Some experiences using the non-hydrostatic model AROME as driver for the MATCH model

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The AROME model is under evaluation at SMHI as part of the work conducted within HIRLAM project. AROME is run on 2.5 km resolution once a day up to 24 hours and for two different areas of Scandinavia.

The benefit of using AROME in contrast to e.g. MM5 is, from a MATCH model perspective, that weather data are provided on hybrid vertical layers, that has been the bases for the MATCH model since its development in the early 90's. The specific challenge has been to use non-hydrostatic data in a model that uses the hydrostatic assumption to determine the vertical discretization and the vertical wind. Moreover, in order to ensure mass conservation we use an initialisation of the horizontal winds that restore the wind and mass balance disrupted by internal time interpolation of data (Heimann and Keeling, 1989). The initialisation procedure is also based on the hydrostatic assumption.

We are able to use non-hydrostatic input data and still have mass conservation. One of the issues we have to penetrate is to what extent we are "washing out" the non-hydrostatic information by the procedures adopted in the MATCH mode.