The corresponding climatological errors (CLIFF-IMERG; mm/day) are shown for (e) NDJ and (f) DJF seasons.

# Reforecast skills of CLIFF

NDJ Season

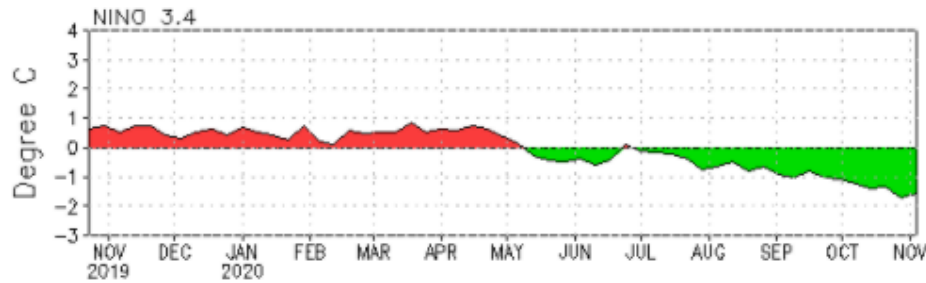


**Reforecast skills of CLIFF are evaluated from 20 seasons from 2000-2001 to 2019-2020.**

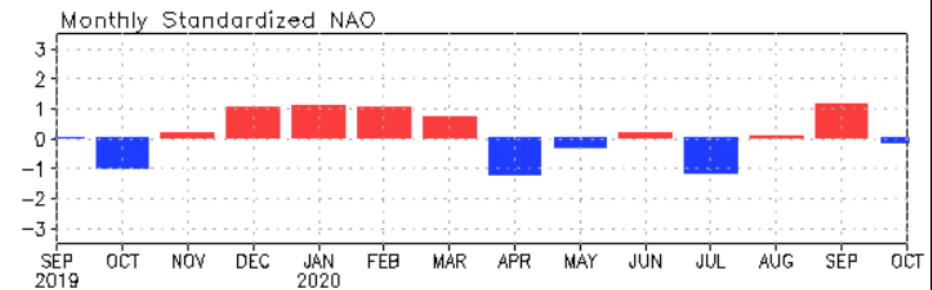
DJF Season

Time series of (a-g) NDJ and (h-n) DJF seasonal mean precipitation (mm/day) from GPM (black line) and for CLIFF (red line is for the ensemble mean and shading is the range of the ensemble members) for (a, h) Northwest Florida (NWF), (b, i) Suwannee River, (c, j) St. Johns River, (d, k) Southwest Florida (SWF), (e, l) South Florida (SF), (f, m) Peace River Manasota (PRM), and (g, n) Tampa Bay Water regions. The correlation between the GPM observations and ensemble mean CLIFF with the trend ( $r_t$ ) and after removing trend ( $r_{nt}$ ) and the corresponding root mean square error (rmse) are also indicated.

## Nino3.4 SST index



- A Majority of the models predict the continuation of La Niña through the Northern Hemisphere winter 2020-21.
- NOAA "ENSO Diagnostics Discussion" on 12 November stated that "La Niña conditions are likely to continue through the Northern Hemisphere winter (~95% chance) and into spring (~65% chance)".



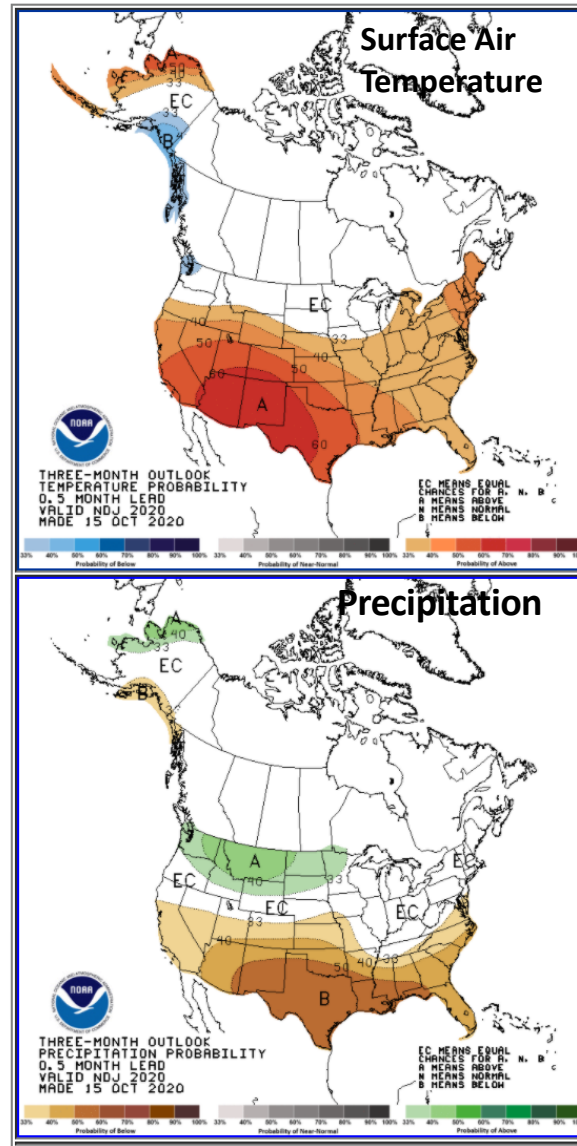
Strong La Nina increases the **likelihood** for a dry and warm winter and spring seasons, especially over South Florida. NAO could act as a spoiler! Negative NAO can result in cold winters (remember 2009/10 winter!)

Courtesy: NOAA CPC

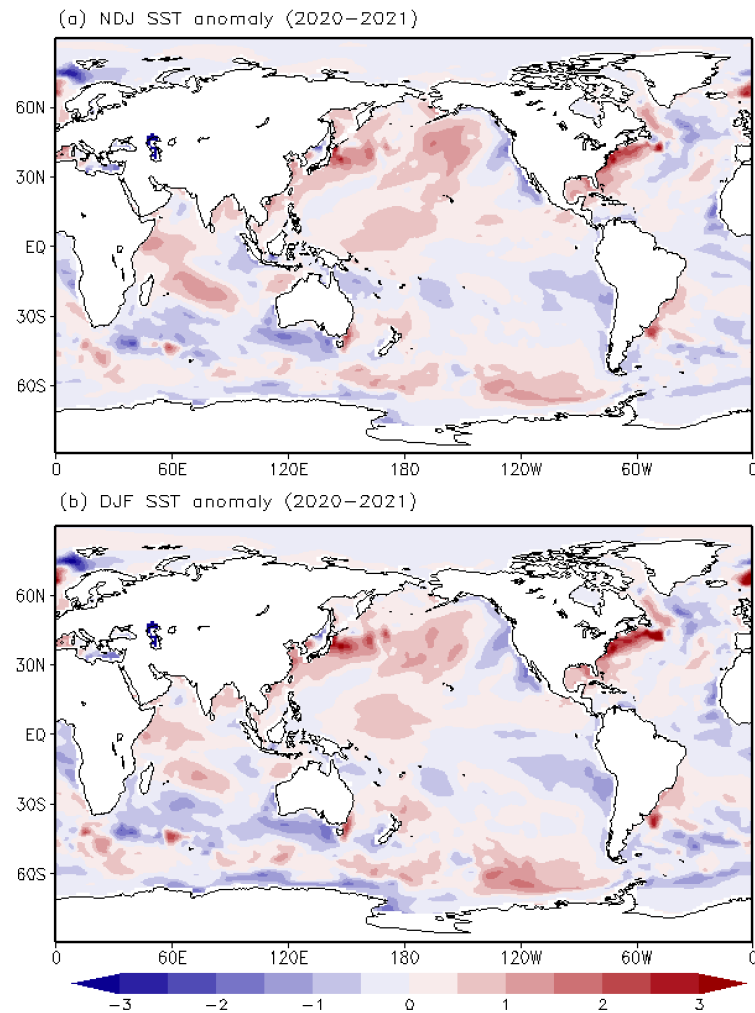
**Three month outlook: CPC Official Forecasts  
Nov-Dec-Jan 2020-21**

Outlook suggests that there is **33-40%** likelihood of above normal surface temperature over Florida

Outlook suggests that there is **40-50%** likelihood of below normal precipitation over Florida



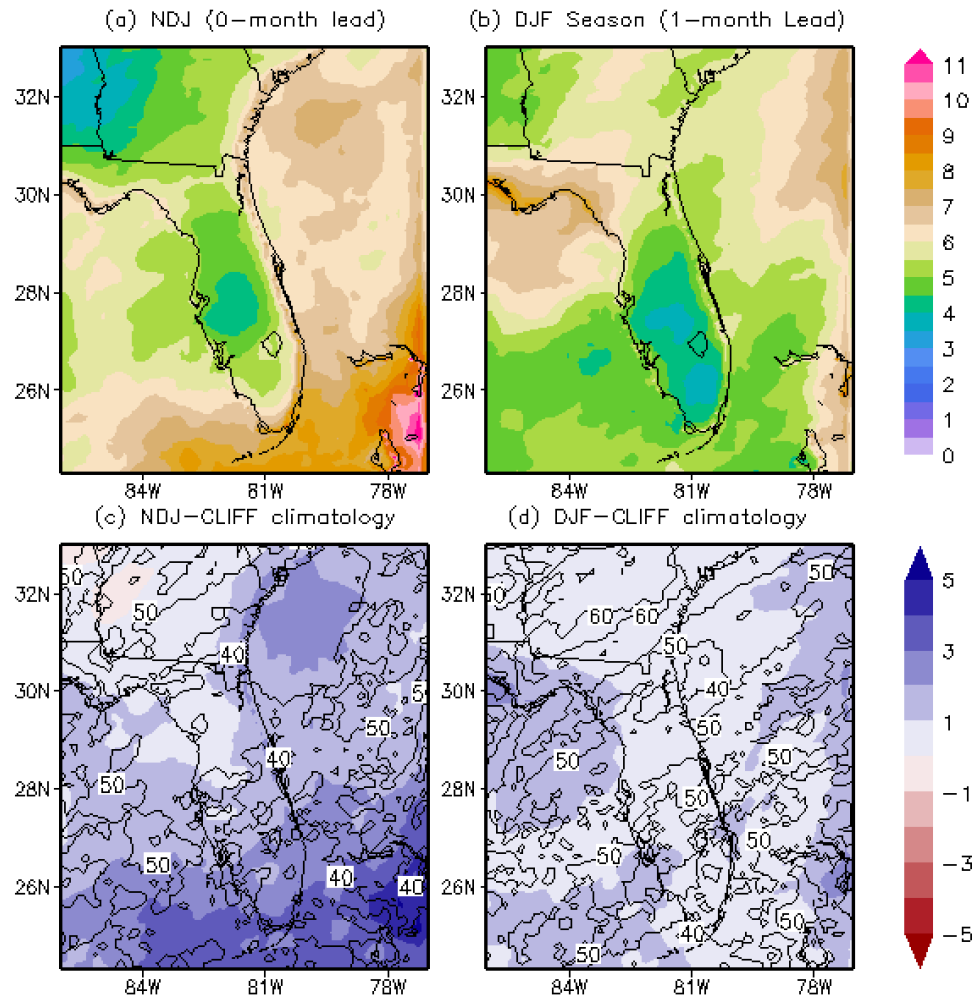
Courtesy: NOAA CPC



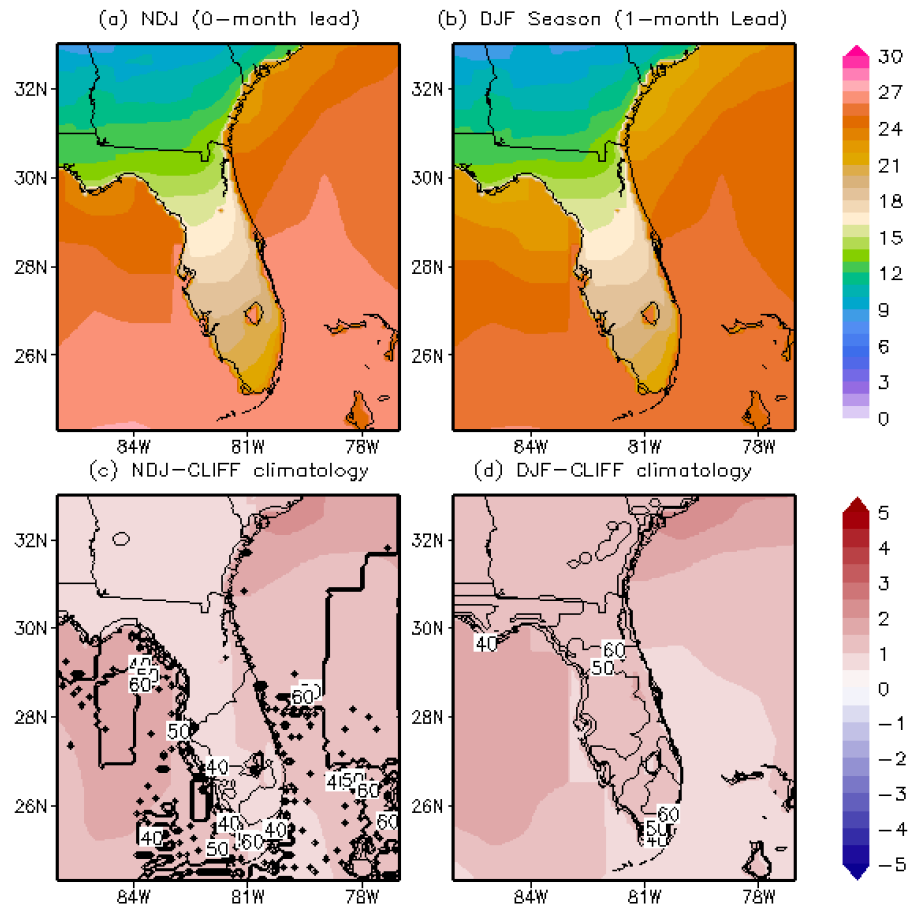
SST forecast field provided from CCSM4 as part of the NMME, courtesy Prof. Ben Kirtman, U. Miami.

The SST anomaly forcing used in CLIFF for a) NDJ and b) DJF 2020-2021.

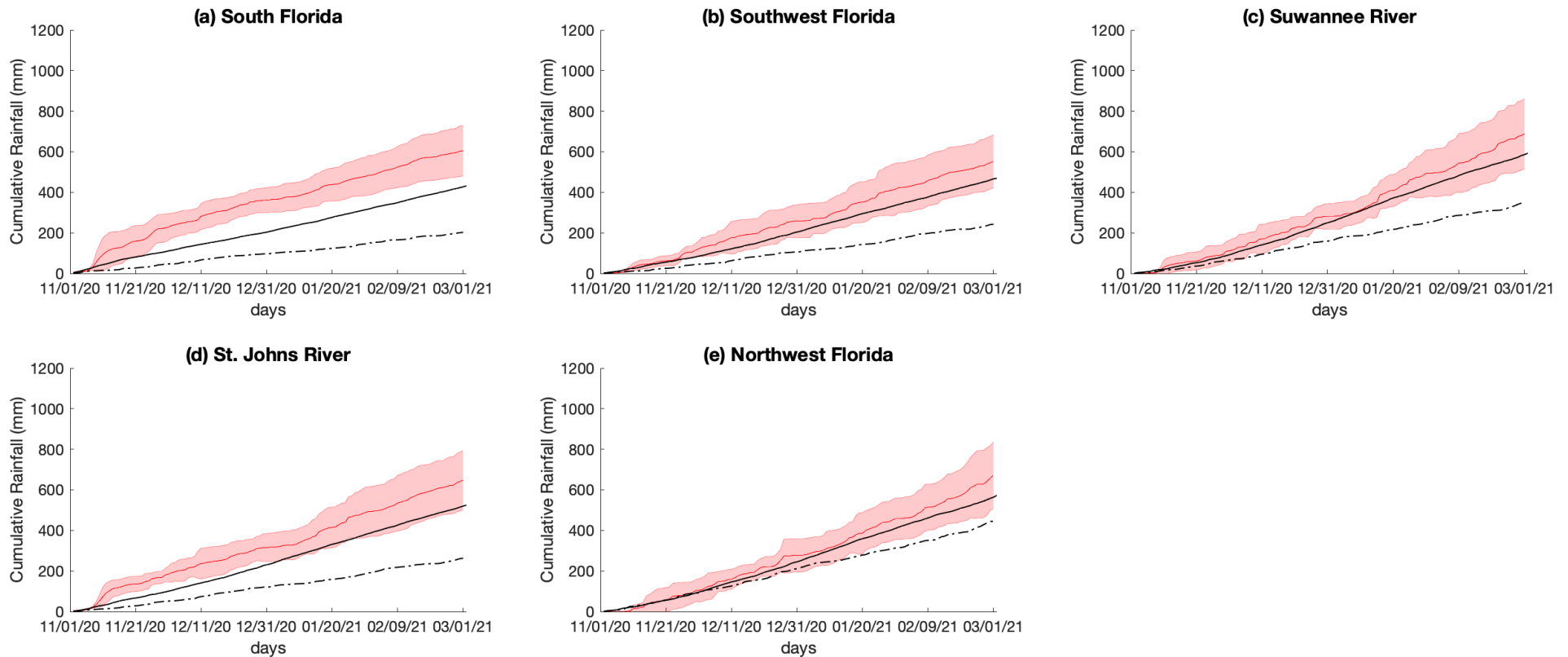




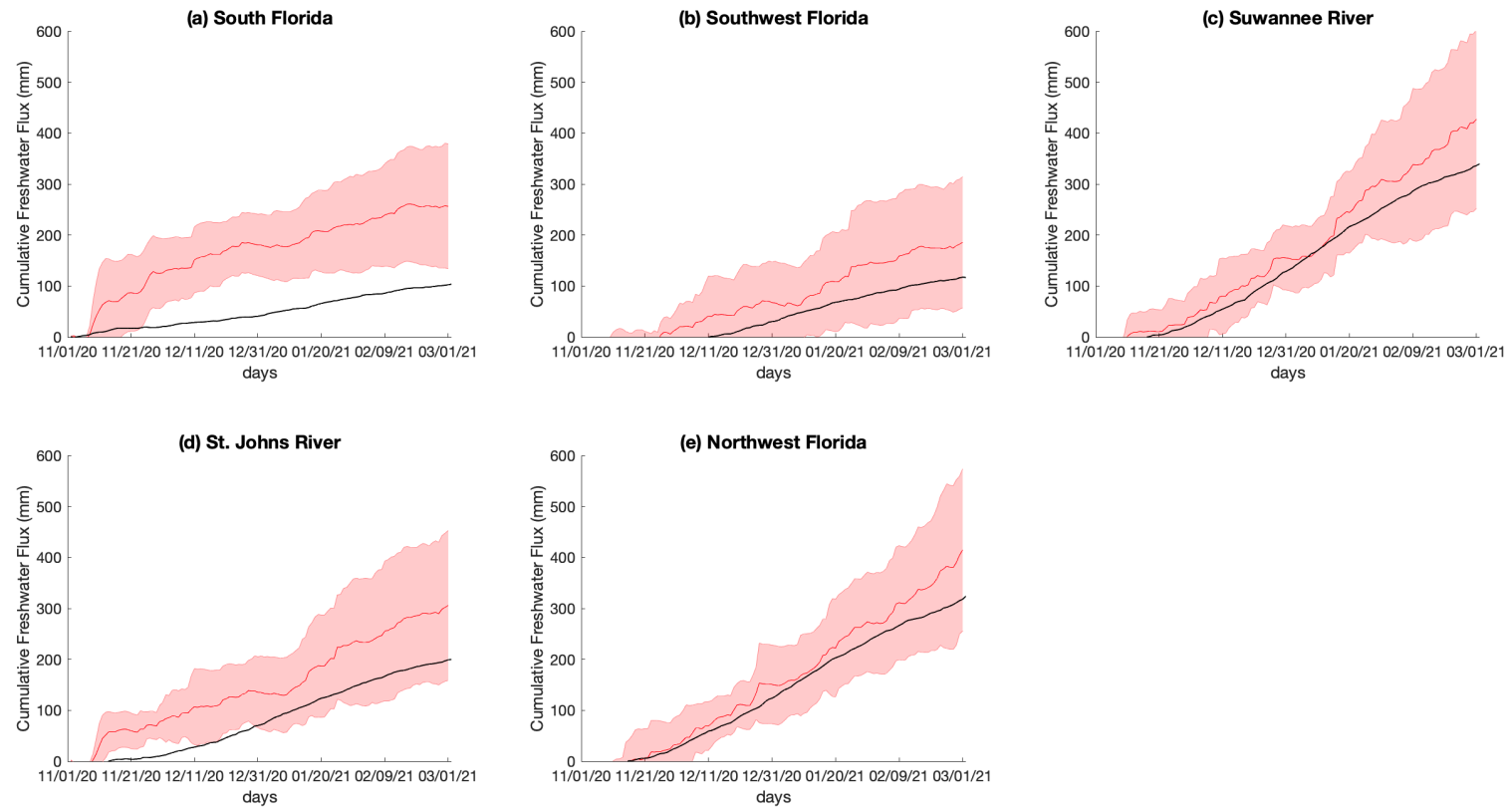
The forecasted rainfall (in mm) for a) NDJ (0-month lead) and b) DJF season (1-month lead) from the ensemble mean of CLIFF. The corresponding difference from CLIFF climatology for c) NDJ and d) DJF season. The contours in (c) and (d) shows the probability in % of the occurrence of these anomalies in CLIFF.



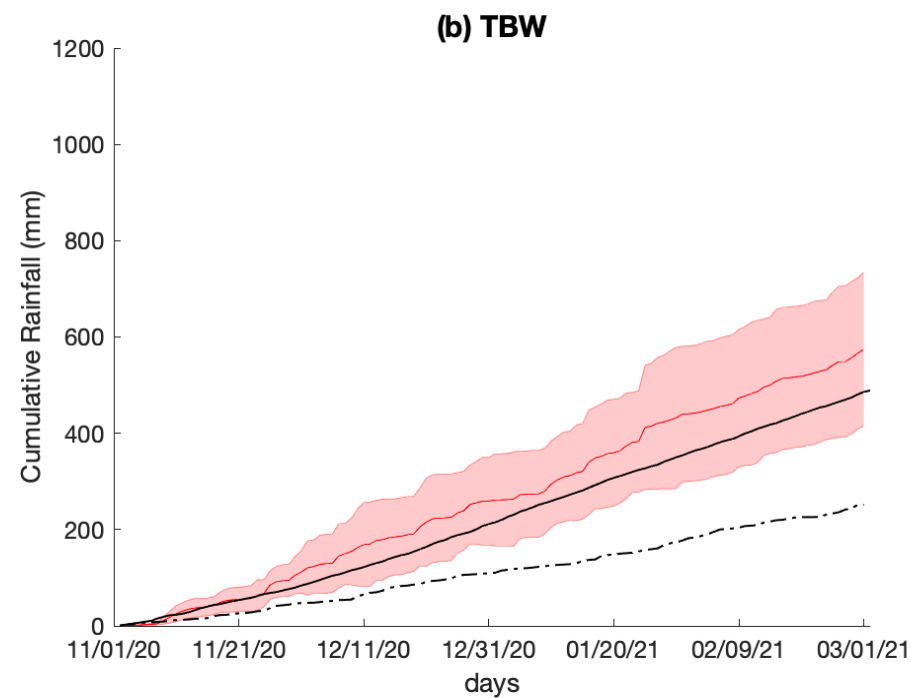
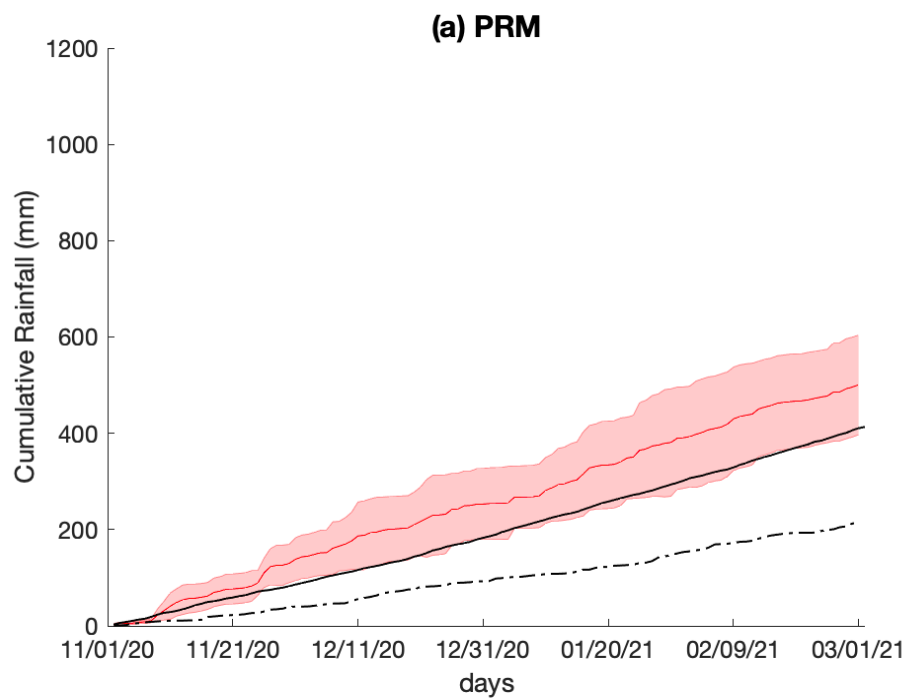
The forecasted surface air temperature (in °C) for a) NDJ (0-month lead) and b) DJF season (1-month lead) from CLIFF. The corresponding difference from CLIFF climatology for c) NDJ and d) DJF season. The contours in (c) and (d) shows the probability in % of the occurrence of these anomalies in CLIFF



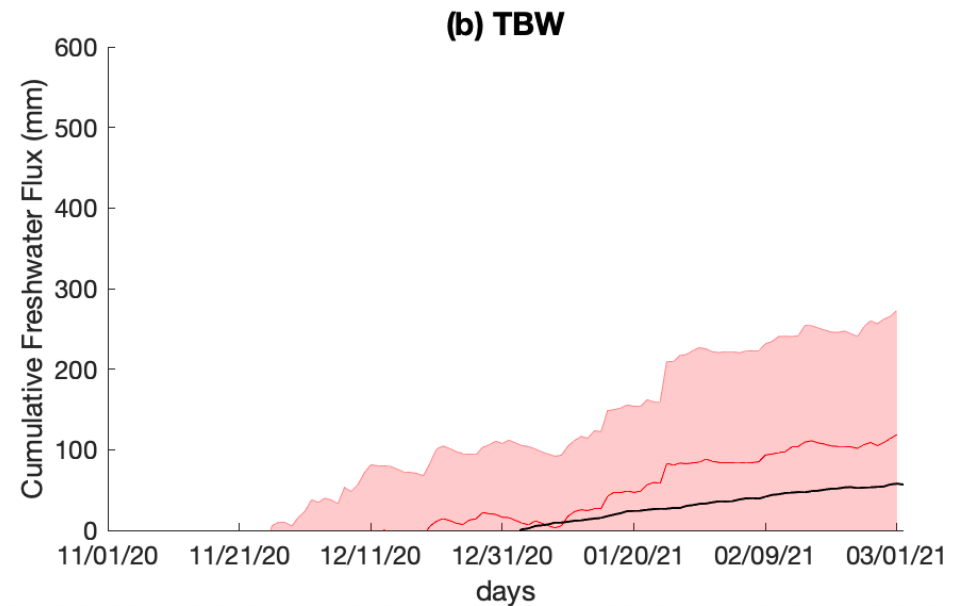
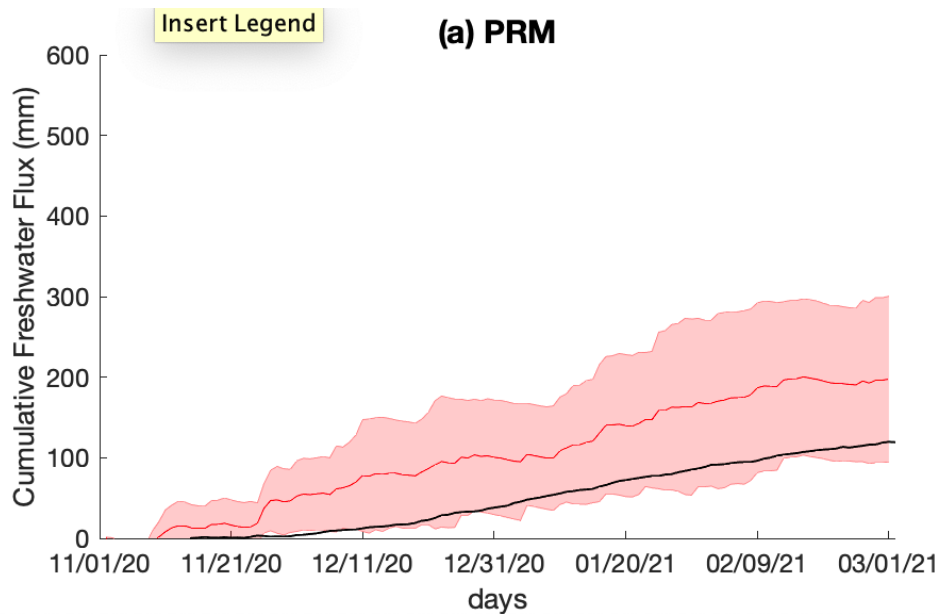
The cumulative rainfall (in mm) over a) South Florida, b) Southwest Florida, c) Suwannee River, d) St. Johns River, and e) Northwest Florida Water Management Districts from 1 November, 2020 to 1 March, 2021 of the following year for the ensemble mean (thin red line) and the individual ensemble members (shaded) of CLIFF. The solid black line is the corresponding model climatological cumulative rainfall for the season, and the dashed black line is the observed climatology.



The cumulative freshwater flux (precipitation-evaporation; in mm) over a) South Florida, b) Southwest Florida, c) Suwannee River, d) St. Johns River, and e) Northwest Florida Water Management Districts from 1 November, 2020 to 1 March, 2021 of the following year for the ensemble mean (thin red line) and the individual ensemble members (shaded) of CLIFF. The solid black line is the corresponding model climatological cumulative freshwater flux for the season.



The cumulative rainfall (in mm) over a) PRM and b) TBW from 1 November, 2020 to 1 March, 2021 of the following year for the ensemble mean (thin red line) and the individual ensemble members (shaded) of CLIFF. The solid black line is the corresponding model climatological cumulative rainfall for the season, and the dashed black is the observed climatology.



The cumulative freshwater flux (precipitation-evaporation; in mm) over a) PRM and b) TBW from 1 November, 2020 to 1 March, 2021 of the following year for the ensemble mean (thin red line) and the individual ensemble members (shaded) of CLIFF. The solid black line is the corresponding model climatological cumulative freshwater flux for the season.

# Forecast Summary for winter 2020-2021

- The CLIFF forecast is based on near neutral in November-December-January to slightly colder forecasted SST anomalies in December-January-February seasons in the eastern Equatorial Pacific Ocean. Therefore the forecasts are more uncertain for the winter 2020-2021 over Florida than one would expect for a very strong La Nina Winter. Furthermore at this unprecedented 10km grid spacing, CLIFF is resolving far more weather noise than conventional forecasts at coarser resolution, which can also make the forecasts less uncertain.
- CLIFF calls for increased likelihood for wetter winter and anomalously higher freshwater flux (Precipitation-Evaporation) than normal over South Florida Water Management District. In the remaining four water management districts of Florida the likelihood is that winter precipitation and freshwater flux are going to be near normal.
- Likewise, CLIFF calls for likelihood of near normal precipitation and freshwater flux in the watershed areas of Tampa Bay Water and Peace River Manasota Regional Water Supply Authority utilities
- As a cautionary note, we want to reinforce that these forecasts are cast in probabilistic terms (likelihood) suggesting that failure of the forecasted “most likely” events by CLIFF is probable, but less likely.