Presentation Title:
An AgroClimate web tool for ARID (Agricultural Reference Index for Drought) monitoring.

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Main focuses:
Climate analyses and Decision support tools and products

Presentation Abstract:
Agriculture is an economic activity directly affected by drought. With the constant increase of demand for food and the need of high efficiency in crop production, drought effects have gained attention. The Agricultural Reference Index for Drought (ARID) was developed in order to quantify drought and better understand its effect on agriculture. ARID values range from 0 to 1 where 0 representing no stress and transpiration occurring at potential rate and 1 representing full water deficit. The El Niño Southern Oscillation (ENSO) phenomenon is the main factor of climate variability in the Southeast USA and has a strong influence on Florida’s climate. As ARID indicates how dry the soil is, the evaluation of how historical values were affected by ENSO phases is important to determine the risk of drought enabling seasonal forecasting of ARID trends. ARID can also be used to indicate agricultural losses caused by water stress through the use of a simple crop model. The main objective of this study is to create scientific support for a tool on AgroClimate website with ARID seasonal forecast, monitoring and crop losses estimation. The specific goals include to investigate ARID’s temporal and spatial variability in Florida, the potential anomalies caused by ENSO, and to understand the relationship between ARID and yield losses.

Daily ARID was calculated using data obtained from the National Weather Service COOP (Cooperative Observer Program) weather stations located in Florida, Georgia and Alabama. These values were compiled into monthly averages and categorized according to the ENSO phase based on the Multivariate ENSO Index (MEI). Crop losses estimation will be based on the assumption that relative transpiration (ratio of actual transpiration to potential transpiration) is directly proportional to relative yield (ratio of economic yield to potential yield).

Our results showed that typical ARID values for Florida vary throughout the year. During cold months, the combination of higher evapotranspiration and lower rainfall in the southern region compared to the northern region and panhandle, resulted in higher ARID values in South Florida. During warm months, ARID values were slightly lower for the southern region and slightly higher in the panhandle. ENSO showed strong influence during cold months; these variations were due to the higher amount of rainfall during El Niño events and lower amount of rainfall during La Niña. Overall, April and May were the driest months while the wettest were September in the south and January in the other regions. The next steps in this study will involve the use of spatial weather data to estimate daily values of ARID in Georgia, Alabama, South Carolina and North Carolina as well.