

Simulation of evaporation front depth and evaporative flux from a shallow water table (case study: Sistan region)

In arid and semi-arid regions, the evaporative demand is usually greater than the ability of the soil to conduct water in the liquid phase and this lead to discontinuity in liquid-vapor phase. Knowledge of relation between water table depth and evaporation from bare soil is very important in these regions. evaporation front (EF), is occurred between the soil surface and the water table. In this study a pseudo water table model was used to estimate evaporation front and evaporation rate under nonisothermal and greenhouse conditions. TDR was conducted to obtain soil moisture in order to determine depth. The result shows that evaporation front is greater in light soil Texture. In a sandy loam soil EF at watertable depths 40, 60 and 80 cm were 7.92, 11.1 and 14.88 cm after 74 days. It could be result of low porosity and more hysteresis phenomenon in sush a texture. The lighter soil texture, the lower evaporation front. Also for a loamy soil EF at water tables depths 40, 60 and 80 7.64, 9.9 and 13.12 cm respectively and for loamy clay soil EF at same water table depths were 7.04, 8.8 and 11.36 cm after 74 days. More water table, more evaporation front. measured evaporation for soil for sandy loam texture at water tables 40, 60 and 80 cm were 359.1, 304.83, and 233.88 respectively in this period. for for soil loamy texture with conditions measured evaporation were 380.8, 334.3 and 265.2 and for loamy clay soil measured evaporation were 398.5 , 351.1 and 287.4. then model was developed in order to simulate depth of evaporation front and evaporation rate in various condition, soil texture, potential of evaporation and water table were included. statistical result showed good agreement between simulated and and measured data. salty of surface layer (1 or 2 cm) were measured results showed the highest and lowest salinity in surface layer were determined for water table depths 80 and 40 cm respectively. The highest salinity was obtaired in the loamy sand soil.

Key words: Evaporation front, Liquid flow, vapour flow, evaporation from bare soil, Capillary rise



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