Geophysical Research Abstracts
Vol. 18, EGU2016-4891, 2016
EGU General Assembly 2016

A New approach for evaluate a sandy soil infiltration to calculate the permeability

M.Mohamed Mechergui (1) and Ms Latifa Dhaouadi (2)

(1) Institut National Agronomique de Tunisie, Tunis Tunisia(mechergui.med@inat.agrinet.tn), (2) Research Regional Center of Oasis Agriculture in Deguache (Tozeur), Tunisia (latifa_hydro@yahoo.fr)

10 sites were chosen in the four ha field of Research Regional Center of Oasis Agriculture in Deguache (Tozeur). The soil is homogeneous to the depth of 120 cm; with a sandy texture (60% big sand, 20% small sand 13% silt and 7% clay); with a mean bulk density equal to 1.43g/cm3 and with field capacity and welting point equal respectively to 11.9 and 6 %. The time duration for each infiltration essay lasted between 352 and 554 minutes. The number of observation points for each infiltration curve varies between 31 and 40. The shape of the infiltration curves observed in all sites is in part similar to what observed in literature (high increase with time of cumulative infiltration for a short time and then a linear increase of this parameter to a time varying between 122 to 197 minutes depending on the site) and then something special a slowdown in the cumulative infiltration to the end of the essay. The (F(t) / t 1/2 versus t 1/2) plotted curves showed two distinguished parts: A linear relation to the time varying between 122 and 197 minutes confirming the validity of Philips model and a second part showed a slowdown in the slope to a time varying between 231 and 347 minutes depending on the site and then drop down to the end of the essay. This is may be due to the rearrangement of particles after a long time of infiltration which led to a decrease in hydraulic conductivity.
To improve the calculation of the saturated hydraulic conductivity, we choose only the part that is validated by Philips model, the linear part. The number of omitted points in the cumulative infiltration varies between 11 and 22 points. By this method, the saturated hydraulic conductivity varies between 1 and 3.72 m/day with a mean equal to 2.35. However the previous technique used gave a mean value equal to 2.07. The new method is accurate and gives better results of K and sorbtivity.