

Case study of dynamic adjustment of radar data and model based evaluation.

Morten Borup

The radar

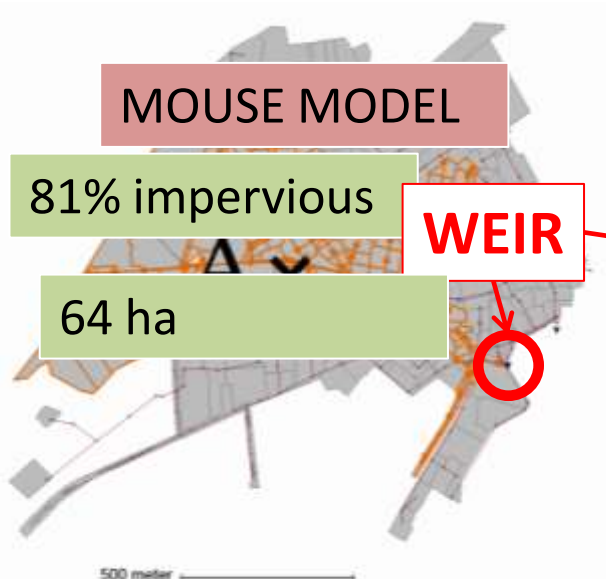
- DHI LAWR X-band radar
- Spatial resolution: 100 x 100 m
- Temporal resolution: 1 minute



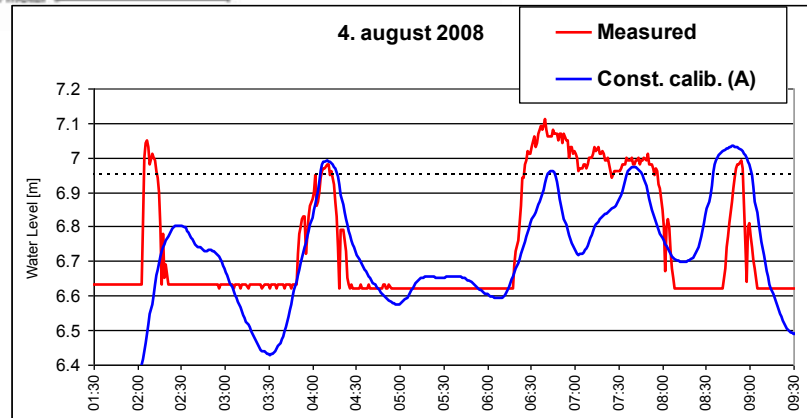
Pre treatment of radar data

- En-route correction
- Distance correction

Model based validation from weir WL

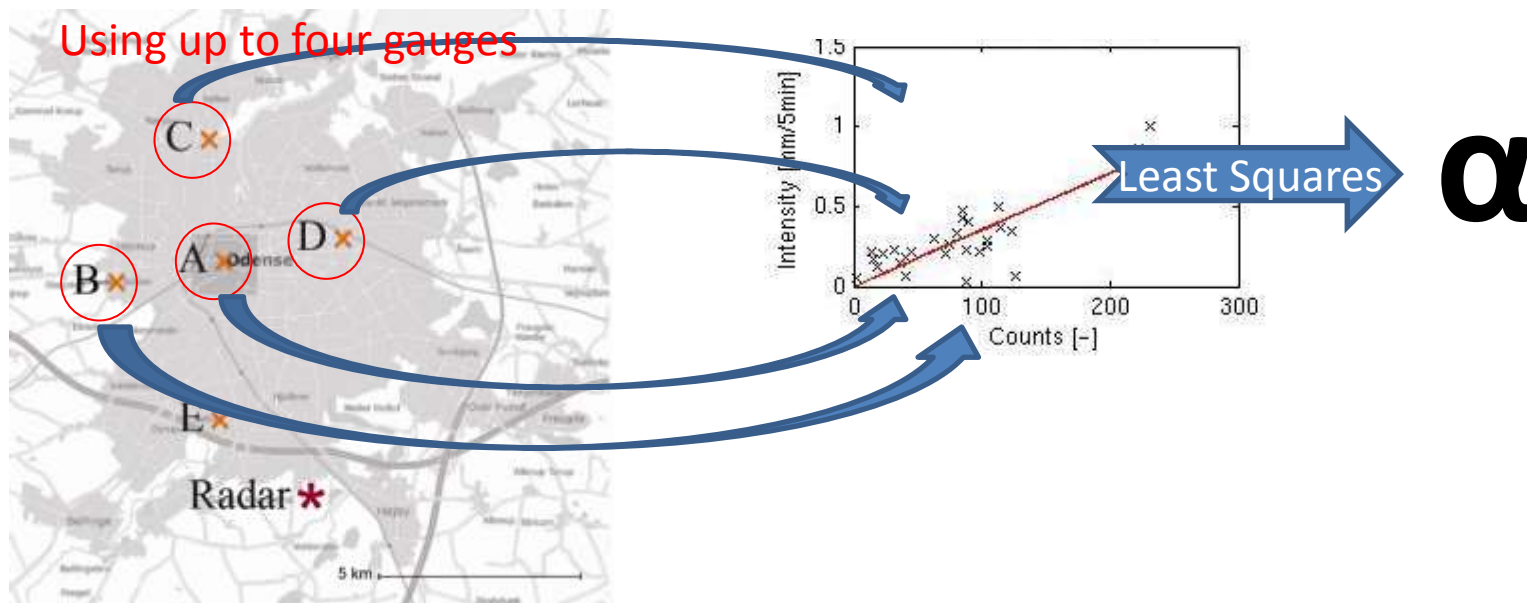


Performance measures:
 RMSE
 Relative Overflow Volume



Adjustments

Assumption: Rain intensity = $\alpha \circ$ Counts



Examples:

DA₃(30): Dynamic Adjustment using previous 30 minutes of data from gauge B,C&D. Performed each minute.

ESA_A: Event wise Static Adjustment using only gauge A. Performed after event.

Results

Data: 9 summer events

ESA: Event wise Static Adjustment

CSA: Constant Static Adjustment

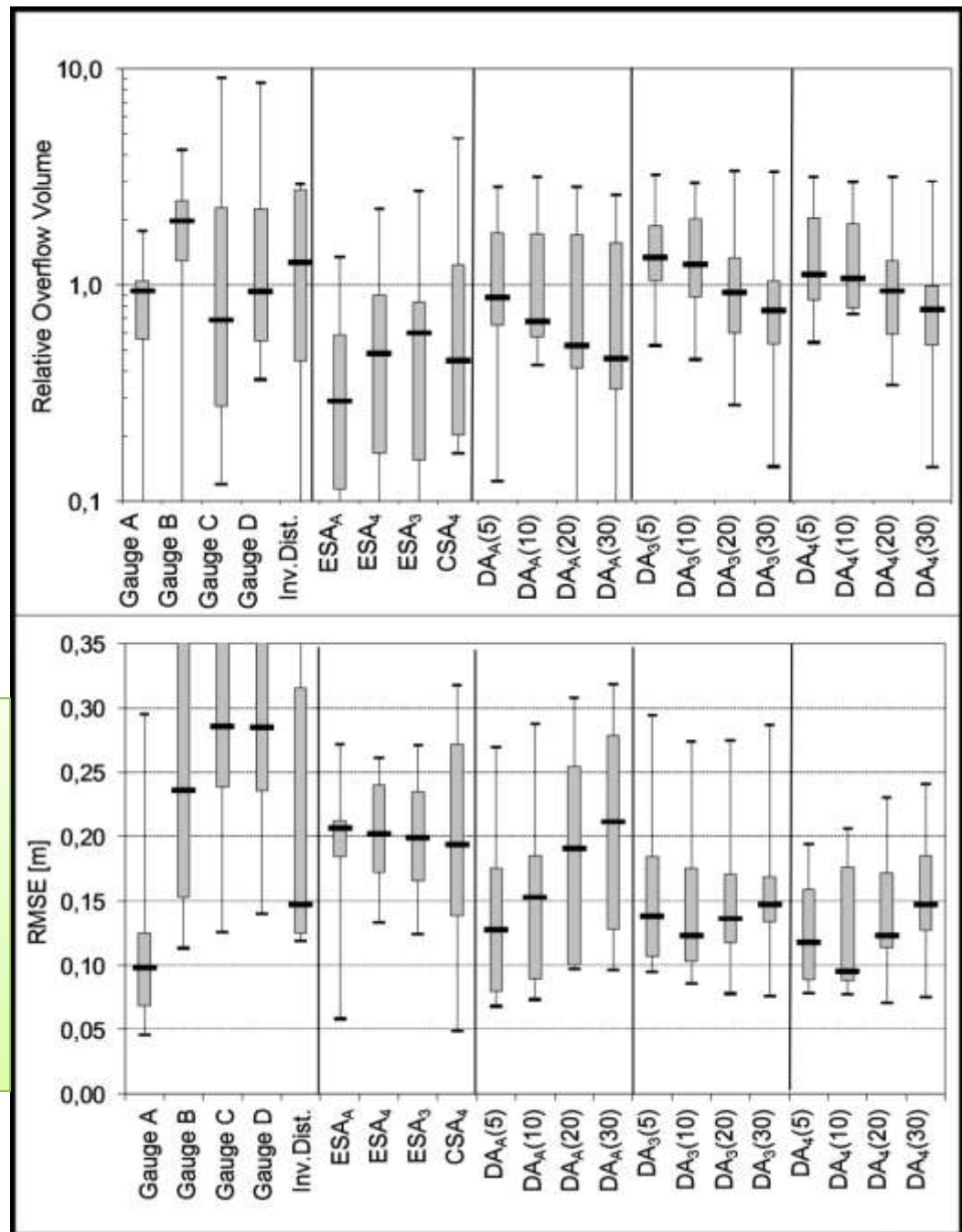
DA: Dynamic Adjustment

Inv. Dist: Inverse distance

interpolation using gauge B,C & D

Conclusion:

Dynamic adjustment has to be based on short interval to catch extremes.

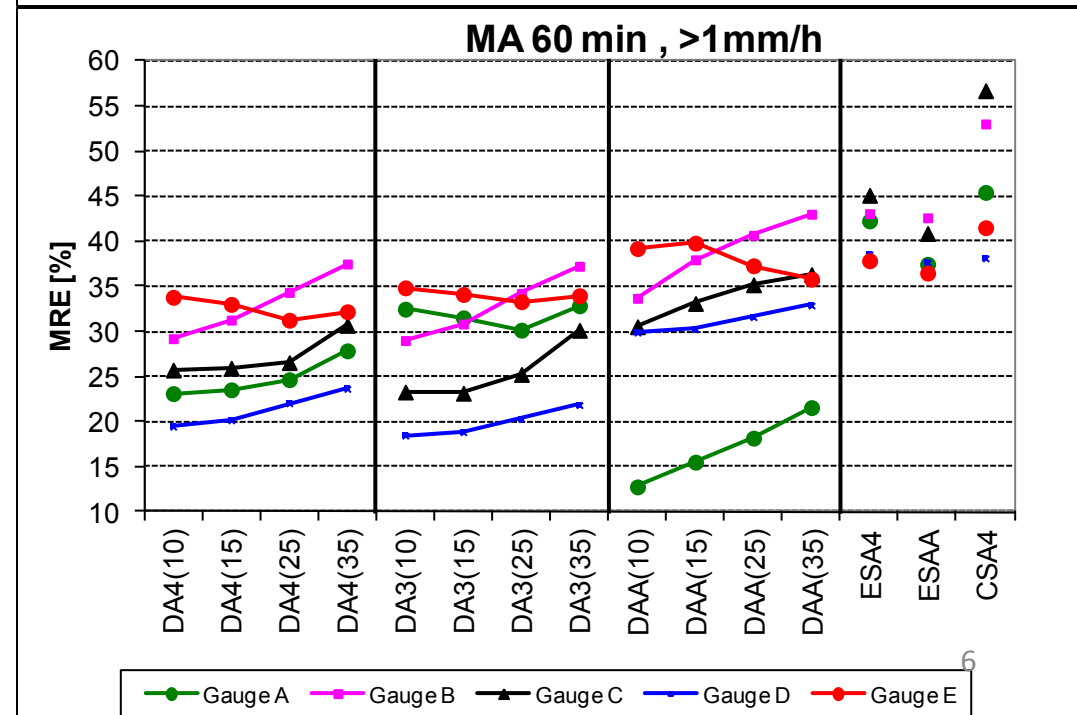
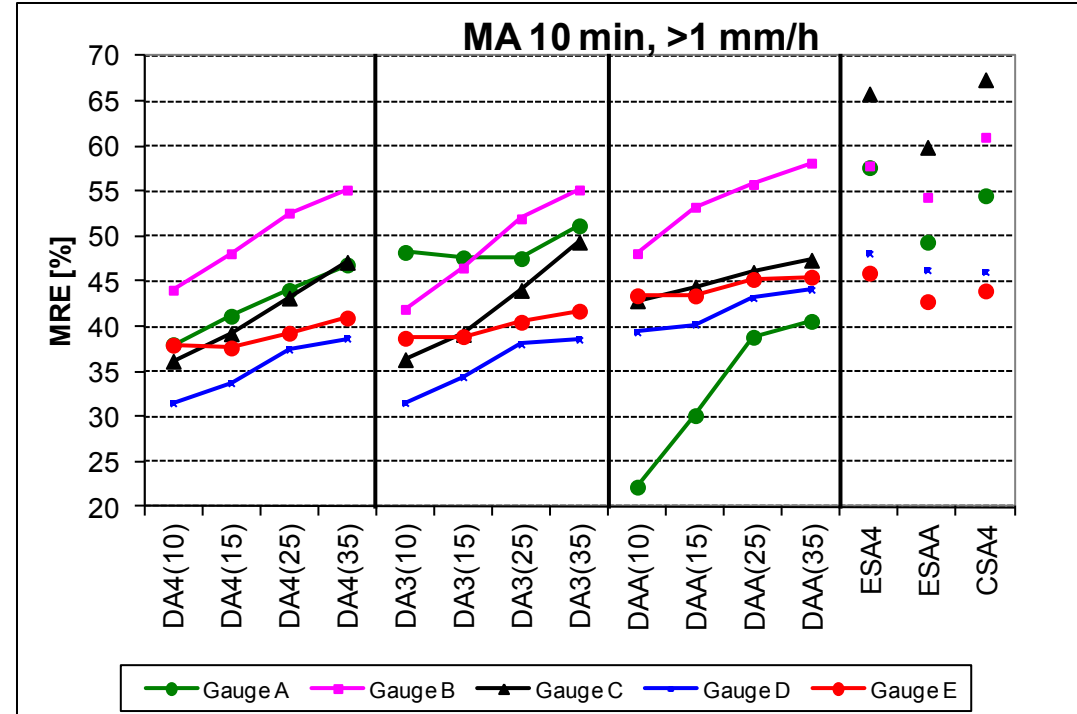


Validation by gauge

Moving average of Tc
minutes before error
quantification

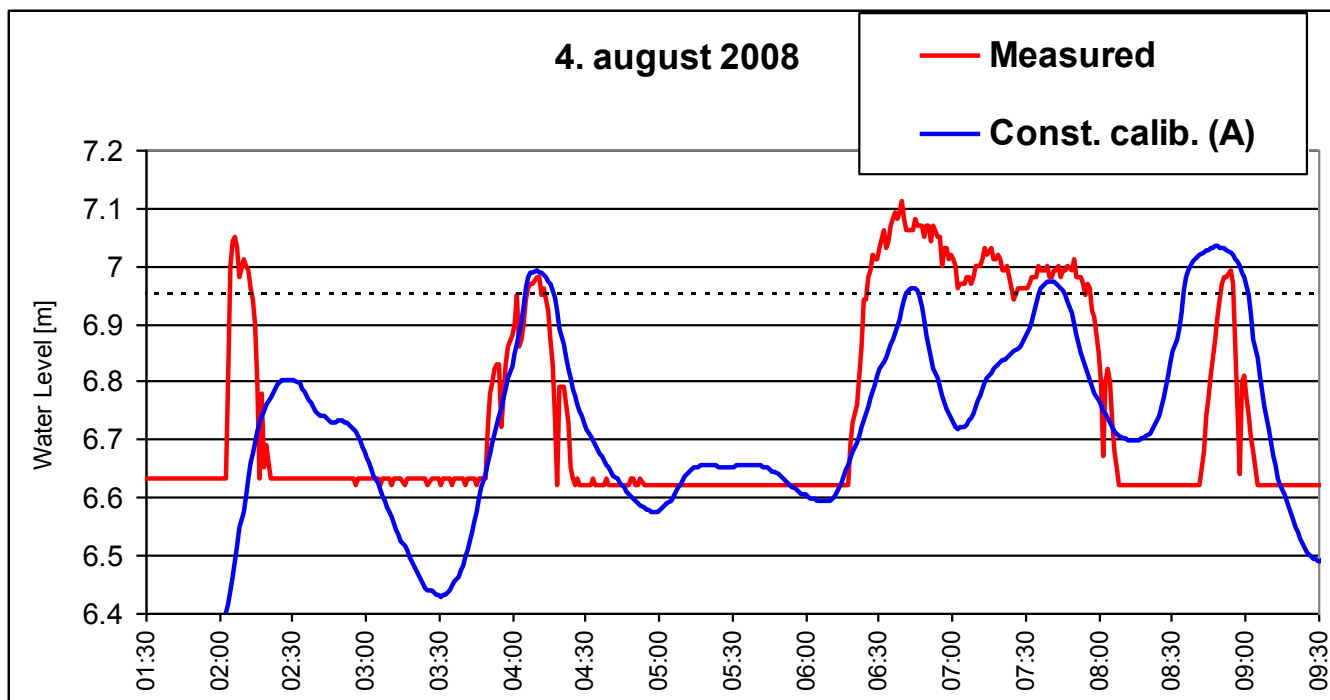
Above 1 mm/h

Mean Relative Error



Event the 4th of august

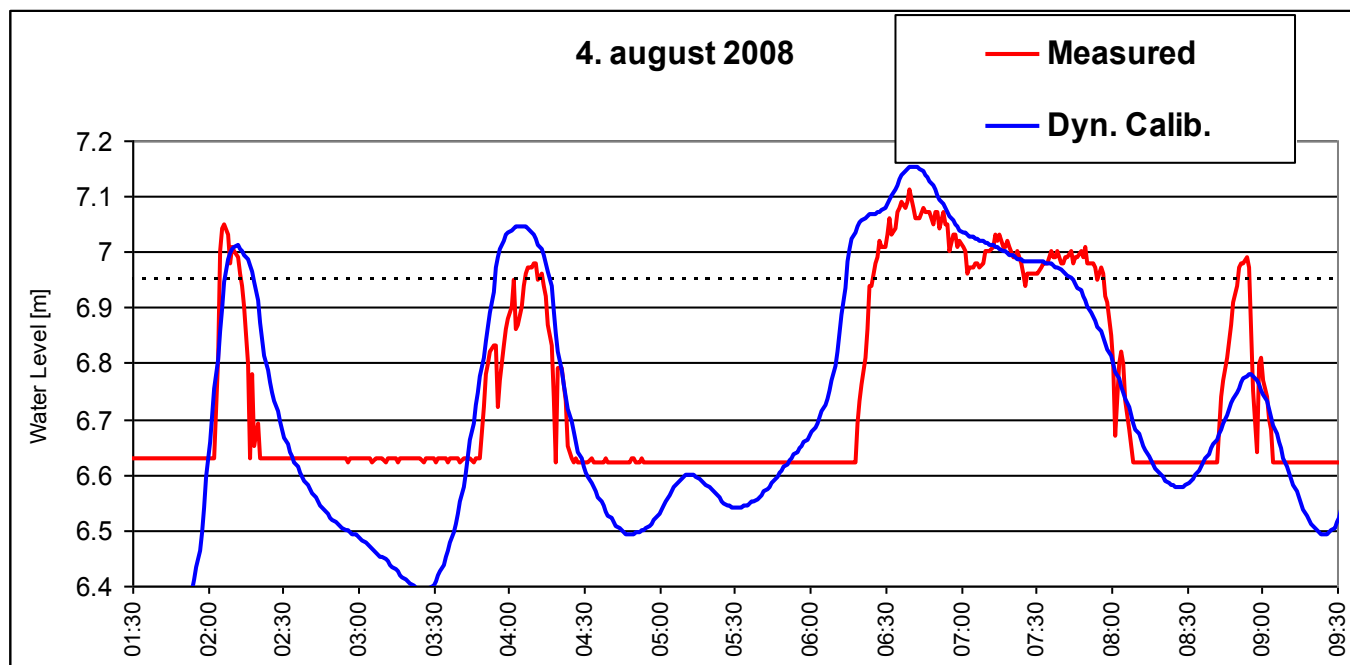
- Constant calibrated radar



- RMSE = 0.19

Event the 4th of august

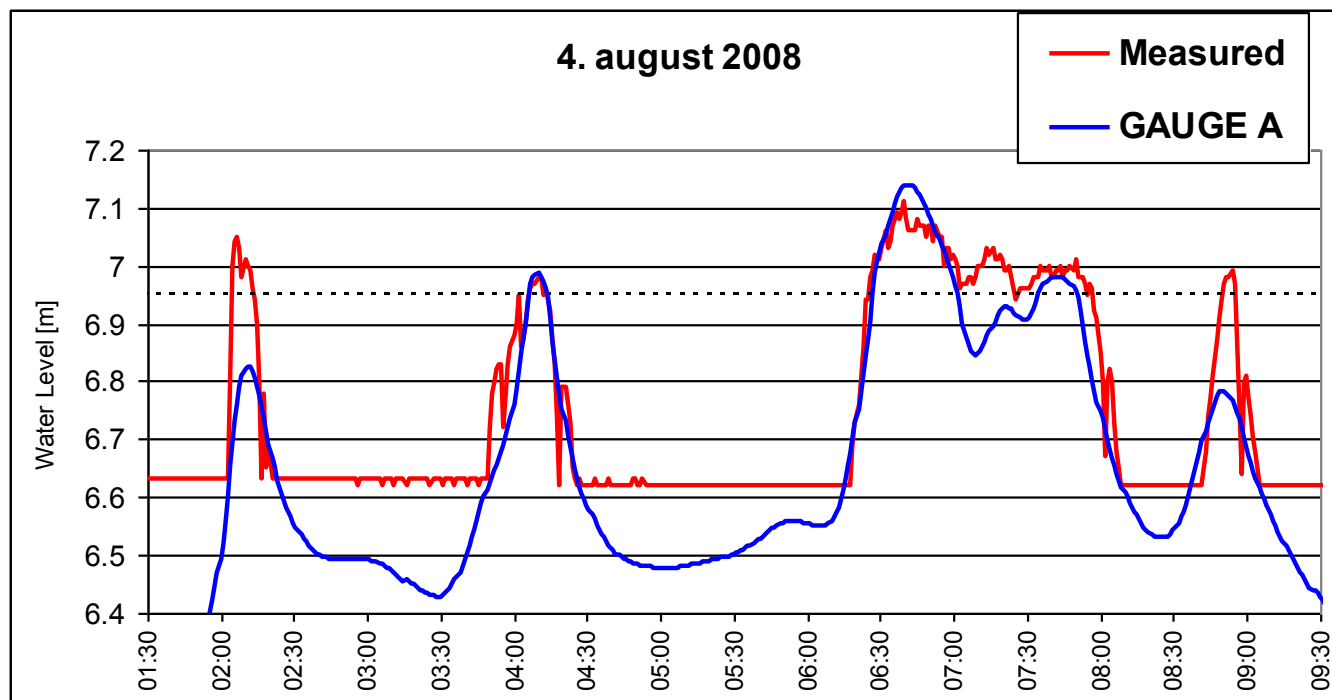
- Dynamically calibrated radar



- RMSE = 0.10

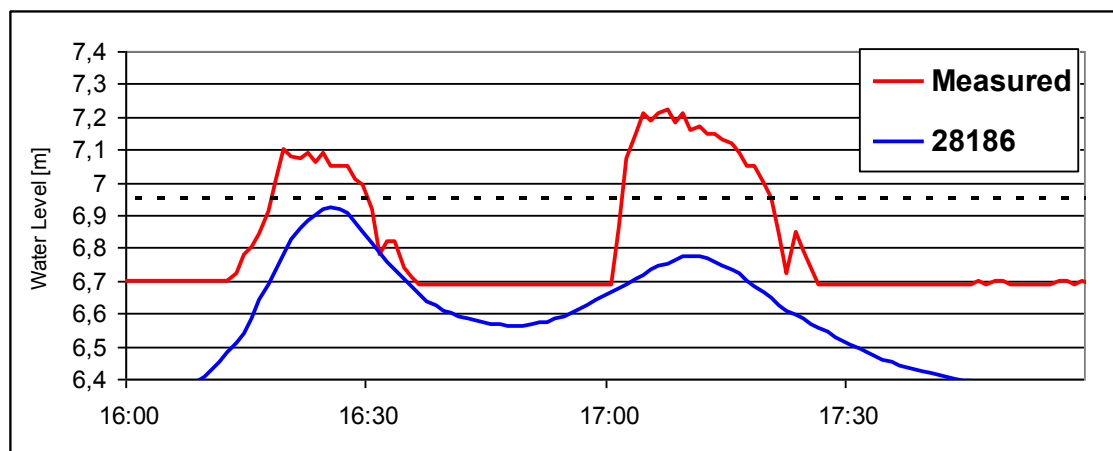
Event the 4th of august

- Rain gauge A



- RMSE = 0.10

Event the 21th of august

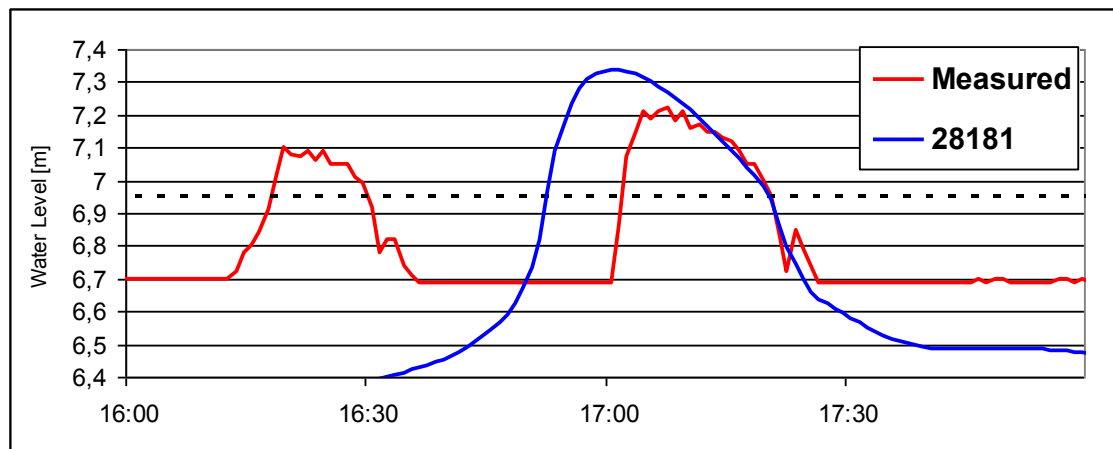


- RMSE = 0,29

Rain gauge depth: 2 – 7 mm

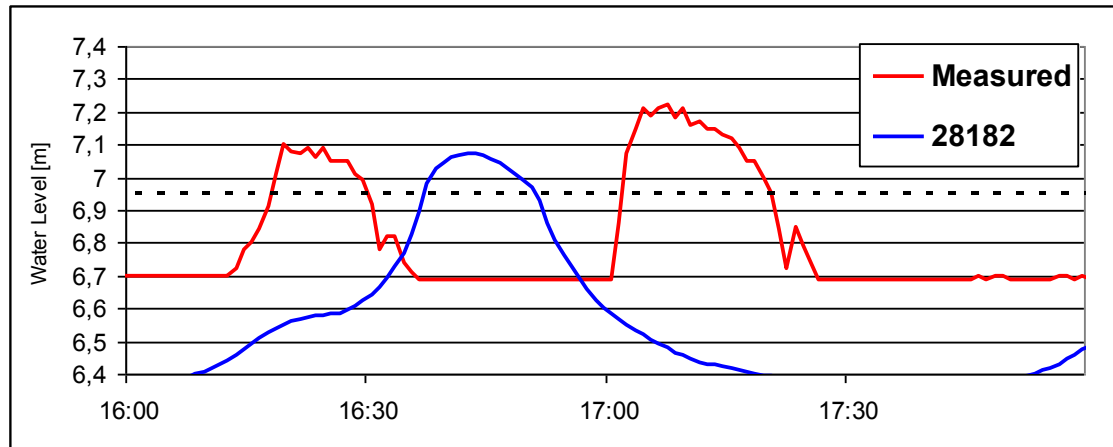
320 m³ of overflow

Event the 21th of august



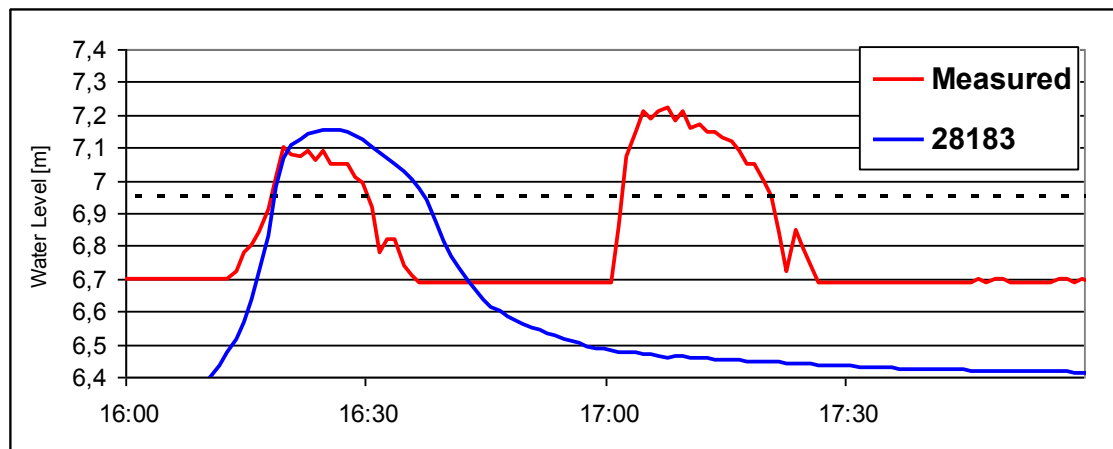
- RMSE = 0,41

Event the 21th of august



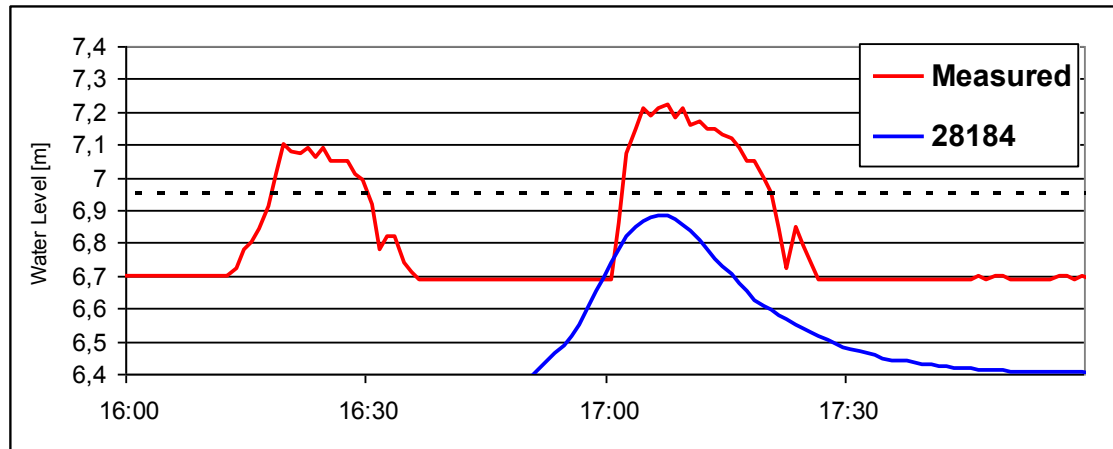
- RMSE = 0,52

Event the 21th of august



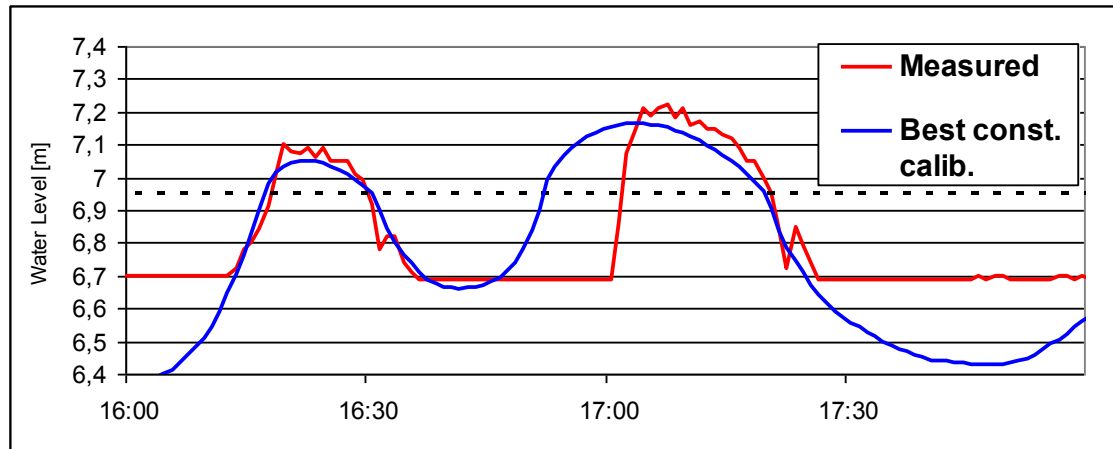
- RMSE = 0,45

Event the 21th of august



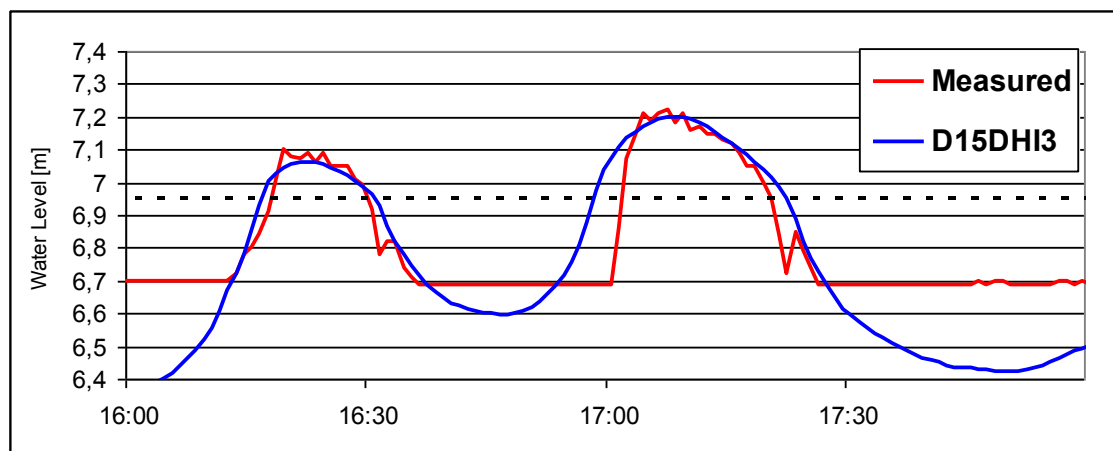
- RMSE = 0,48

Event the 21th of august



- RMSE = 0,10

Event the 21th of august



- RMSE = 0,09