

## **Quantitative Precipitation Estimation: observations from radar, gauges and opportunistic sensing for flood prediction.**

**When:** Sunday 1 July 2018, 9:00 – 17:00

**Where:** Hotel De Reehorst, Ede-Wageningen, The Netherlands

**Course aim:** After following this course, you will understand and be able to identify what precipitation characteristics can be extracted from different sensors and how these impact hydrological predictions.

### **Program:**

#### *Morning*

- Welcome
- **1. Sensors and technologies for QPE**, what spatial and temporal resolutions do various sensing techniques resolve and what are their uncertainty characteristics.
  - (Polarimetric) weather radar
  - Satellite and rain gauges
  - Opportunistic sensing: microwave links, smartphone apps, crowdsourcing
- **2. Validation and adjustment**, how to use information from multiple sensing techniques for intercomparison and merging, and to describe the spatial variability of rainfall.
  - Geostatistics
  - Examples of rain gauge – radar merging
  - Blending of opportunistic sensing – rain gauge

#### **[Lunch]**

#### *Afternoon*

- **Practical exercise**, geostatistics (~ 30 min).
- **3. Precipitation information for hydrological modelling**, critical resolutions and space-time scales of rainfall in relation to hydrological response prediction.
  - Flooded Locations And Simulated Hydrographs Project over the continental U.S.
  - Flow response to precipitation moments and rainfall resolution: urban catchments
  - **Practical exercise**, computing urban hydrological response parameters (~30 min).
- **Synthesis**, moderated discussion (~20 min)

**Preparation:** The course contains a practical exercise in R. This is a popular programming language, as R is open-source, freeware and has a large amount of documentation available online. Participants are required to bring laptops with RStudio installed.

It is recommended to have a working knowledge of R before participating in this short course. Information on how to install R and RStudio as well as a start-up tutorial can be found here: <https://github.com/ClaudiaBrauer/A-very-short-introduction-to-R>

**Lecturers:** Pierre-Emmanuel Kirstetter, Marie-claire ten Veldhuis, Marc Schleiss, Lotte de Vos