Konstantinos Karagiorgos

Using different sources of rain data to model urban flooding
Introduction

- Floods
  - Extremely 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

Hydrometeorological data (Precipitation / Stream Flow)

- Rainfall - Runoff Models
- Statistical Analysis
- Land-use / Geology data

Q (m³/sec)

HEC-HMS

Basemaps And Surveys

Hydraulic Models

Water Surface Elevation

DEMs DTMs

Flood Maps

HEC-RAS
Model - calibration

1. Start
2. Raw Data
   - Method selection
   - Parameterization
   - Model Run
   - Model Output
   - Evaluate Performance Metrics
     - Acceptable
     - Not Acceptable
   - Calibration
3. End
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 – 1 hour time step
Data – NetAtmo

- Personal Weather Station
- Cheap / User-friendly / grown rapidly network
- NetAtmo platform (+ Wundermap etc)
- 5min interval
- Measurement 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
Tack!