CHARACTERIZING HISTORICAL AND PROJECTED FUTURE DROUGHTS FOR SOUTH FLORIDA

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The United States Geological Survey, in collaboration with the South Florida Water Management District (SFWMD) and Florida International University, is evaluating projections of future drought event characteristics based on downscaled climate datasets from the Coupled Model Intercomparison Project phase 5. This study will inform water-supply vulnerability assessments at the SFWMD to determine the capacity of local and regional water resources to meet future water needs. Future changes in drought may exacerbate pressures on the water-resource system which would require development of alternative water-supply sources and other adaptation strategies.

Gridded historical timeseries of the Standardized Precipitation-Evapotranspiration Index (SPEI) were developed to understand drought characteristics and identify critical thresholds and timescales that capture historically significant drought events. Principal component analysis (PCA) identified regions with similar historical evolution of SPEI that generally coincide with existing water supply planning regions in the SFWMD and were selected for evaluating projected future changes in droughts. Projected SPEI timeseries were generated at grid points from monthly estimates of reference evapotranspiration (RET) and precipitation derived from downscaled climate datasets which were evaluated for completeness and bias correction. Sensitivity analysis using various estimates of plant stomatal response to changing carbon dioxide concentrations will be applied to future SPEI timeseries. SPEI projections will be clustered to identify a subset of models and datasets representative of ranges of future projected changes in drought. Precipitation and RET timeseries from the identified models and datasets will be available to drive hydrologic and groundwater models to support vulnerability assessments that will inform water-supply planning efforts at the SFWMD.

PRESENTER BIO: Michelle Irizarry-Ortiz is a hydrologist with the U.S. Geological Survey Caribbean-Florida Water Science Center with more than 20 years of experience in hydrologic modeling and statistical hydrology. She has extensive experience modeling the hydrology and water management system of south Florida and its vulnerability to climate change.