

ET TRENDS AND THE INFLUENCING FACTORS AND CORRELATIONS

Yibing Kevin Zhu

South Florida Water Management District, West Palm Beach, FL, USA

Studies have been reporting global climate changes in the past decades. The increased level of greenhouse gases and the subsequent warming have altered the hydrological cycle to different extents at locations around the Earth (IPCC 2021). To address the challenge, the SFWMD is implementing several water and climate resiliency metrics to identify the regional trends, using the best available data from the District, USGS, and NOAA. Along with rainfall and surface flow, evapotranspiration (ET) plays a critical role to the sustainable development of our infrastructure, e.g. in agriculture and water supply. A recent look at the observation data shows that South Florida has been experiencing an upward trend of ET over the past 30 to 60 years, with an averaged change ratio of +0.11 inch/year. This trend is a compound reflection of environmental changes. ET rate is usually affected by four meteorologic factors, i.e. solar radiation, air temperature, relative humidity and wind speed. Historical data show that increasing solar radiation and increasing air temperature contribute to the upward ET trend most ($R^2 = 0.52$ and 0.26 respectively), followed by the declining relative humidity and no-trend wind speed. When all considered, the correlation between the upward ET trend and the four driving factors can be as high as $R^2 = 0.9$. The variation of annual ET amounts also oppositely corresponds to annual rainfall amounts very well.

PRESENTER BIO: Kevin is a professional engineer with more than 25 years of experience in water resources, from hydraulic structures' design, to H&H modeling, to environmental assessment. Most recently, he is working extensively on hydrological data quality and the investigation of monitoring issues.