



## **Soil moisture data assimilation increments in the ECMWF Extended Kalman Filter scheme**

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For thirty-six location spread across Europe a 15-month soil moisture data assimilation experiment was executed using a single column model of the ECMWF model in combination with an Extended Kalman Filter algorithm. Both a control simulation without data assimilation, and an experimental simulation in which daily updates of soil moisture content diagnosed from forecast errors of near-surface temperature and humidity were applied. In both cases radiation and precipitation were prescribed forcings derived from observations. The differences between the two experiments were evaluated in terms of cumulative water budget of the soil.

In spite of prescribing observed precipitation and radiation, the data assimilation in the ELDAS single column experiments still applied systematic increments at most locations. Accumulated over the growing season these were non-zero, of the same order or larger than one standard deviation of the interannual variability generated by multi-year offline simulations. Furthermore, for a majority of locations a large fraction of the data assimilation increments was eventually removed as runoff rather than used to change the evaporation. Only for some Mediterranean locations the effect of the data assimilation on evaporation was dominant. Available observations at a subset of the explored locations were not fully conclusive, apart from the observation that the difference between the control and data assimilation run is generally smaller than the (positive) evaporation bias in the control simulation.