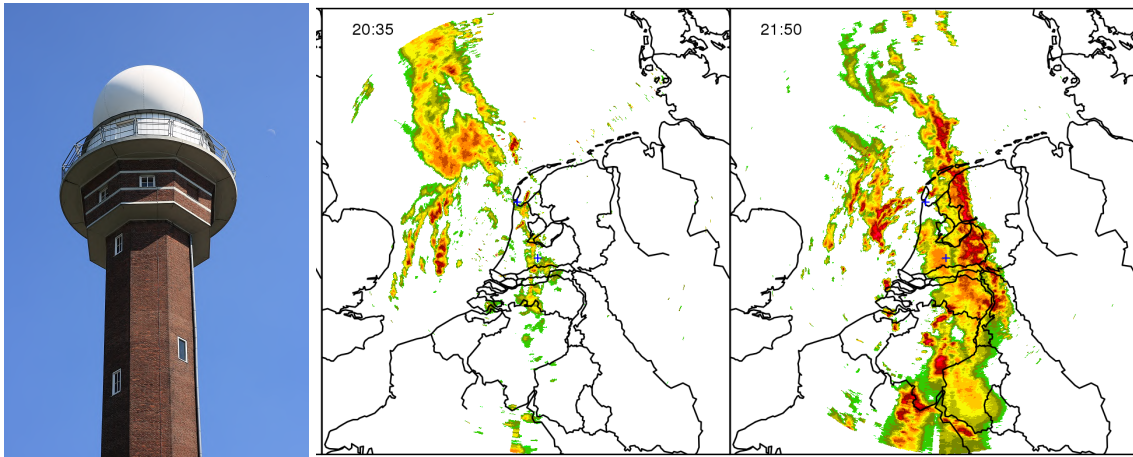


Operational KNMI radar topics

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Introduction

KNMI operates two C-band Doppler radars (one in De Bilt and one in Den Helder). These radars can be used to measure rainfall and wind velocities. However, these measurements are prone to several sources of error. In order to be able to correct for these errors, we must understand the physics behind them. Much can be learned by comparing radar data to measurements from other types of radars, rain gauges, disdrometers, satellites, aircraft measurements, and to numerical weather prediction (NWP) model output. Combining these data sources often yield significant improvements in data quality.



Activities

Several topics are available:

- Understanding errors by studying radar-rain gauge comparisons (the next page gives a more detailed description of this topic)
- Combining operational KNMI C-band radar data with very high-resolution X-band radar data (in collaboration with TU Delft)
- Combining radar data and NWP model output to obtain information about precipitation type, rain evaporation, and advection of snowfall
- Combining radar measurements with geostationary satellite (MSG) and disdrometer data to gain understanding of precipitation processes
- Extracting two-dimensional wind vectors from radar data

Unravelling the differences in radar-rain gauge comparisons

Introduction

Quantitative precipitation estimation (QPE) using radar is negatively affected by many potential sources of error. This is the main reason why radar is currently not used extensively in many hydrological applications. One of the ways to reduce these errors in radar QPE is to correct radar data using rain gauges. At KNMI, this is currently done by applying a mean-field bias correction based on 32 operational rain gauges. This yields better results, but it does not take the physics of the different sources of error into account. The goal of this project is to explain the differences between precipitation amounts observed by the radar and the rain gauge network, based on the physics of the different sources of error. This may ultimately lead to a more physically-based correction method for radar QPE.

Activities

The analyses of the differences between radar and rain gauge precipitation estimates will be carried out using volume radar data (i.e. 3-dimensional radar data are available) on a 5-minute time resolution. Rain gauge data are available for 32 stations over the Netherlands with a time resolution of 10 minutes. A third rain gauge dataset consists of more than 300 stations that report daily precipitation amounts can be used for validation.