Geophysical Research Abstracts
Vol. 20, EGU2018-3882, 2018
EGU General Assembly 2018

Field evaluation of a commercial sap flux Granier system to estimate transpiration in a flood irrigated olive orchard

Jhonathan Ephrath, Pedro Berliner, Nguyen Thao, and Adit Arazi

Ben-Guruion University of the Negev, Jacob Blaustein Institutes for Desert Research, French Assoc. Inst. for Agriculture and Biotechnology of Drylands, Sede Boqer, Israel (yoni@bgu.ac.il)

Sap flow meters have been extensively used to monitor transpiration fluxes in a variety of crops and tree species. The greatest uncertainty in sap flux measurements in mature trees stems from the fact that the width of the trunk annulus through which sap flows exceeds the length of the sensor. Corrections to account for this limitation have been proposed. Verification of these corrections have usually been carried out for well- watered trees or saplings. The validity of such assumptions for mature trees during prolonged drying out phases has not been evaluated. We present the results of field trial carried out in a 5 year old flood irrigated olive tree (Olea oleaginosa, cv. Barnea) orchard. The loess soil surrounding three trees was wetted to a depth of 2.0 m. The wetted soil area was covered with various layers of polyethylene sheet thus preventing direct evaporation of water from the soil. The following were measured: Soil water content with a neutron moisture meter to a depth of 3 m. in eleven access tubes per tree (10-21 days interval) , soil root length using a minirhizotron system (BTC100, Bartz Technology Corporation, Ca, USA) down to a depth of 2m in 12 mm intervals in 11 Plexiglas transparent tubes located in the same configuration as the access Neutron tubes (30 days interval), sap flux with a TDP-PS-GP30 system in each tree (continuous monitoring), transpiration and photosynthesis in Li 6400 fully extended and illuminated mature leaves of each tree (14 days interval).
No internal drainage below the deepest measuring depth took place and hence the soil water balance in a given time interval equals the transpiration flux. Our results indicate that the ratio between the soil moisture derived transpiration and the direct sap flow was not constant and decreased with time.