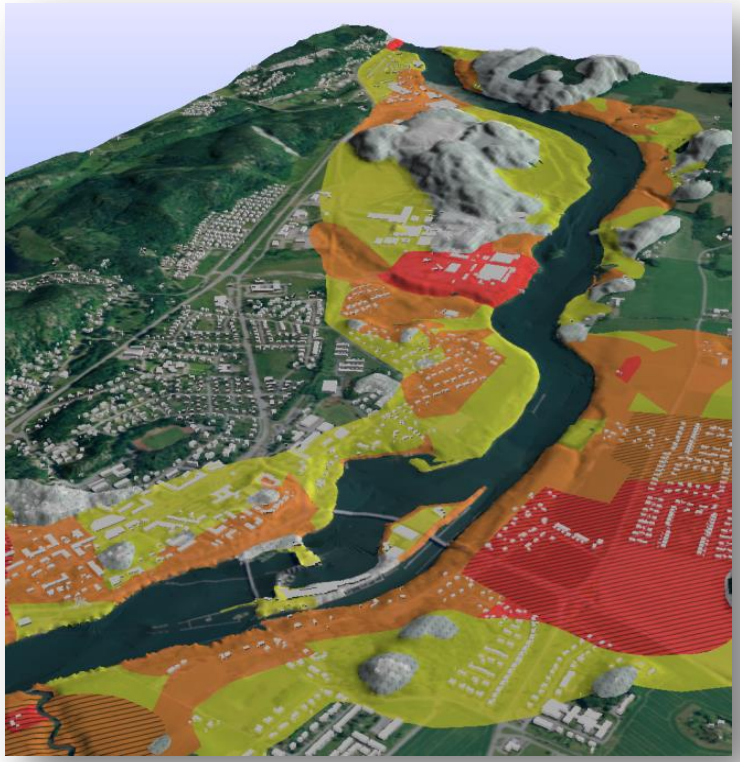
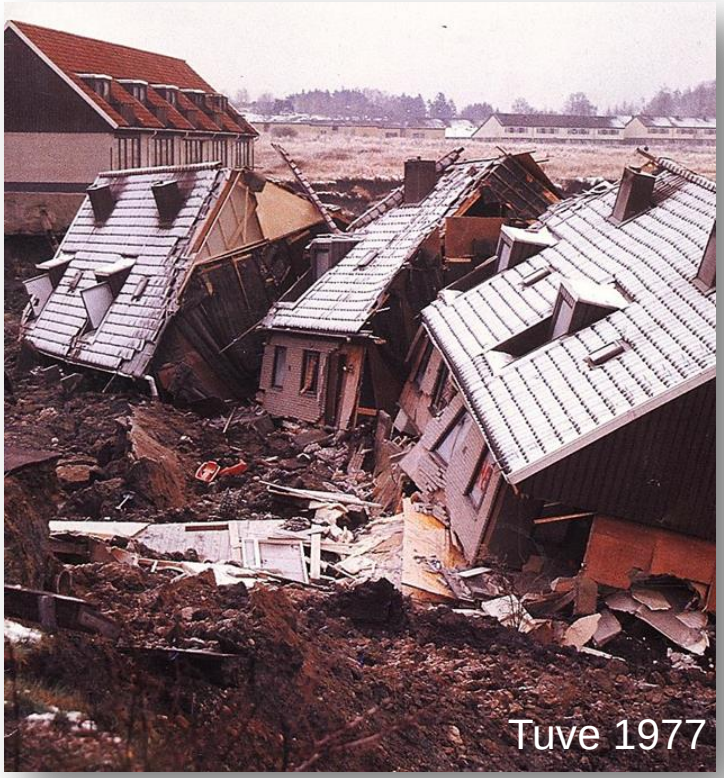
EWS for landslides in Sweden

from one governmental agency's perspective






Ånn 2006
Photo: Morgan Johansson

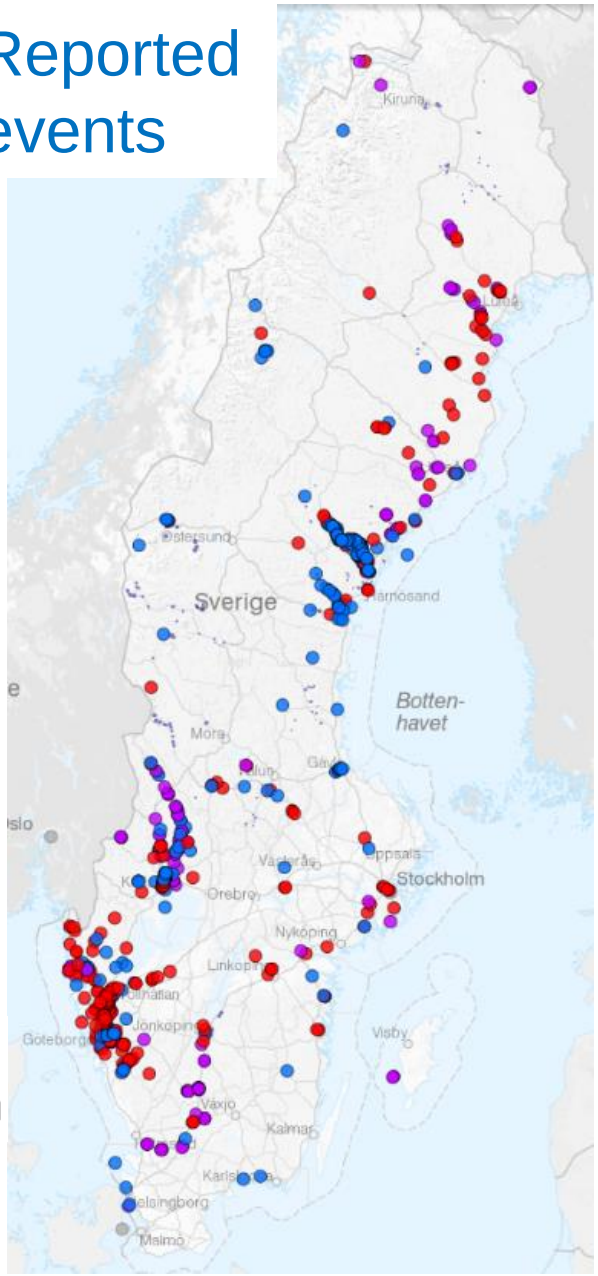
SGI

MSB Swedish Civil Contingencies Agency

SGU
Sveriges geologiska undersökning
Geological Survey of Sweden

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

Reported events



SMHI

National warning for weather events

Class 3: 50 yr water flow

Class 2: 70 mm in 24 hrs
10 yr water flow

Class 1: 35 mm in 12 hrs
2nd yr water flow

EWS in place

none

A study to optimize the benefit of SMHI's warning information for weather events in debris flow regions - SGI

- Background
- Interview study
- Detailed precipitation study in Åre
- Project outcome - suggetsions for the future

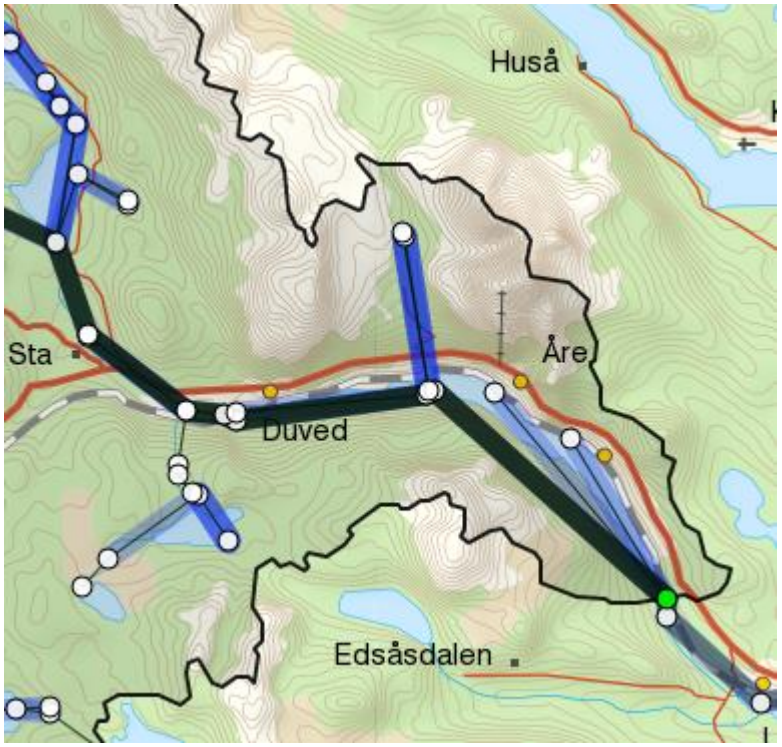
SMHI SGI

KARLSTAD UNIVERSITY

MSB Swedish Civil Contingencies Agency

Background

- What can we learn from abroad?
- How is the current warning information perceived and applied by municipalities?
- Is the currently avalilable weather data representative for Åre?



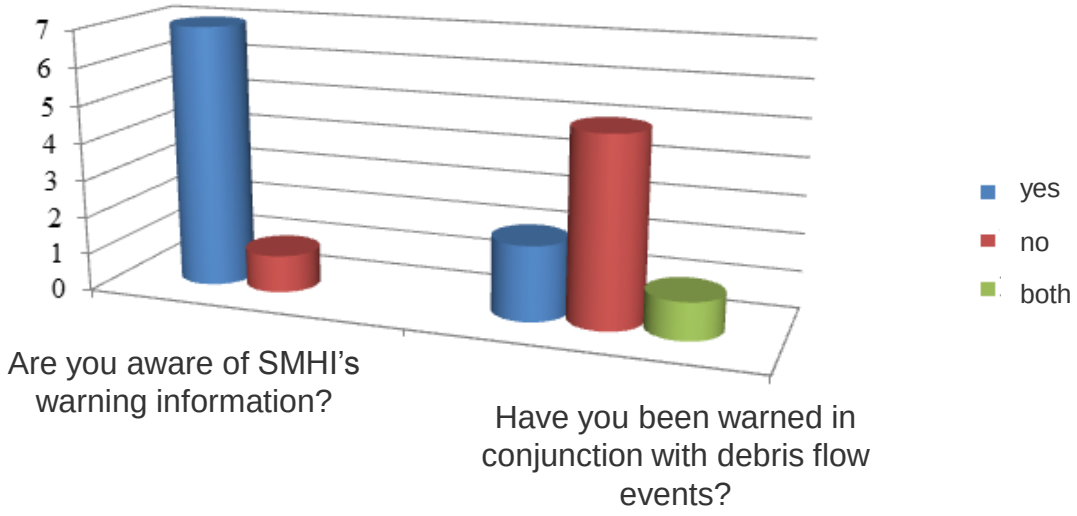
Interview study

10 municipalities with three or more vulnerable localities

Questions to municipalities:

- Knowledge about debris flows and SMHI's warning information
- Routines and behavior when warning is received
- Post-event evaluation of routines and actions
- Improvements

8 out of 10 municipalities responded



Are you aware of SMHI's warning information?

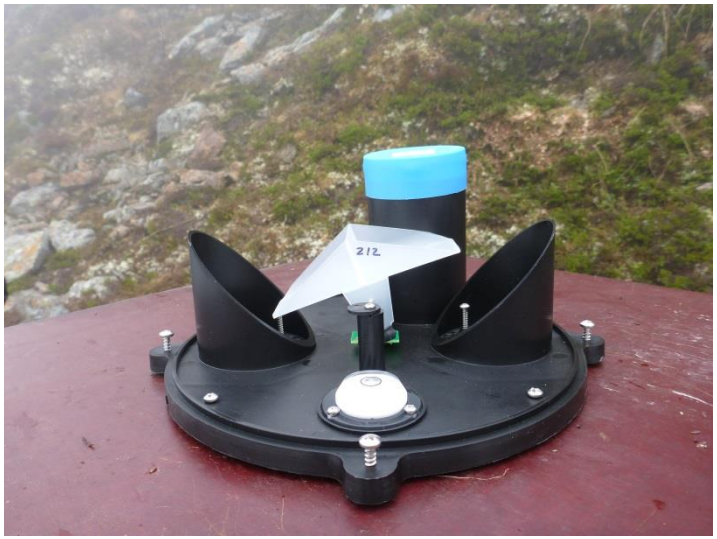
Have you been warned in conjunction with debris flow events?

Interview study

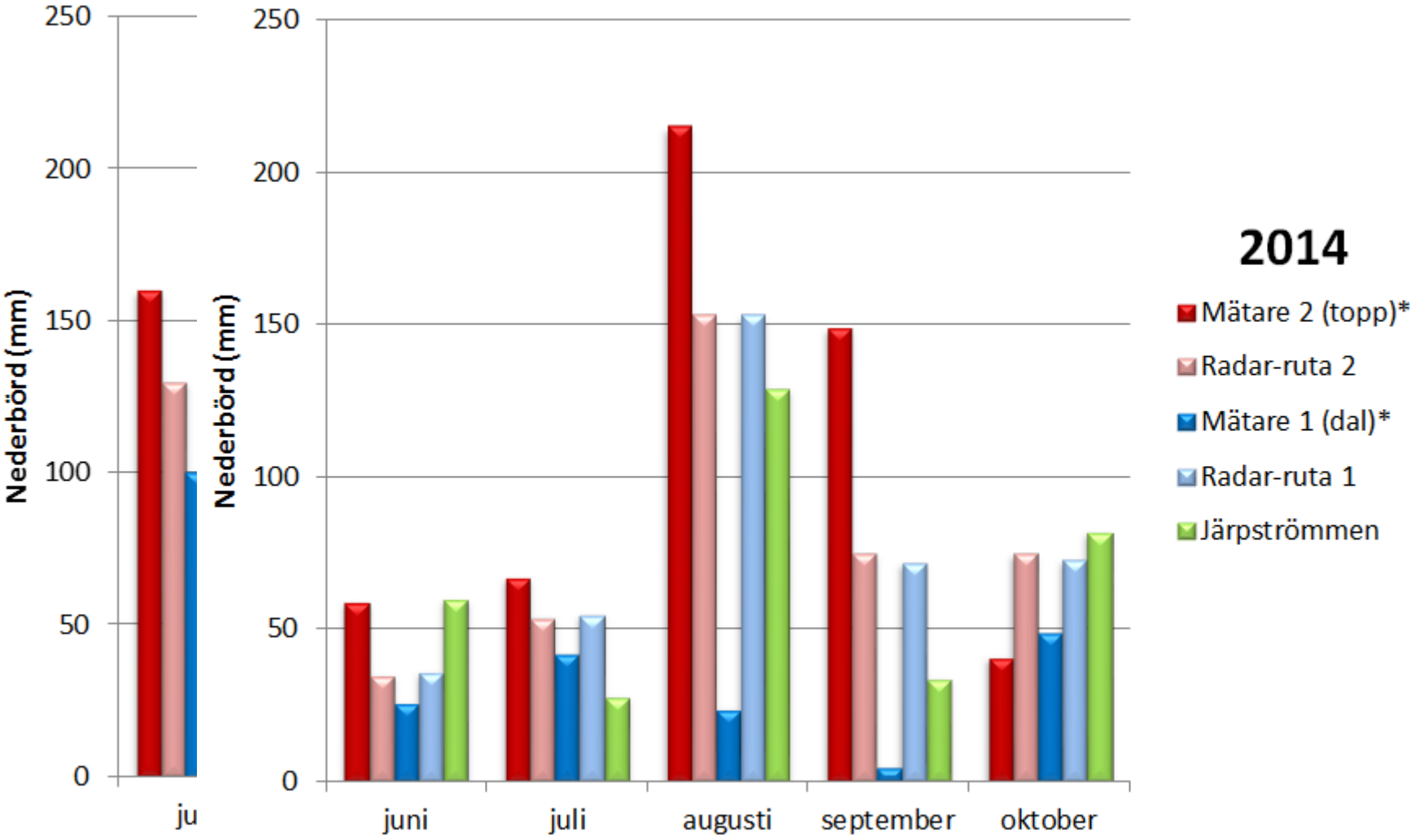
Conclusions:

- A need of improved resolution, especially for extreme rainfalls.
- High-resolution water flow forecasts are desirable, especially for vulnerable catchments.
- Proper response routines upon warning.
- Non-sufficient routines concerning post-event evaluation.

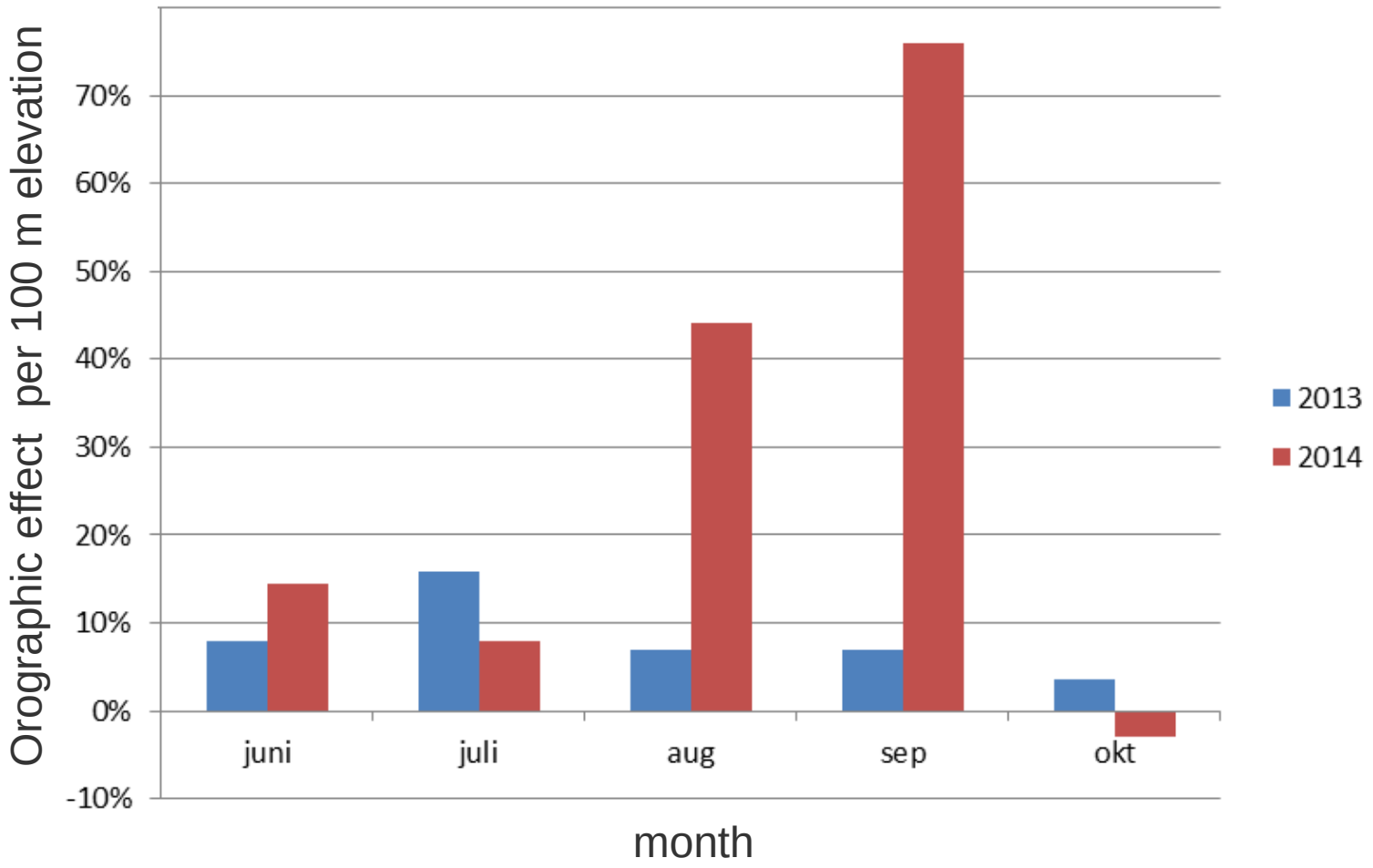
Detailed study Mörvik river catchment in Åre – precipitation measurements



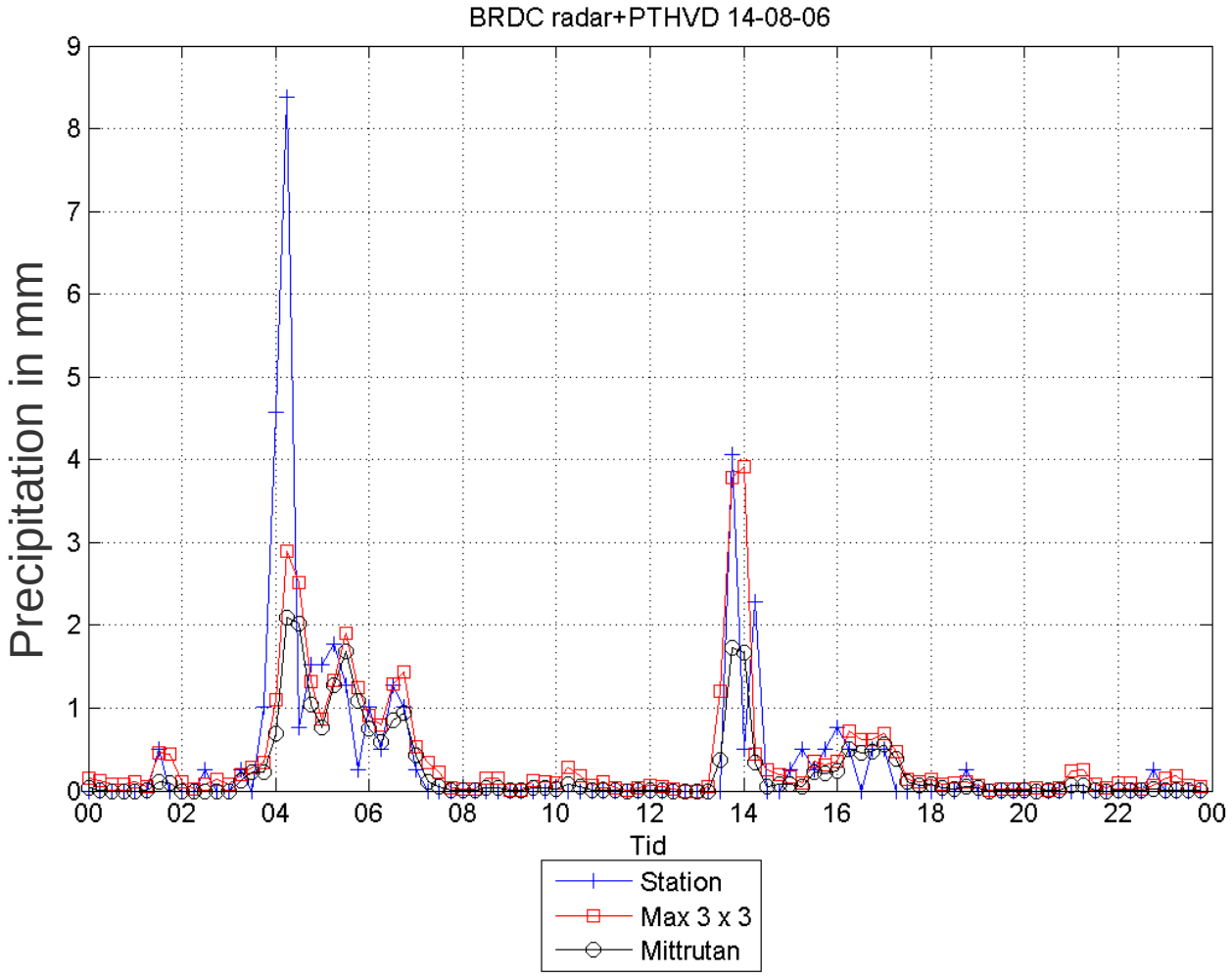
Comparison with currently available data



Orographic effect



Comparison for one single event
data from radar versus temporary station



Detailed study Mörvik river catchment in Åre – precipitation measurements

Conclusions:

- Automatic weather stations nearby not representative for the Mörvik river catchment.
- A general estimate of 10% for the orographic effect not suitable here and should be used with caution in the mountain regions.
- Follow-up of extreme rainfall events should be based on data with at least 15 minutes resolution.

Suggestions of future work – goal…

- Municipitalities with debris flows are aware of the hazards and work with preventive measures.
- Governmental agencies have relevant knowledge about debris flows and their triggers, and work actively with knowledge transfer.
- Governmental agencies act based on the experiences and knowledge of the municipalities
- Adequate warning information for extreme rainfall in place, which considers debris flows as a consequence and takes into account local conditions.

Suggestions of future work – …and actions

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- Governmental agencies have relevant knowledge about debris flows and their triggers, and work actively with knowledge transfer.
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Municipalities
- Investigate the risk
- Cost benefit analysis
- Action plan
- Monitoring & evaluation

Governmental agencies
- Guidelines for preventive measures
- Improve the warning information
- S-HYPE models, vulnerable catchments
- Weather stations in top regions

Research and development
- Improve local or regional rainfall forecasting in regions with pronounced relief
- Standardized method for gathering statistics in small municipalities

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