

臺灣利用廿公分之小蒸發器 估測自由水面蒸發之可靠性

on the Reliability of Using the Evaporation Pan to Estimate Open-water Evaporation in Taiwan

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Abstract

The conventional method of using 50 % of pan (20 cm in diameter and 10 cm in depth) evaporation (V_p) for estimating open-water as well as vegetated surface evaporation was tested for its reliability at four climatic stations in Taiwan against three popular evaporation prediction models. Results of the study show that all the open-water evaporation (i.e., maximum potential evapotranspiration) calculated by the three models exceed the pan estimates ($0.5V_p$) by amounts ranging from $0.25V_p$ to $0.45V_p$. Based on the calculated values, the comparisons of $0.5V_p$ with other international studies in the region, and the author's judgement, it is concluded that (1) The open-water evaporation estimated using the 20 cm evaporation pan with a coefficient of 0.5 is too low, (2) the pan exposure needs to be standardized, and (3) the confusion of using the same pan coefficient to convert pan evaporation into open-water as well as vegetated surface evaporation needs to be clarified. A comprehensive study of lake-pan relations is recommended to be conducted in different regions of Taiwan so that a more reliable estimate can be obtained for water resources application.

The Problem

Studies on water losses from open-water surfaces have been a primary objective in both research and the application of many fields and disciplines. Since field measurement of evaporation for a lake or reservoir is not feasible, estimates based on hypothetical, theoretical, empirical, and rational approaches are widely employ-

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