

AN ESTIMATION OF EVAPOTRANSPIRATION BY SIMPLE MODELS IN THE SEMI ARID MEDITERRANEAN ZONE OF THE NORTH-WEST OF ALGERIA

S. REZAK¹ AND A. KHALDI²

¹Department of Architecture, ²Department of Hydraulics,

^{1,2}Faculty of Architecture and Civil Engineering, University of Sciences and Technology of Oran - Mohamed Boudiaf - (USTOMB), ALGERIA.

(E-mail: ¹sali_rez@yahoo.fr, ²khaldiakz@yahoo.fr)

Abstract :

Five temperature based models of evapotranspiration were applied and compared to daily measurements obtained by a piche evaporimeter in a mediterranean climate zone of the semi arid type in the north-west of algeria. direct measurements of evaporation obtained by piche on to stations spreading over a period greater than five years (nov.1988 - dec.1993) were corrected by the bouchet. evapotranspiration was calculated according to the following models: blaney-criddle, blaney-criddle (usda), linacre, romanenko and hamon.

In order to select a simple model for well adapted to the region under study, several statistical parameters have been estimated, namely: standard deviations, Relative Root Mean Square Error (*RelRMSE*), Index of Agreement (*d*), Mean Bias Error (*MBE*), t-statistic as well as ETP underestimation or overestimation percentages (ET_{ave}/E_p (%))

The Blaney-Criddle formula (Soil Conservation Service) has significantly overestimated evapotranspiration values by de 47 % at the Serno station and by a small 6% at the Bouhanifia station with respective average quadratic gaps of 1.83 mm/day and 1.78 mm/day (equivalent to relative errors of 47% and 6%). However, the Blaney-Criddle method has considerably overestimated daily evapotranspiration by 84% at the Serno station and by over 29% at the Bouhanifia station (equivalent to relative errors of almost 100% and less than 60% at Serno and Bouhanifia stations respectively) with average quadratic gaps of 2.33 mm /day and 2.01 mm /day. The Hamon method gave the worst evaluation with the highest overestimation and average quadratic gaps of over 18 mm /day at the Serno station and over 16 mm /day at the Bouhanifia station.

The Romanenko and Linacre have also considerably overestimated evapotranspiration. Overestimations of more than 80% and 60% for the Romanenko model and over 69% and 34 % for the Linacre model at the Serno and Bouhanifia stations respectively. Comparisons of the different results with Bouchet data has led to the following conclusions:

The error on the estimation of evapotranspiration has been reduced considerably for all models and for both stations (Figure 2). Hence, it may be concluded that the Bouchet formula improves and brings closer Piche evaporimeter measurements to evapotranspiration given by different models.

At daily scales, the Blaney Criddle (USDA) model is the best model one which gave excellent results for both drainage sub-basins studied, presenting the lowest statistical parameters. It has overestimated evapotranspiration values by over 10% with respect to the corrected ones and y more than 47% with respect to direct measurements at the Serno station. In the case of the Bouhanifia station, an underestimation of over 3% is noted with respect to the corrected values and an overestimation of over 6% is noted with respect to direct measurements.

In case direct evaporation measurements are not available, the blaney criddle (usda) model is the most suitable for the daily evapotranspiration.

Keywords: Evapotranspiration; semi arid; North-West; Romanenko; Bouchet, Blaney-Criddle