Seasonal changes in pan evaporation observed in South Korea and their relationships with reference evapotranspiration

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Abstract

Pan evaporation (Epan) is an important indicator of water and energy balance. Despite global warming, decreasing annual Epan has been reported across different continents over last decades, which is claimed as pan evaporation paradox. However, such trend is not necessarily found in seasonal data because the level of contributions on Epan vary among meteorological components. This study investigates long-term trend in seasonal pan evaporation from 1908 to 2016 across South Korea. Meteorological variables including air temperature (Tair), wind speed (U), vapor pressure deficit (VPD), and solar radiation (Rs) are selected to quantify the effects of individual contributing factor to Epan. We found overall decreasing trend in Epan, which agrees with earlier studies. However, mixed tendencies between seasons due to variation of dominant factor contributing Epan were found. We also evaluated the reference evapotranspiration based on Penman-Monteith method and compared this with Epan to better understand the physics behind the evaporation paradox.

Keywords : pan evaporation, evaporation paradox, climate change

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