Status report from the Lead Centre for surface processes and assimilation of surface variables

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1 4th SRNWP Workshop on surface processes and assimilation of surface variables

The fourth SRNWP Workshop on surface processes and assimilation of surface variables will be held around spring 2004 at the SMHI (Norrköpping, Sweden) and depending on HIRLAM internal arrangements. As in previous occasions it will be convened as a part of a HIRLAM meeting devoted to different physical parameterizations.

2 Activities at different centres

- ALADIN (see (Giard and Bazile, 2000) for a description of the surface module)
  - Development and testing of the soil moisture variational assimilation in the frame of ALATNET and ELDAS projects (Balsamo *et al.*, 2003).
  - Creation of a new global physiographic database (ECOCLIMAP) with 1 km resolution (Masson *et al.*, 2003).
  - Work on snow depth analysis based on OI.
  - Work on the externationalization of the surface module.
- HIRLAM (see (Rodriguez *et al.*, 2003) for a description of the surface module)
  - Comparison of performance of the explicit and implicit treatment of soil water freezing/thawing (Parodi *et al.*, 2003).
  - Re-computation of background error statistics for 2-metre temperature and relative humidity analysis.
  - New snow depth analysis based on OI (Cansado and Navascues, 2003).
  - Additional tile for snowed bare ground and low vegetation surfaces (Gollvik, 2002).
  - Assessment and evaluation of the HIRLAM surface module by seasonal integrations and against field data (RhoneAggr, EFEDA).
  - Tests with subgrid run-off formulation.
- COSMO (see (Schrodin and Heise, 2001) and (Hess, 2001) for a description of the surface module)
  - Testing of the new multi-layer version of the TERRA soil scheme (Heise *et al.*, 2001) with the RhoneAGG dataset (Boone *et al.*, 2001).
- UK (see (Best *et al.*, 2001) for a description of the surface module)
  - Testing the impact of the MOSES 2 land-surface scheme on the global model performance.

3 Recent relevant experiments and projects

- Rhone AGGregation experiment (Boone *et al.*, 2003).
  The main goals of Rhone-AGG were to examine how various state of art SVAT schemes were able to simulate the river discharge over several annual cycles when inserted into the Rhone modelling system, and to explore the various scaling or aggregation methods on the simulation of certain components of the hydrological cycle.

- European Land Data Assimilation System (ELDAS) (http://www.knmi.nl/samenw/eldas).
  ELDAS will derive a prototype soil moisture data assimilation system, validate its products, and explore the potential improvements in meteorological and hydrological applications. In the frame of ELDAS, most of the major European operational land-surface schemes have been inter-compared using Rhone-AGG data.

- Land SAF Project (http://www.meteo.pt/landsaf/).
  The main purpose of the Land SAF is to increase the benefits of the MSG and EPS data related to land, land-atmosphere-interactions and biophysical applications.

4 Preferent fields of activity for the near future

- Runoff description is rather crude. For many models it depends only on reaching the soil saturation point, without considering any use of soil moisture subgrid variability, subgrid topography, subgrid precipitation, ... As a consequence of the RhoneAGG experiment some models have already implemented improvements of their runoff formulation.

- Comparison of existing methods for soil moisture assimilation (sequential, variational, off-line forced with observations) will be conducted in the frame of the ELDAS project.

- Winter conditions are still a source of problems for surface schemes. A better snow description is needed, including albedo and density ageing, effect of water retained by melting snow, snow albedo in cases of forest and complex orography, etc. The estimation of the relation between snow amount and snow fraction, also needs further development. Also lakes evolution and sea ice description need to be improved.

- Improvement of the physiographic description. Substitution of land-use and look-up tables by directly measured (from satellite) vegetation parameters: NDVI, alb, etc. The frequency of updating should also be revised (1 week?). The very recently appeared ECOCLIMAP database is currently being assessed by different groups.

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