Satellite data assimilation model for the estimation of surface energy fluxes on southern italian region

F. Sini (1), G. Boni (1), and D. Entekhabi (2)

(1) CIMA, Università di Genova e della Basilicata-Savona, Italy, (2) Ralph M. Parsons Laboratory, MIT, Cambridge-MA, USA

Latest studies have shown that monitoring heat, mass and energy fluxes of land surfaces is becoming more and more important for investigating the dynamic balance of water resource in a river basin or simulating ecological changes. Soil moisture and evapotranspiration play a vital role in assessing terrestrial environmental conditions related to ecological, hydrological and atmospheric processes. Otherwise ground based data of latent and sensible heat fluxes are available only for limited time periods and over very small areas. Remote sensed data conjunct with ground observed data and data assimilation technique, supply us a convenient approach to retrieval and estimate land surface variables. According to that, the primary objective of the present studies has been the development of a flexible and simple model to estimate energy fluxes over extended area. The starting point of the research is the variational assimilation scheme, based on surface energy balance, modified in order to take into account the contribution of precipitation observed data. Land surface temperature, signature of dynamics energy balance, from different sensors and platforms, included SEVIRI data, is the assimilated variable. Net Radiation, wind speed, precipitation and air temperature are the forcing meteorological data. Model doesn't require auxiliary data on soil texture and vegetation cover. It provides daily evaporative fraction map and hourly-daily energy fluxes from 8 am to 6 pm. This approach is tested and validated over Southern Great Plains 1997 hydrology field experiment data and applied on Basilicata region, southern Italy. The period of study covers one month, from 12th of June to 11th of July. Model grid has a resolution of 3km x 3km.