EMS Annual Meeting Abstracts
Vol. 12, EMS2015-40, 2015
15th EMS / 12th ECAM


# Urban High-Resolution Precipitation Product for rainfall-runoff simulations: Combining C-Band and Local X-Band Radar Data

Katharina Lengfeld (2,1), Marc Berenguer (2), Marco Clemens (1), Felix Ament (1), and Daniel Sempere-Torres (2)

(1) University of Hamburg, Meteorological Institute, Germany (katharina.lengfeld@zmaw.de), (2) Universitat Politècnica de Catalunya, Centre de Recerca Aplicada en Hidrometeorologia, Barcelona, Spain

Modelling precipitation induced floods and their impact on flood-prone regions is one of the biggest challenges for hydrometeorological forecasters. The largest source of error in flood forecasting systems is uncertainty in precipitation estimation. In state of the art rainfall-runoff models, precipitation fields from C-band radars are used as input with temporal resolution in the order of 5 minutes and spatial resolution in the order of kilometres. These radars cannot observe the small scale structure of rain events that influences runoff especially in impermeable urban areas. Therefore, precipitation fields with higher spatial and temporal resolution would improve flood forecasting.

In recent years radar systems operating in the X-band frequency range have been developed to provide precipitation fields for areas of special interest in higher temporal (1 min or below) and higher spatial resolution (250 m or below) in complementation to nationwide radar networks. However single X-band radars are highly influenced by attenuation. C-band radars have coarser resolutions (typically 1 km in range and 5 min in time), but are less affected by attenuation.

We will introduce a method to merge the precipitation fields derived from the X-band radar into the precipitation field provided by the C-band radar. The observations of C-band radar will be integrated in the correction of the attenuated measurements of the X-band. The merged precipitation field of both radars will be a valid product to improve rainfall-runoff simulations, because it combines the high-resolution of X-band radars with the more accurate rain-rate observations of C-band radars. In addition to the combined precipitation product, a concept for investigating improvement in rainfall-runoff simulations in different kinds of environments (rural, urban, flat, mountainous) will be presented as well as preliminary results.