Geophysical Research Abstracts,
Vol. 11, EGU2009-12328, 2009
EGU General Assembly 2009

A revised land hydrology in the ECMWF model: A step towards water fluxes prediction in a fully-closed water cycle

G. Balsamo (1), E. Dutra (2), F. Pappenberger (1), P. Viterbo (3), and B. van den Hurk (4)

(1) ECMWF European Centre for Medium-range Weather Forecasts, Reading, UK (gianpaolo.balsamo@ecmwf.int), (2) IDL-CGUL University of Lisbon, Lisbon, Portugal (endutra@gmail.com), (3) IM Institute of Meteorology, Lisbon, Portugal (pedro.viterbo@meteo.pt), (4) KNMI Royal Netherlands Meteorological Institute, De Bilt, The Netherland (hurkvd@knmi.nl)

Predictions of the global water cycle involve accurate atmospheric analyses and forecasts and a realistic representation of land surface processes for correctly timing water recirculation. A river routing mechanism is then needed to simulate rivers transport back into the oceans.
Physical parameterizations of the ECMWF Integrated Forecast System (IFS) involved in the predictions of soil moisture and snow have been recently revised to address known shortcomings of the land surface scheme and a river routing scheme has been implemented. An improved representation of land water reservoirs is proven to be essential in global weather and climate prediction due both to partitioning of incoming solar radiation (e.g. via snow reflection/insulation, soil moisture/ice control on turbulent fluxes) and to timing of fresh water recirculation (e.g. evaporation, sublimation and runoff).
The HTESSEL land surface scheme including a soil texture map and revised hydrological properties is verified together with an improved snow scheme in which a new snow density formulation and a liquid water reservoir have been introduced. River outflows produced by HTESSEL+TRIP2 models are then verified against major World Rivers. These developments allow closing more accurately the global water cycle and extending model forecasts verification, particularly the land surface components, by the use of routinely observed rivers discharges.