Geophysical Research Abstracts,
Vol. 11, EGU2009-4974, 2009
EGU General Assembly 2009

Analysis of some peculiarities of the DREAM model parameterization in a semi-arid basin of Southern Italy

T. Bisantino (1), F. Gentile (2), V. Iacobellis (3), P. Milella (4), and G. Trisorio Liuzzi (5)

(1) PROGESA Department, University of Bari, Bari, Italy (t.bisantino@agr.uniba.it), (2) PROGESA Department, University of Bari, Bari, Italy (francesco.gentile@agr.uniba.it), (3) DIAC Department, Polytechnic of Bari, Bari, Italy (v.iacobellis@poliba.it), (4) PROGESA Department, University of Bari, Bari, Italy (pamelamilella@agr.uniba.it), (5) PROGESA Department, University of Bari, Bari, Italy (giuliana.trisoriol@agr.uniba.it)

Water resources management in semi-arid environments is a complex issue because of the time and spatial variability of weather and the insufficient monitoring network useful to derive input data for hydrological modelling. In this work a water balance model is revised with particular attention to the input dataset and the theoretical approach in order to improve the accuracy of the predicted outputs.

The DREAM model (Manfreda et al., 2005) is applied in a semi-arid basin of Southern Italy (Carapelle torrent, basin area: 506 km^2). Hydrological processes are computed on a grid schematization of the river which takes into account the spatial heterogeneity of the basin using distributed data concerning soil texture, land use, hydraulic characteristics and local slope. Time and spatial variability of vegetation coverage is considered using satellite data. Normalized Difference Vegetation Index values are converted into Leaf Area Index profiles to estimate interception and evapotranspiration.

The performance of the hydrological model was improved varying four aspects of the model: the pedotransfers functions used to predict the soil hydraulic characteristics, the equations referring to the evapotranspiration process, the type of satellite images and the parameters used for calibration. Evapotranspiration is calculated using two different approaches: Thornthwaite and Penman-Monteith. Leaf Area Index is estimated using a linear regression LAI-NDVI (Caraux-Garson) and a logaritmic one (Beer). The calibration of the Beer law is carried out selecting some sample areas and comparing the literature LAI values to the simulated ones. The spatial resolution of the satellite data influences the hydrologic response: the use of the MODIS images instead of the NOAA-AVHRR ones determines higher values of evapotranspiration more realistic for Mediterranean environments.

The analysis described will be useful to select the equations which are more suitable for semi-arid catchments and to individuate which factors need to be measured accurately in order to achieve better results in the model output.