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Forecasting the weather
- ensemble techniques
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Deep summer convection within a convergence zone - towards the understanding of convective clouds, its development and characteristics using WRF and radar.

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Deep convective events trigger large amounts of precipitation, especially when occurring inside a convergence zone during the warm-season. Understanding the most dominant mechanisms behind deep convective clouds represents a challenge in meteorology because of the different spatial scales and physical processes involved in the evolution of these storm cells. As a result, forecasting these events is still very uncertain on its location and timing. It is therefore first to have a deep analysis of these systems. By doing, the studied cases enable to evaluate performance of mesoscale models and potentially improved the parameterizations of physical processes.

To improve understanding, the convergence zone which occurred over the Netherlands at 26th of June, 2009 was subjected to analysis by means of the mesoscale model WRF and radar observations. Both WRF and radar were used to characterize the storm using a method called “rain cell tracking”, a Lagrangian approach for getting the evolution of rain intensity, cloud depth and cloud’s horizontal and inner vertical wind speed.

WRF was able to reproduce the convergence zone and its resulting precipitation pattern very satisfactorily in terms of timing, rain intensity and precipitation area compared to radar observations. In addition, radar was used for comparison in rain intensity in a quantitative sense. Rain gauge observations measured 51 mm accumulative precipitation at the station of Eerbeek that day. Model’s output grid point maximum was 40 mm and radar observations measured 25 mm. Because of radar’s properties on the way of measuring and the resolution in vertical dimension, comparisons between radar and WRF with respect to cloud depth and horizontal and vertical wind speed were valuable in qualitative sense.

To correct the location of the modeled precipitation area, sensitivity analysis was performed by shifting the wind direction and modifying model’s input initial and boundary conditions. This sufficiently improved precipitation’s location, but timing of the event became less good.