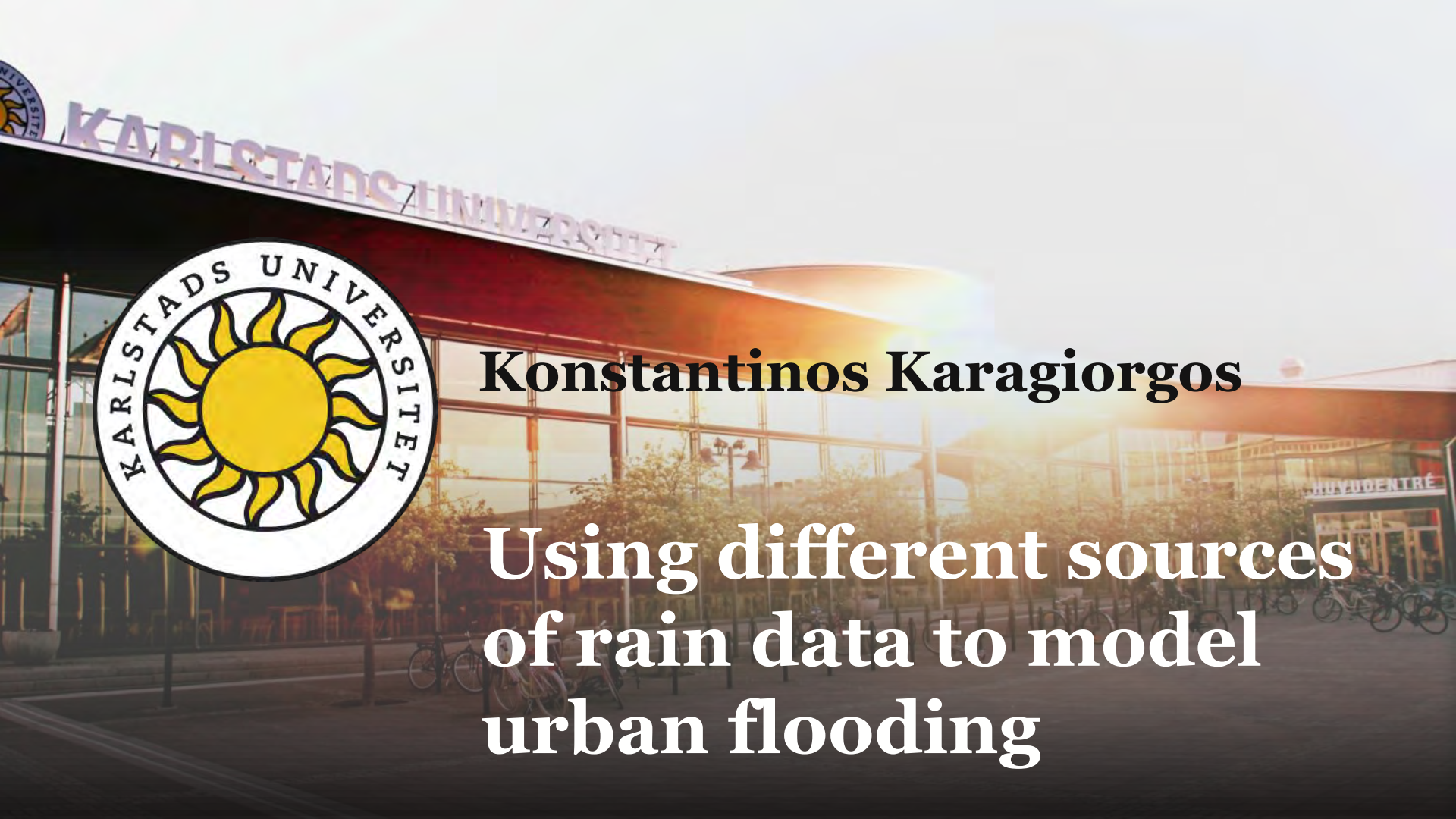


Konstantinos Karagiorgos

Using different sources of rain data to model urban flooding

Introduction

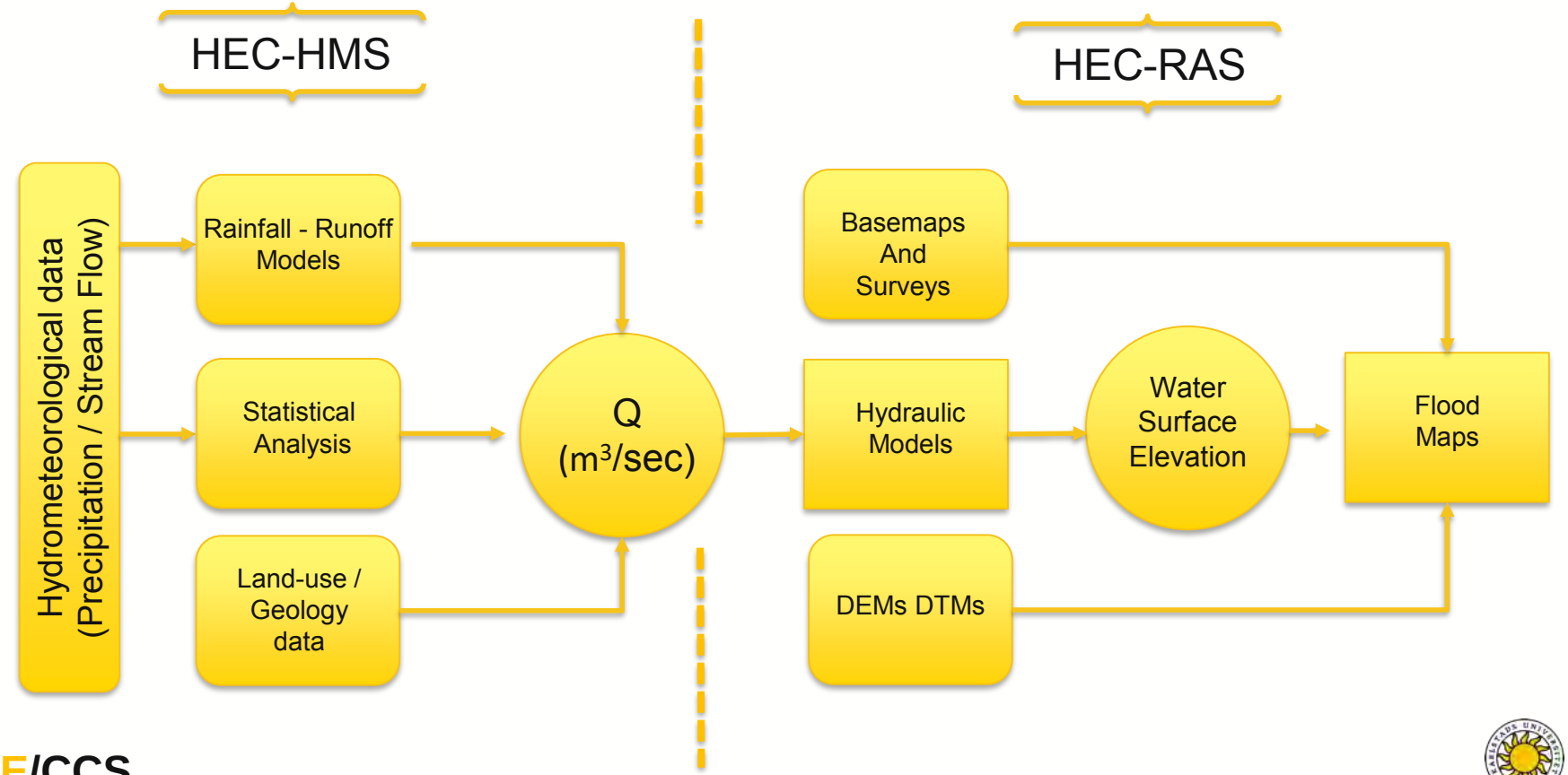
- Floods
  - Extemely complex phenomenon to model

- Key challenges
  - 1. Data
  - 2. Methods
  - 3. Applications

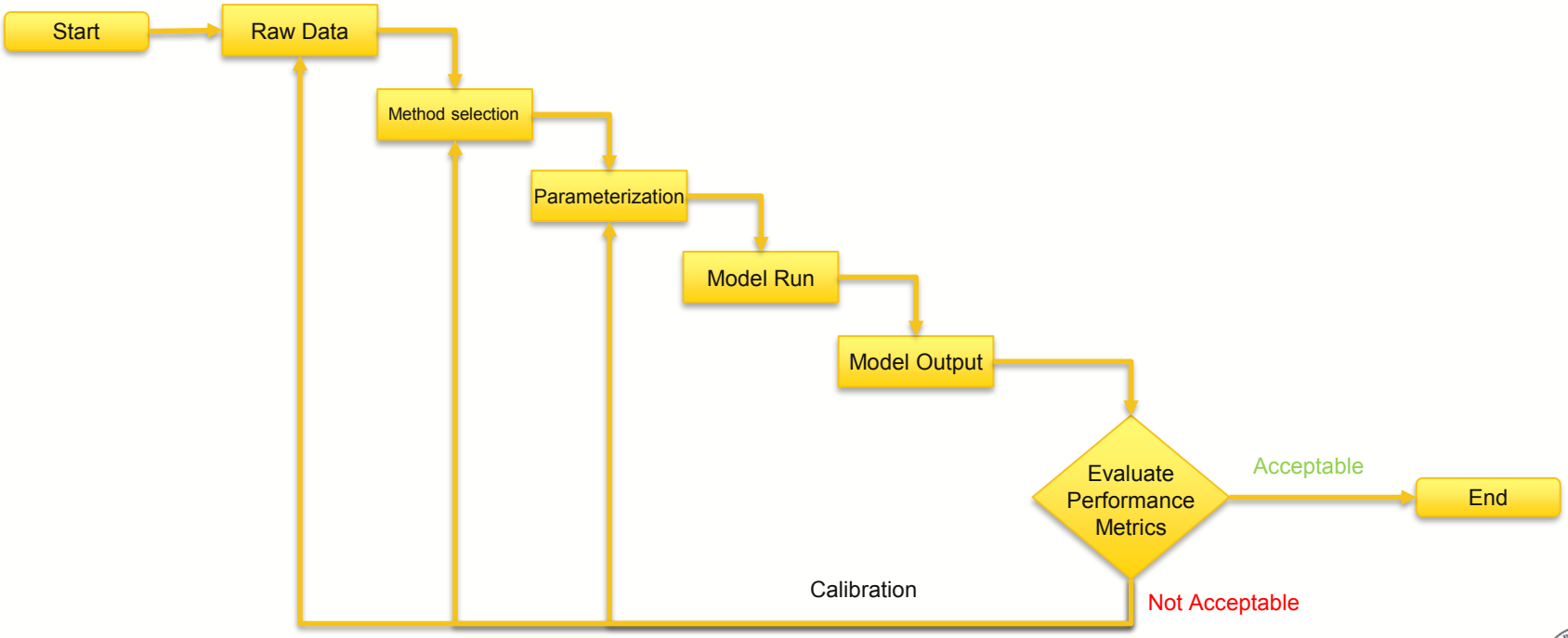
Introduction – flood hazard analyses

- Why?
  - Describe areas of high and low flood risk
  - Produce a range of probabilities described by return period
- How?
  - Hydrology
    - How much water?
  - Hydraulic modelling
    - Where does the water go?

Model - workflow

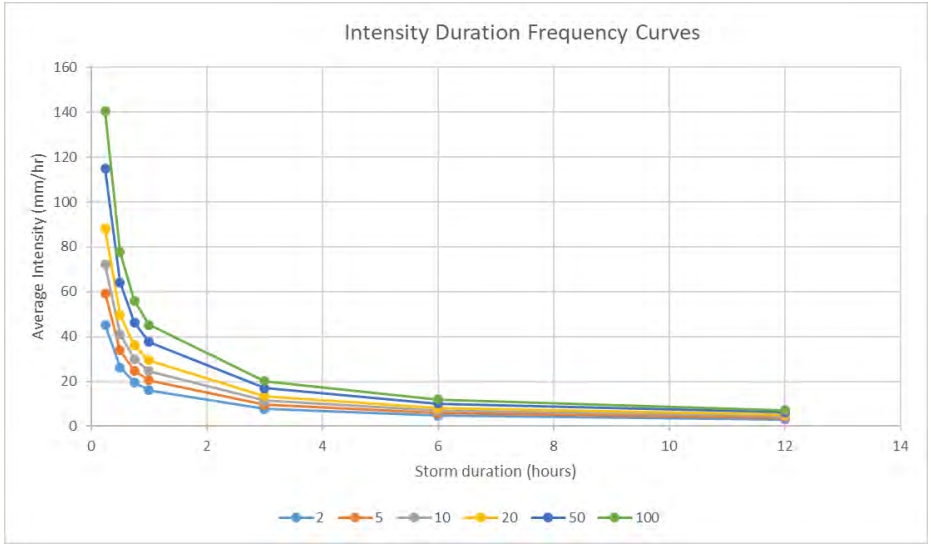


Model - calibration



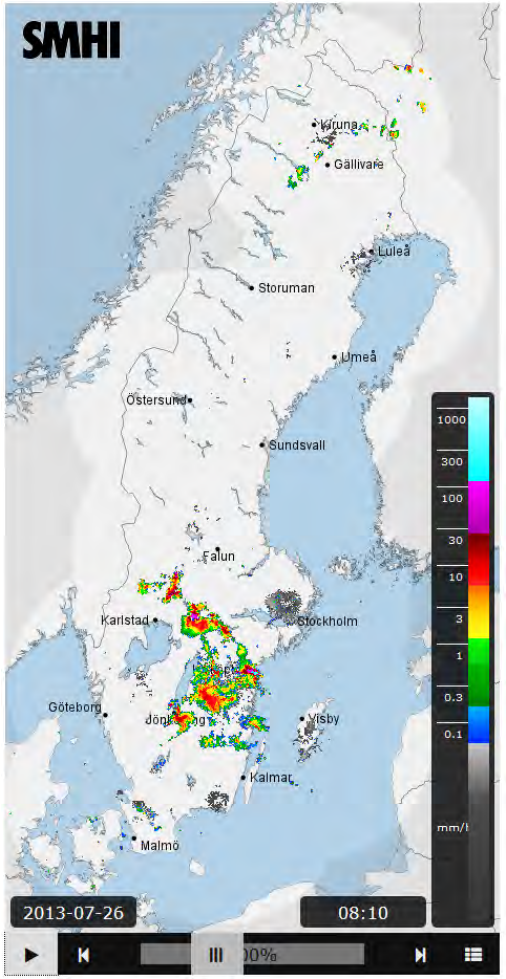
Model – Calibration / Validation

- Event based models
  - 3 Events Calibration
  - 2 Events Validation
- Probabilistic models



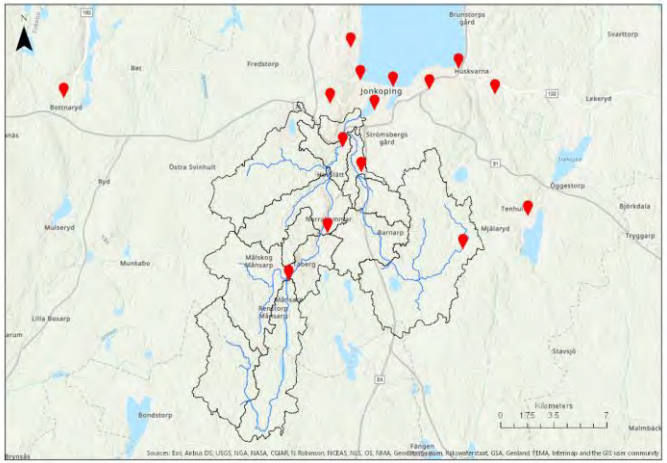
Data - Radar

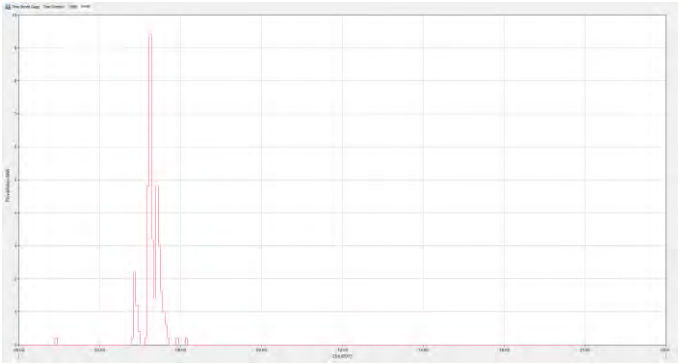
- Swedish Meteorological and Hydrological Institute
- Sweden
- 2008 – Current
- *.png - *.tif
- ArcMap – HEC-DSS
- Grid format - 5 minutes time step



Data – Time Series

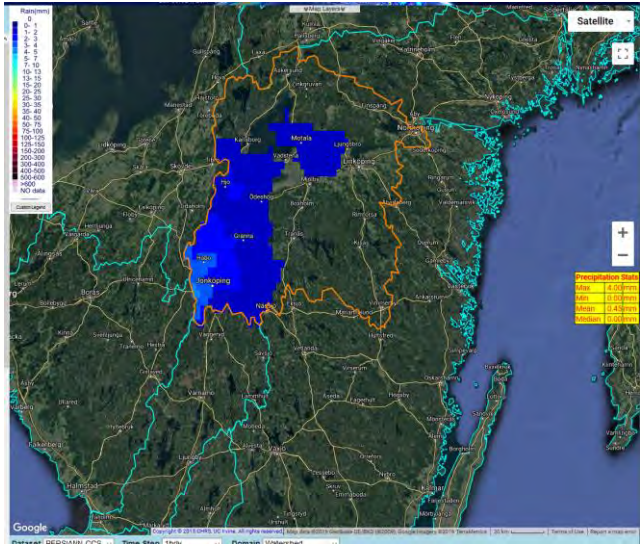
- Jönköping Municipality
- 20 Stations
- 1990 – Current
- *.csv
- time – series analysis
- Interpolation - Grid files





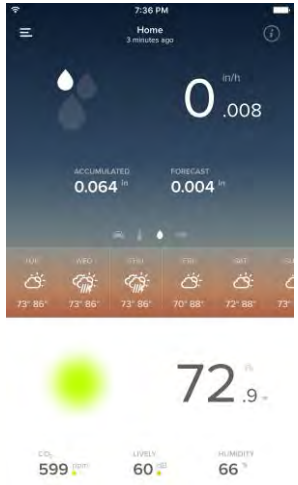
Data – Satellite data

- Center for Hydrometeorology and Remote Sensing (CHRS) - University of California
- World
- 2003 – Current
- *.tif
- Arcmap – HEC-DSS
- Grid format – 1hour time step



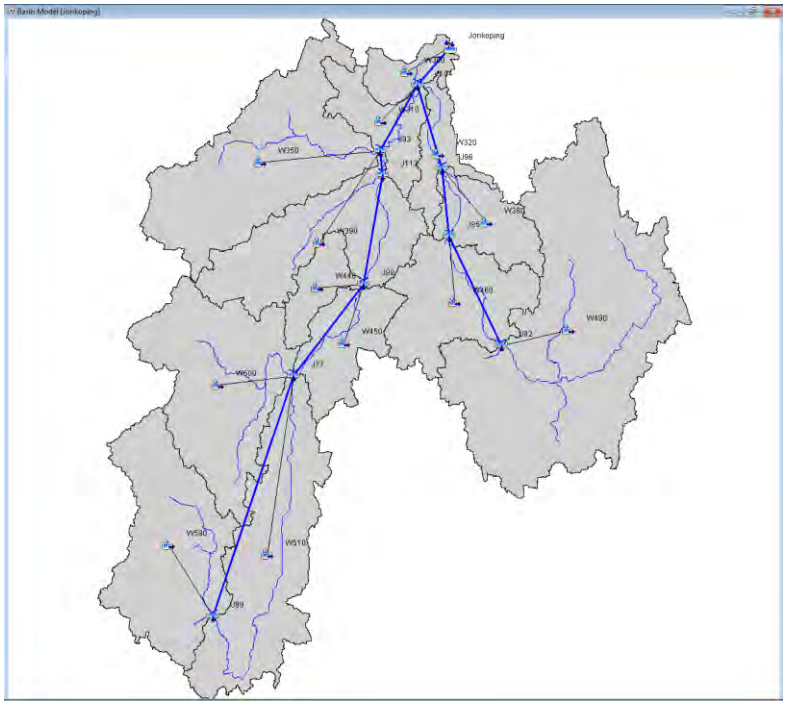
Data – NetAtmo

- Personal Weather Station
- Cheap / User-friendly / grown rapidly network
- NetAtmo platform (+ Wundermap etc)
- 5min interval
- Measurament range 0.2 – 150 mm h^{-1}
- Comparison with gauge data (Karlstad airport)



Next Steps

- Flood hazard maps
  - Event 26/07/13
  - Return periods 2/5/10/20/50/100 years
- Vulnerability analysis
  - Stage-Damage Curves
  - SoVI
- Risk Maps
  - Insurance / Decision makers / Population



KARLSTADS UNIVERSITET
Tack!