Geophysical Research Abstracts
Vol. 19, EGU2017-10695, 2017
EGU General Assembly 2017

Stable isotope measurements of evapotranspiration partitioning in a maize field

Patrick Hogan (1), Juraj Parajka (1), Markus Oismüller (1), Peter Strauss (2), Lee Heng (3), and Günter Blöschl (1)

(1) Vienna University of Technology, Centre for Water Resource Systems, Vienna, Austria (hogan@waterresources.at), (2) Institute for Land and Water Management Research, Federal Agency for Water Management, Petzenkirchen, Austria, (3) Soil and Water Management and Crop Nutrition Subprogramme, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture, International Atomic Energy Agency (IAEA), Vienna, Austria

Evapotranspiration (ET) is one of the most important processes in describing land surface - atmosphere interactions as it connects the energy and water balances. Furthermore knowledge of the individual components of evapotranspiration is important for ecohydrological modelling and agriculture, particularly for irrigation efficiency and crop productivity. In this study, we tested the application of the stable isotope method for evapotranspiration partitioning to a maize crop during the vegetative stage, using sap flow sensors as a comparison technique. Field scale ET was measured using an eddy covariance device and then partitioned using high frequency in-situ measurements of the isotopic signal of the canopy water vapor. The fraction of transpiration (Ft) calculated with the stable isotope method showed good agreement with the sap flow method. High correlation coefficient values were found between the two techniques, indicating the stable isotope method can successfully be applied in maize. The results show the changes in transpiration as a fraction of evapotranspiration after rain events and during the subsequent drying conditions as well as the relationship between transpiration and solar radiation and vapor pressure deficit.