



Regional Calibration of Hargreaves-Samani Equation Based on Meteorological Data for Marmara Region of Turkey

Hatice Çıtakoğlu (1), Murat Cobaner (1), Tefaruk Haktanir (1), and Fatma Yelkara (2)

(1) Turkey (hčitakoglu@erciyes.edu.tr), Erciyes University, (2) Turkey, DSİ

Regional Calibration of Hargreaves-Samani Equation Based on Meteorological Data for Marmara Region of Turkey

Murat Cobaner, Hatice Çıtakoğlu, Tefaruk Haktanır, Fatma Yelkara

Erciyes University

Penman-Monteith equation is the most commonly used model in the literature for estimation of reference (grass) evapotranspiration (ET₀) because of the fact that it gives more accurate and consistent estimates. Despite its higher accuracy potential, Penman-Monteith equation requires quite a few meteorological quantities as explanatory variables affecting the value of evapotranspiration such as solar radiation, air temperature, wind velocity, and relative humidity. Because it needs so many meteorological variables and partly due to its cumbersome analytical form, the Penman-Monteith (PM) equation is not easily applicable for all cases for calculating the reference evapotranspiration, and therefore the Hargreaves-Samani (HS) equation is necessarily used instead of it for regions at which the pertinent meteorological data may not be available. The simplicity of the HS equation, however, causes its results to be less accurate as compared to the PM formula. Therefore, different numerous attempts were done for improving the estimation capability of the HS equation. Generally, the HS equation is calibrated with PM ET₀ or lysimeter values based on the linear regression line for regional calibration of the regression coefficients. In some studies, a spatial calibration was obtain on the basis of available maximum and minimum relative humidity and temperature data. In this study, additionally, HS equation is calibrated using maximum temperature, minimum temperature, maximum humidity and minimum humidity data measured at 24 stations in Marmara Region of Turkey. In conclusion, it is observed that the calculated evapotranspiration values using calibrated HS equations are close to those calculated by PM equation.

Keywords: Reference evapotranspiration, calibration, Penman-Monteith, Hargreaves-Samani.