

## **The relationship between sea surface temperatures and rainfall in the Tampa Bay region: Potential for long-term predictability**

Christopher J. Martinez<sup>1</sup>, Mark A. Newman<sup>2,3</sup>, James W. Jones<sup>1</sup>, Wendy D. Graham<sup>1,2</sup>

<sup>1</sup> Department of Agricultural and Biological Engineering, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL

<sup>2</sup> Water Institute, University of Florida, Gainesville, FL

<sup>3</sup> Department of Civil and Coastal Engineering, University of Florida, Gainesville, FL

Southwest Florida, and the Tampa Bay region in particular, is faced with intense competition for freshwater resources among agricultural, urban, and industrial users as well as the need to meet minimum aquifer levels and minimum surface water flows and levels. This study was conducted to determine the connections, and potential predictability, of monthly rainfall in the Tampa Bay region with sea surface temperatures (SSTs) in the Atlantic and Pacific Oceans. The connection between rainfall and SSTs is examined using singular value decomposition analysis (SVD). SVD is an effective method for isolating orthogonal modes of co-variability between two data sets. SVD is conducted using both concurrent (same month) SSTs and rainfall and with time-lagged SSTs. The isolation of ocean regions that show persistent co-variability with precipitation can be used as predictors of future rainfall. The results of this work will aid Tampa Bay Water, the largest wholesale water distributor in the region, in making water management decisions.

**Keywords:** Climate variability, sea surface temperatures, rainfall, water management, water resource sustainability

**Challenge Addressed:** Climate variability and climate change factors impacting water resource sustainability

**Issue Addressed:** Water availability and allocation