Geophysical Research Abstracts, Vol. 9, 08146, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08146

Assessing the agro hydrological SWAP model to simulate soil water balance in typical Mediterranean crops

C. Agnese (1), F. Blanda (1), A. Drago (2), M. Iovino (1), M. Minacapilli (1), G. Provenzano (1), G. Rallo (1), M. Sciortino (3)

(1) Dep. of Ingegneria e Tecnologie Agro Forestali - Università degli Studi di Palermo, Palermo, Italy, (2) Servizio Informativo Agro-Meteorologico Siciliano - Assessorato Agricoltura e Foreste - Regione Siciliana, Palermo, Italy, (3) Centro di Ricerche Casaccia - Ente per le Nuove Tecnologie, l'Energia e l'Ambiente, Roma, Italy. (agnese@unipa.it / Fax: +39091484035 / Phone: +390917028107)

In semiarid environment characterized by water scarcity it is necessary to schedule irrigation taking into account the real crop needs, in order to increase water use efficiency. Agrohydrological models allow to simulate water balance in the soil-plant atmosphere continuum, even if model validation is required, with the aim to verify the adaptability to specific meteorological, pedological and coltural conditions. In this work the main objective was to verify the reliability of the physically based SWAP agrohydrological model to simulate water balance for tipical Mediterranean crops. SWAP model aims to simulate all the water processes involving in the soil-plant-atmosphere continuum. The model includes detailed submodels on soil water flow, soil evaporation, plant transpiration and crop growth and can operate on fixed temporal interval from daily to seasonal cycles. Simulations were carried out during the irrigation seasons 2005 and 2006, in a set of plots inside an experimental farm located in South-West of Sicily and cultivated with herbaceous (alpha-alpha) and arboreal (vineyard, citrus, olive) types in which soil moisture content at different depths, root depth and crop parameters (leaf area index, fractional cover, plant height) were measured. A preliminary analysis was carried out during the first season in order to assess an approach for evaluating the range of variability of the most critical parameters for the examined crops, i.e. extinction coefficients and Kc crop factors. The experimental data collected in the second irrigation season allowed to validate the proposed approach by

mean of the comparison of simulated and measured soil moisture profiles. The results evidenced a general agreement between simulated and measured soil water content at different depths for herbaceous crop characterized by an uniform coverage of the field and for which the hypotheses of a mono-dimensional water exchange processes is verified. On the other hand, for the arboreal crops, due to the strong sensibility of the model to the examined crop parameters, as well as the not verified hypotheses of one-dimensional water exchange processes, further investigations are required in order to improve the reliability of the model.