



## **Comparison of three algorithms for the initialization of soil moisture in a numerical weather prediction model**

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The analysis of soil moisture for the initialization of numerical weather prediction (NWP) models is discussed subjected to the constraints imposed by an operational environment. Under the frame of the ELDAS EU project, three different techniques for soil moisture assimilation were compared within the HIRLAM forecasting system. The first method is the HIRLAM default option based on optimal interpolation (OI) analysis with optimal coefficients analytically formulated. It makes use of 2-metre temperature and relative humidity errors. A second method is based on a simplified variational approach to assimilate also 2-metre observations of temperature and relative humidity. The estimate of tangent linear of the observation operator is obtained here from an extra integration of the numerical model. Finally, a third method is based also on the variational assimilation of soil moisture by a parent (global) model (ARPEGE) and a posteriori corrected by the forecasted precipitation error. The soil moisture produced is then imported to the HIRLAM system. The assimilation period for the three experiments corresponds to the year 2000 growing season (June-October). Scores and different diagnostics were produced to show the features and differences of the soil moisture assimilation procedures.