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From manual to automatic precipitation measurement

One of DMI's modernisation strategy goals is, only to use automatic stations to perform ground measurements. In order to comply with the strategy DMI is currently working on replacing manual precipitations measurements with an automatic precipitation system.

The upcoming system will consist of a combination of ground measurements provided by a number of (different) automatic precipitation gauges combined with radar data.

The poster only describes the precipitation gauge part of the upcoming system: The transition process of reducing the station net density from around 500 manual stations couple of years ago to 150 manual stations today and down to approximately 100 automatic stations in the very near future (couple of months).

From Manual to Automatic Precipitation Measurement

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INTRODUCTION

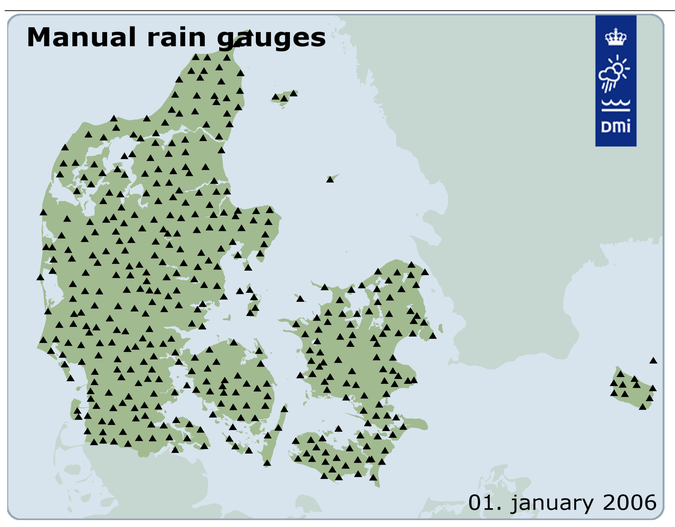
DMI's modernization strategy sets as one of its goals to automate ground-based measuring of parameters. Currently, it is the manual precipitation gauges (Hellmann) that have to be replaced with some kind of automatic system. The result will most likely be a radar product calibrated with ground-based measurements. This poster only covers the ground based measurement part of the project.

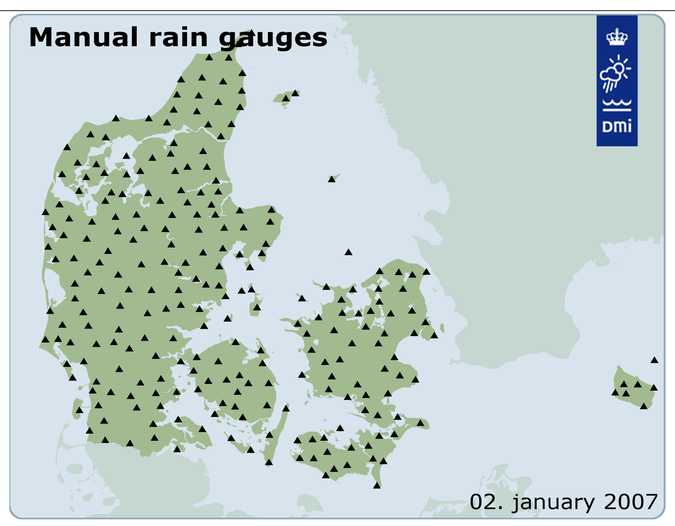
DMI has access to data from a couple of automatic networks:

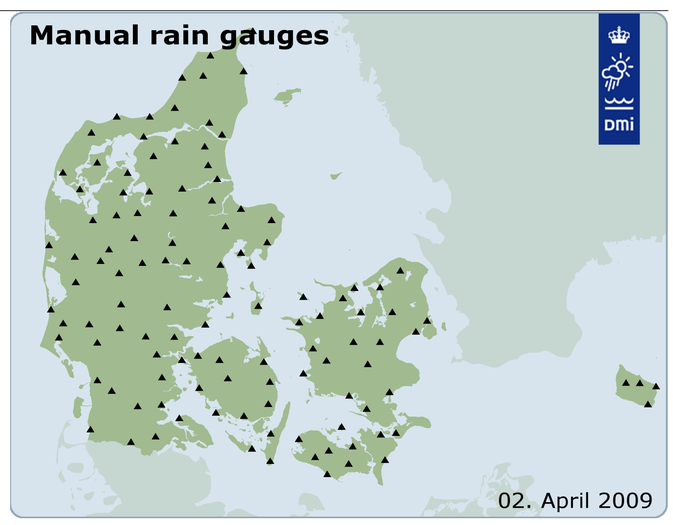
- DMI's own network of automatic GEONOR / RIMCO gauges (~31 stations)
- SVK network (Dense network within urban areas for control of wastewater flow—RIMCO Tipping bucket / intensity) (~120 stations)
- A number of airport stations (~9 stations, Different measuring methods: Thies, GEONOR, RIMCO)

The main task is to evaluate the data and meta-data from the stations and to decide which stations and locations to use in a future network.

TIMELINE (MANUAL RAIN GAUGES)





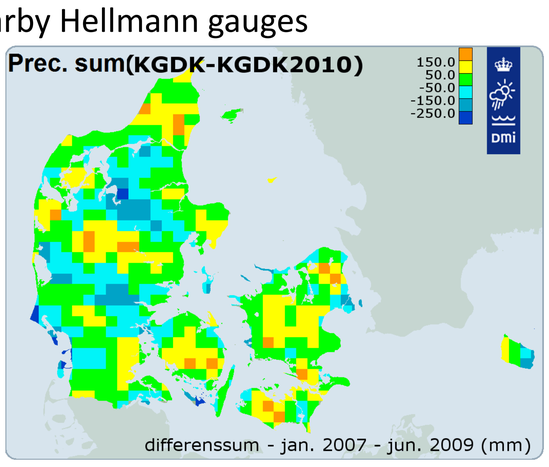


Year	*2006*	*2007*	*2009*
No. Stations	*414*	*248*	*117*

PROCEDURE

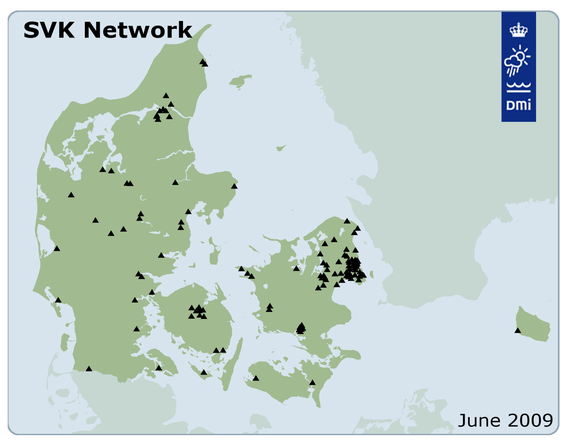
Tasks

- Geographic positions and locations were evaluated (attempting even distribution)
- Time series comparison of stations with nearby Hellmann gauges
- Spatial simulation and comparison with al ready existing products (10x10km grid) (Se figure —>)



Challenges

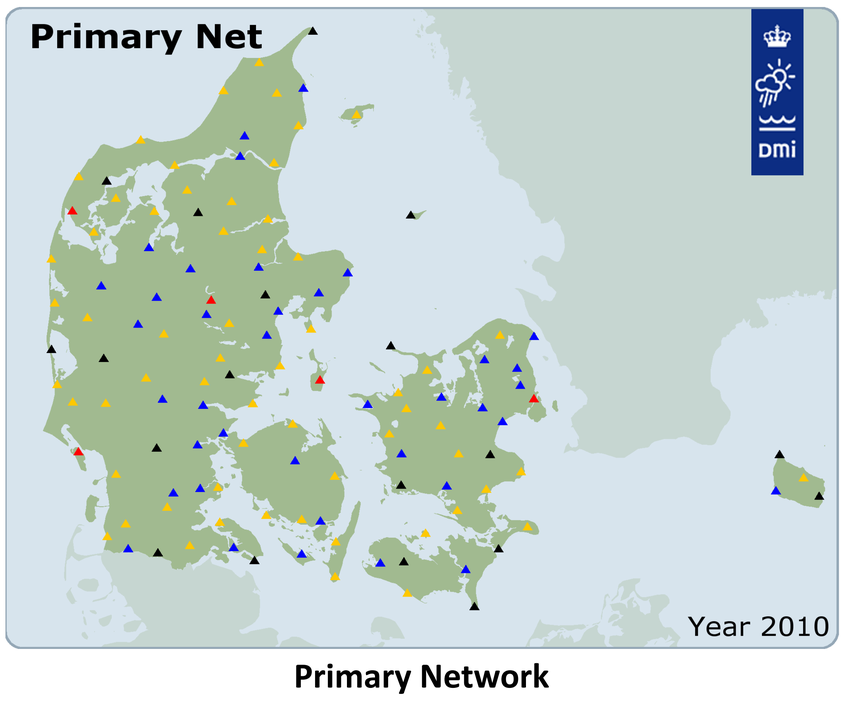
- Station networks of varying density (See figure —>)
- Station networks with different instruments
- How suitable are the current locations ?
- How are the installations made? (Known examples of same type of instrument measuring perfect at one location but with large deviation at another)



RESULT

The resulting network consists of two sets of stations:

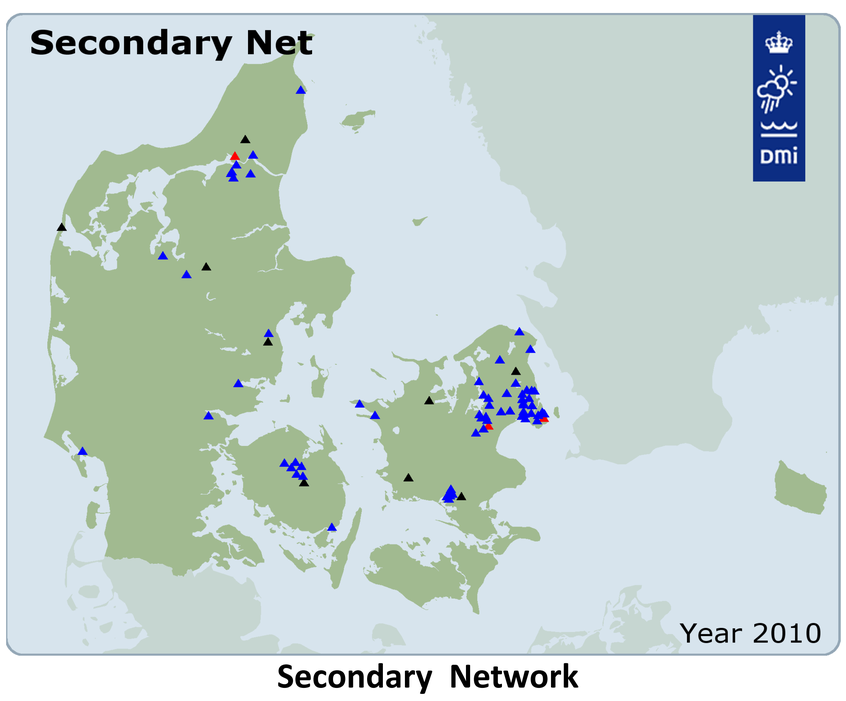
A primary set, geographically evenly distributed, carefully chosen and a secondary set which contains stations that are not necessary for operation but since they exist, their data can be used.



Primary Network

Primary:

- **Hellmann - 5 long-term**
- **GEONOR - 22**
- **RIMCO - 34**
- **OTT Pluvio - 60**



Secondary Network

Secondary:

- **GEONOR - 9**
- **RIMCO - 63**
- **Thies - 3**