



A new approach for assimilation of two-dimensional radar precipitation in a high resolution NWP model

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The DMI nowcasting system has been running in a pre-operational state for the past year. The system consists of hourly simulations with the High Resolution Limited Area weather model combined with surface and three-dimensional variational assimilation at each restart and nudging of satellite cloud products and radar precipitation. Nudging of a two-dimensional radar reflectivity CAPPI product is achieved using a new method where low level horizontal divergence is nudged towards pseudo observations. Pseudo observations are calculated based on an assumed relation between divergence and precipitation rate and the strength of the nudging is proportional to the offset between observed and modelled precipitation leading to increased moisture convergence below cloud base if there is an under-production of precipitation relative to the CAPPI product. If the model over-predicts precipitation, the low level moisture source is reduced, and in-cloud moisture is nudged towards environmental values. In this talk results will be discussed based on calculation of the fractions skill score in cases with heavy precipitation over Denmark. Furthermore, results from simulations combining reflectivity nudging and extrapolation of reflectivity will be shown. Results indicate that the new method leads to fast adjustment of the dynamical state of the model to facilitate precipitation release when the model precipitation intensity is too low. Removal of precipitation is also shown to be of importance and strong improvements were found in the position of the precipitation systems. Bias is reduced for low and extreme precipitation rates.