Evaluation of precipitation estimation based on CombiPrecip radar information and rain-gauge networks in the Canton of Geneva

Weather radars can measure precipitation on a large surface with a high spatial resolution (1 km²). However, the measurements are not very exact, so the radar has to be calibrated before it can be used.

CombiPrecip is compared to two networks of rain-gauge stations. The first network is operated by the "Service écologique des eaux" of the Canton of Geneva (SECOE). The second network is operated by "Agrometeo", a federal service for providing agriculture-related information.

Rain-gauge stations offer more exact measurements, but the data corresponds to a single point in space.

MeteoSuisse has developed a product called CombiPrecip combining data from 3 radars and around 70 automatic rain-gauge stations in real-time.

The analysis is based on three rain events during July 2013 with durations between 9h and 33h. The rainfall data is aggregated to 60-minute mean precipitation.

The differences between Agrometeo and SECOE stations are also visible when comparing stations that are close to each other. MeteoSuisse stations seem to measure values similar to Agrometeo stations.

Most indicator values based on all data of a rainfall event are of the same order of magnitude as the values from the nationwide evaluation by Sideris et al. The bias, however, is significantly larger. This could be a consequence of the particular geographic location of Geneva or the smaller sample size. In the case of Agrometeo network, it appears to be caused by a systematic difference in the measurements.

The Hanssen-Kuipers discriminant measures how well CombiPrecip and rain-gauge values agree on the detection "rain" vs. "no-rain" (values between 0 and 1). The value for Geneva shows a good agreement. The indicator maps and time series did not show a clear spatial or temporal pattern.

The differences in rainfall estimates from CombiPrecip and rain-gauge networks in Geneva appear to be related to the rainfall intensity. This deviation can be corrected if it can be described by a model. Once this correction is done, more subtle spatio-temporal patterns might appear in a next analysis.