ABSTRACT

HOW TO SELECT EVAPOTRANSPIRATION MODELS

T. E. A. van Hylckama, R. M. Turner, and O. M. Grasz

There are many equations proposed to estimate potential evapotranspiration (E_t). Soil-moisture depletion being some sort of function of E_t, the most useful equation can be selected by comparing known values with estimated values of soil moisture. Once selected, such an equation can reliably be used to predict changes with any given shift in climatic variables.

Studies were made at the Santa Rita Experimental Range on the bajada west of the Santa Rita Mountains south of Tucson, Ariz. Eleven observation stations were used, spanning more than 500 vertical meters and representing Sonoran Desert, Desert Grassland, and Oak Woodland-Grass ecotones. The studies showed that models developed by Budyko, Penman, and Olivier were well suited to predict soil-moisture conditions in that 250 km^2 area and probably over most of the southwest desert of the U.S. outside flood plains.

Methods of extrapolating climatic data, gathered in the Tucson area (about 50 km north of the mountains) to the Santa Rita slopes are discussed and graphs are presented showing by statistical analysis, that the correlation coefficient between measured and predicted soil-moisture values is on the order of 0.75 and significant at the 0.01 level.