
Assimilation of Nowcast Objects in the Regional Forecast Model ICON-LAM

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Abstract

Data assimilation methods are designed to update gridded model variables based on their statistical correlation to observations at other locations. This framework, while reliable and well-established, does not entirely take into account the coherent nature of convective systems but rather relies on modeled correlations to account for the fact that observations at neighboring gridpoints may be part of a coherent system.

As assimilation updates are becoming more frequent (from several hours to hourly or less), data assimilation is starting to enter the world of nowcasts, i.e. rapidly updated short-term forecasts based on recent radar composites. On these time scales it makes sense to assimilate not just gridded fields of observed precipitation, but also information about convective systems as a whole, e.g. the area of a convective cell or the cell-based Vertically Integrated Liquid Water.

At the German Weather Service, cell attributes are computed from radar composites using the KONRAD3D cell detection and gridding system. We have implemented a method for assimilating these cell attributes into the ICON-LAM regional forecast model, by generating model-equivalent radar fields that are then fed into the cell-detection and subsequently counted up on a model grid. This talk will explain the approach and show some first experiments that illustrate the extra information that can be obtained by considering objects.

Keywords: LETKF, convective cells, object assimilation, regional data assimilation, rapid update cycle

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