



Use of land cover and vegetation indexes from remote sensing data in the hydrological water balance modelling

Andrea Gioia (1), Anna Balenzano (2), Vito Gigante (1), Vito Iacobellis (1), Salvatore Manfreda (3), Francesco Mattia (2), and Giovanni Satalino (2)

(1) Politecnico di Bari, Water Engineering and Chemistry Department, Italy (a.gioia@poliba.it, +39 0805963414), (2) ISSIA-Consiglio nazionale delle ricerche, Bari, Italia, (3) DIFA- Università della Basilicata, Potenza, Italia

The hydrological water balance, in a Mediterranean environment, crucially depends on space-time variability of soil properties which strongly affect the soil moisture and water fluxes dynamics. Distributed hydrological models allow, in principle, for the development of optimization strategies in water resources management, nevertheless a high level of uncertainty is still associated with the model prediction. In this field also the parameter uncertainty plays a major role whereas the traditional monitoring networks of hydrological variables often do not provide enough data for reliable calibration/validation procedures. At the same time, new sources of information available from remote sensing are becoming popular, including digital elevation models, land cover maps and vegetation indexes. This kind of information is today available from different missions providing observations of different resolution, typology and accuracy.

Remote sensing images provide synoptic view and repetitive coverage of useful data on land-use dynamics, that are particularly amenable for exploitation in the context of the hydrological modelling at the basin scale. Milella et al. (2010) for the description of the vegetation cycle in a semi-distributed hydrological model used for comparison purpose: monthly NOAA-AVHRR NDVI maps derived by 1×1 km data recorded in 1998 and MODIS NDVI maps with resolution 250 m, available with a frequency of 16 days, recorded in 2006. In this work, we present preliminary results obtained by the use of images acquired over the Puglia region (Southern Italy) by the COSMO-SkyMed constellation and MERIS sensor, aboard ENVISAT satellite, in some sub-processes of the DREAM (Manfreda et al., 2005) model. In particular we exploit multi-temporal COSMO-SkyMed SAR data for land cover/use classification and MERIS data for retrieval of NDVI and LAI maps (Satalino et al., 2010).

Acknowledgement

This work was supported by the Italian Space Agency, (COSMOLAND project, contract nr. I/051/09/0).

References

- Manfreda, S., Fiorentino, M., Iacobellis, V.: DREAM: a distributed model for runoff, evapotranspiration, and antecedent soil moisture simulation, *Adv. Geosci.*, 2, 31-39, 2005.
- Milella P., Bisantino T., Gentile F., Trisorio Liuzzi G. & Iacobellis V.: influence of lai-ndvi relations on runoff modelling at basin scale, *European IAHR Congress Edinburgh*, 2010.
- G. Satalino, F. Mattia, A. Balenzano, M. Rinaldi, S. Ruggieri, P. Garofalo, "A comparison of Leaf Area Index maps derived from multi-sensor optical data acquired over agricultural areas", *Ital. J. Agron./Riv. Agron.*, 2010, 5:167-175.