Agronomie 22 (2002) 529

EDITORIAL

Data assimilation techniques which are now operational for meteorology and oceanography enable us to combine various sources of information to our knowledge on the processes represented by the corresponding models. However, the development of such a promising technique applied to surface processes is just emerging. The ReSeDA (**Re**mote **Se**nsing **D**ata **A**ssimilation) project aims to develop and evaluate remote sensing data assimilation methods for the description and understanding of surface processes, mainly canopy functioning and soil vegetation atmosphere transfers.

The ReSeDA project is based on a comprehensive data set allowing us to concurrently document ground characterization of the surface, flux measurements, meteorological data along with remote sensing observations. The main emphasis is put on the exploitation of multi-temporal and multi-sensor data that are acquired at high spatial resolution both with satellite borne (SPOT, Landsat TM, ERS, Radarsat) and airborne sensors (POLDER, INFRAMETRICS, DAIS, ERASME, RENE). The measurements are processed, documented and stored in a data base that is available through the ReSeDA web site. It provides easy and open access to the measurements at the following address: www.avignon.inra.fr/reseda. Hopefully, this unique data base will continue to be exploited in order to advance methodological questions linked to the surface processes characterization through remote sensing data assimilation.

This special issue presents some of the main results derived from this project. The opening papers deal with issues related to the development and evaluation of radiative transfer model inversion techniques applied from the visible to the microwave wavelengths to derive estimates of canopy biophysical variables. These are followed by papers related to SVAT modelling and the assimilation of remote sensing data into SVAT models are presented. Particular attention was devoted to the spatial heterogeneity and scaling issues. Advanced techniques have been used, based on scintillometry and temperature and moisture sensors aboard unmanned light planes, to account for the spatial heterogeneity. Finally, results on remote sensing data assimilation within canopy functioning models are presented, showing quite a large range of the models and approaches used, typical for this emerging domain of research.

The ReSeDA project was originally initiated by Daniel Vidal-Madjar within the Programme National de télédétection Spatiale in France. Because of the importance of the experiment and the large scope covered by its objectives, it was extended at the European level to organise a collaborative effort. We would like to thank Michel Schouppe from the European commission for his interest in the issues addressed and for his positive comments made during the running of the project. The project was also partly supported by the French "Programme National de Recherche Hydrologique".

Apart from the scientific results obtained, the ReSeDA project contributed significantly to the organization of part of the European scientific community concerned by the application of remote sensing to the continental biosphere. This in turn gave an impulse to remote sensing data assimilation issues that is still growing thanks to several projects ranging from very local applications such as precision farming, to global applications linked with human impact on climatic change.

Frédéric Baret,
Coordinator of the ReSeDA project