## USING ENSEMBLE-BASED FORECASTS AS AN IRRIGATION PLANNING AID Emily Christ Peter Webster School of Earth and Atmospheric Sciences, Georgia Institute of Technology Atlanta, GA Guy Collins College of Agricultural and Environmental Sciences, University of Georgia Tifton, GA

## **Abstract**

Recent droughts and the continuing water wars between the states of Georgia, Alabama, and Florida have made agricultural producers more aware of the importance of managing their irrigation systems more efficiently. Many southeastern states are beginning to consider laws that will require monitoring and regulation of water used for irrigation. In fact, last year, Georgia suspended issuing irrigation permits in some portions of the southwest part of the state to try and limit the amount of water being used in irrigation. However, even in southern Georgia, which receives on average between 23 and 33 inches of rain during the growing season, irrigation can significantly impact crop yields. In fact, studies have shown that when fields do not receive rainfall at the most critical stages in the life of cotton, yield for irrigated fields can be up to twice as much as fields for non-irrigated cotton.

This leads to the motivation for this study, which was to produce a forecast tool that will enable producers to make more efficient irrigation management decisions. First, we calculated the forecast error associated with ensemblebased forecasts (here the ECMWF model) for a portion of the agricultural region in southern Georgia. These errors were calculated based upon observations from the Georgia Automated Environmental Monitoring Network. Once the errors were calculated, we applied a q-to-q bias correction technique to the data in an effort to improve the precipitation forecasts over the selected region. Once we applied the bias corrections, we then used the check-book method of irrigation scheduling to determine the probability of receiving the required amount of rainfall for each week of the growing season during the years 2010, 2011 and 2012. Brier Scores were calculated for climatology, the model and for the corrected model runs. The Brier Scores also showed that the corrected model was an improvement over the model results. The techniques used here suggest how probabilistic forecasts may be used to optimize agricultural practices in a very general sense.