

Uncertainties in measured extreme precipitation events

(Main supervisor: Ulrich Foelsche)

One of the expected consequences of global warming is an increase of extreme precipitation events, but a deeper understanding of such changes is hampered by deficiencies in our observing system: Even dense measurement networks (like in Austria) severely undersample the spatial variability in intense convective precipitation systems. As a consequence we have to assume that the “true” extremes are often un-observed, as, e.g. illustrated by the fact that the measured 24h rainfall record in Austria (336 mm in Dornbirn, on August 31, 1910) is only about half of the value that has been credibly reconstructed for an extreme precipitation event on July 16, 1913 in the Stiftingtal valley near Graz (about 650 mm).

Goal: The main goal of this project is to analyze by how much conventional weather stations underestimate precipitation extremes during intense convective events, by using data from the pioneering WegenerNet (<http://wegcenter.uni-graz.at/en/wegenernet>), a dense network of 151 meteorological stations. Other goals are:

- Analysis of systematic differences between measurements from different precipitation sensors.
- Comparison of the WegenerNet precipitation data with those derived from weather radar, together with an assessment of the suitability of the WegenerNet data for potential calibration of weather radar data.
- Determination of the impact of the underestimation of intense precipitation events on groundwater modeling.
-

While the WegenerNet covers a domain of 20 km x 15 km with 151 stations with typical distances of about 1.4 km, the same domain hosts only two conventional weather stations. Under “normal” circumstances we would be restricted to data from these two stations only. WegenerNet data are available since 2007, which allows to analyze a multitude of intense precipitation events – including those in summer 2009, which resulted in severe flooding and numerous landslides.

[The project contributes to answering the DK research question 1](#)