



Drainage estimation to aquifer and water use irrigation efficiency in semi-arid zone for a long period of time

J Jiménez-Martínez (1), J Molinero-Huguet (1,2), and L Candela (1)

(1) Department of Geotechnical Engineering and Geosciences, Technical University of Catalonia, UPC, Barcelona, Spain (joaquin.jimenez@upc.edu), (2) Amphos XXI Consulting S.L., Valldoreix, Barcelona, Spain

Water requirements for different crop types according to soil type and climate conditions play not only an important role in agricultural efficiency production, though also for water resources management and control of pollutants in drainage water. The key issue to attain these objectives is the irrigation efficiency. Application of computer codes for irrigation simulation constitutes a fast and inexpensive approach to study optimal agricultural management practices. To simulate daily water balance in the soil, vadose zone and aquifer the VisualBALAN V. 2.0 code was applied to an experimental area under irrigation characterized by its aridity. The test was carried out in three experimental plots for annual row crops (lettuce and melon), perennial vegetables (artichoke), and fruit trees (citrus) under common agricultural practices in open air for October 1999-September 2008. Drip irrigation was applied to crops production due to the scarcity of water resources and the need for water conservation. Water level change was monitored in the top unconfined aquifer for each experimental plot. Results of water balance modelling show a good agreement between observed and estimated water level values. For the study period, mean drainage obtained values were 343 mm, 261 mm and 205 mm for lettuce and melon, artichoke and citrus respectively. Assessment of water use efficiency was based on the IE indicator proposed by the ASCE Task Committee. For the modelled period, water use efficiency was estimated as 73, 71 and 78 % of the applied dose (irrigation + precipitation) for lettuce and melon, artichoke and citrus, respectively.