



Assimilation of high-resolution radiosonde reports in the ALADIN-HIRLAM NWP System

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Radiosonde reports are an important source of information for numerical weather prediction (NWP). For many years these reports have been produced in an alphanumeric code called TEMP. TEMP code assumes a vertical ascent and applies rounding to the observed variables in order to reduce data volumes. In recent years there has been a global effort to migrate the encoding of radiosonde reports from TEMP to a binary format (BUFR). BUFR encoded radiosonde reports allow for the inclusion of many more vertical levels, time and location for each observation level and extra precision for the observed variables.

The three-dimensional variational assimilation (3D-Var) scheme available in the ALADIN-HIRLAM NWP System is used to evaluate the benefits of assimilating the extra information available in BUFR encoded reports in a mesoscale limited-area model. The HARMONIE-AROME configuration of the ALADIN-HIRLAM NWP System with a grid-spacing of 2.5 km covering a European domain is used for all test periods. The sensitivity to the vertical resolution of the radiosonde observations assimilated and the inclusion of the exact time and location information of the observations is evaluated against the assimilation of radiosonde reports encoded in the original TEMP code. 3D-Var departure statistics are used to validate the assimilation of the radiosonde reports and independent observations are used to validate the quality of forecasts.