

Incorporation of Climatic Variability for Management of Water Resources in South Florida

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In South Florida where major changes to the water resources infrastructure are being contemplated for facilitating the restoration of large-scale ecosystems such as the Kissimmee River Basin and the Everglades, consideration of intra-decadal and multi-decadal climate variability is extremely important in both water resources planning and regional operations. Correlations of hydro-climatology of South Florida to such global phenomena as El Nino-Southern Oscillation (ENSO) and Atlantic Multi-Decadal Oscillation (AMO) have been investigated extensively.

This paper addresses the considerations of hydroclimatic variability in two areas of water resources management: (a) Operational Planning; and (b) Facility Planning. The South Florida Water Management District, regional agency responsible for management of water resources in South Florida, has effectively employed the seasonal and multi-seasonal outlook for operational planning. Since the agency has embarked on a major infrastructure improvement project to facilitate Everglades Restoration while meeting the water supplies for agriculture and increasing urban population, the issue of decadal to multi-decadal climate variability in water resources planning has come to the forefront as a major consideration in future investments. This paper provides an application of the research to develop operational rules of Lake Okeechobee as well as the real-time implementation of rules based on climate outlooks. The current research to address the question of decadal to multi-decadal climate variability in facility planning is also discussed. As the first step towards the simulation of future climate scenarios which include decadal-to-multidecadal variations in climate, the application of a newly developed methodology called Wavelet Autoregressive Model (WARM), and a Nonhomogenous Hidden Markov Models is demonstrated.