

REGIONAL TREND ANALYSIS FOR RAINFALL OF SOUTH FLORIDA

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Rainfall represents the most important component driving the hydrology in Central and South Florida. Understanding the impact of climatic conditions on rainfall nonstationarity is important for evaluating the resilience of the water management system. Rainfall is among the set of science-based Water and Climate Resilience Metrics being implemented by the SFWMD to identify trends in District-managed water and climate data. Rainfall regional trend analysis is performed for all district areas using spatiotemporal rainfall data covering fourteen operations and maintenance rainfall basins between 1935-2018. Analysis was performed for three rainfall properties: 1) Rainfall sum over month, season and annum, 2) Rainfall maxima over 1, 3, and 5 days at certain frequencies, and 3) Peak Over Threshold Analysis. Trend analyses were performed using Mann-Kendall Tau test with 95% confidence band around the trend slope. A trend is considered significant if a double-sided Z test rejects the null hypothesis that there is no trend. Results show a significant rainfall trend during the months of July, August and the transitional month of October. Wet season results show upward trend in some western basins and a downward trend in east Everglades Agricultural Area. EAA annual rainfall trend is slightly downward. Trend analysis for the rainfall maxima show significant trend in the EAA, St. Lucie and Upper Kissimmee areas for the daily maxima and in Broward for 5-day maxima. Rainfall Trend results point out the need to investigate the sensitivity to changes in basin boundaries and in the length of Period of Record as well as the need to understand the coverability with the multidecadal variables

PRESENTER BIO: Dr. Al Ali is a Chief Engineer at the South Florida Water management district with more than 30 years of experience in Geostatistics, stochastic modeling of nonstationary processes, and optimization of nonlinear systems under uncertainties. He has extensive development and application experiences in everglades restoration projects.