Nowcasting system at Danish Meteorological Institute

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What is nowcasting?

Nowcasting is forecasting of the weather right now and some hours ahead

Outline

- Users of nowcasting

- Nowcasting model

- Focus on data-Assimilation

- Output to the users

Users of nowcasting

- Road condition model

- Waste water/Water management

- Energy forecasts

- Agriculture

- Weather service/Aviation
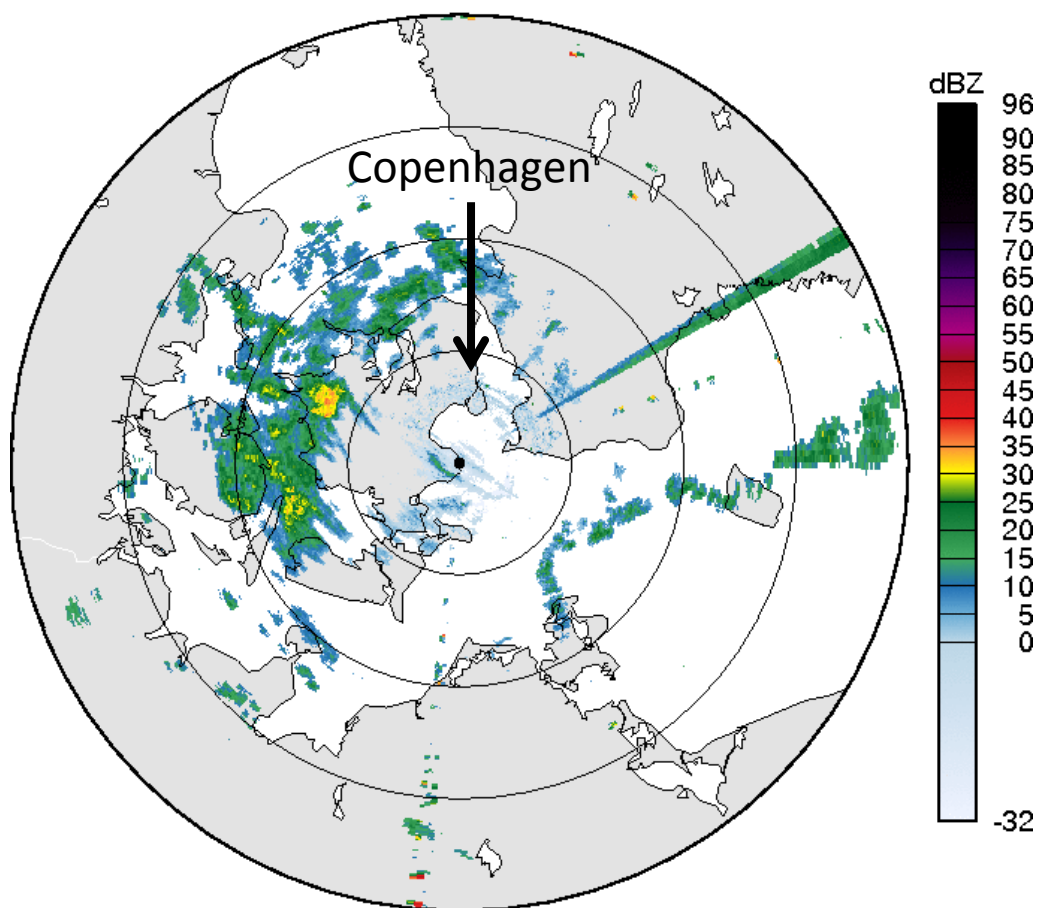
- You and me

Nowcasting is needed

In fact improved water management was very much needed 2 July 2011

The challenge
How to integrate frequent/high resolution observations into NWP

Stevns reflectivity 201107021000

Nowcasting model

- NWP as engine

- Deterministic approach

- Frequent short range forecasts

- Focus on data-assimilation

Use of observations in the NWP

- Surface analysis(Optimal interpolation type)
  - Soil moisture
  - Surface temperature
    - Sea/lake surface temperature
    - Land surface temperature
  - Snow depth
- Free atmosphere analysis (3D-VAR type)
  - Temperature
  - Humidity
  - Wind
  - Surface pressure
- Rain/Snow intensity and cloud cover (Nudging type)
  - Passive clouds
 - Active clouds
    - Stratiform
   - convective

Model setup
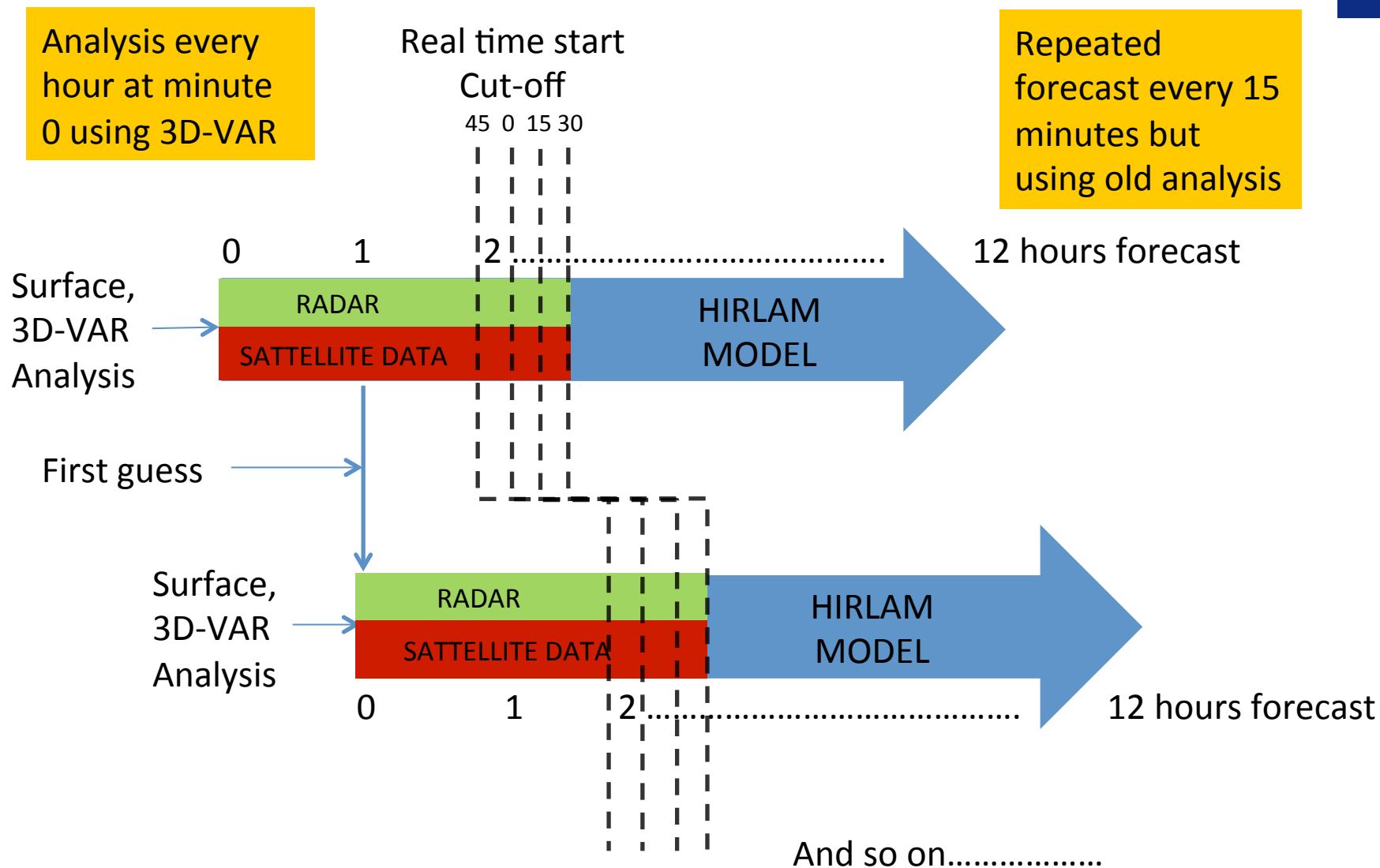
Assimilation of radar and satellite data

- Active clouds
  - Radar data
    - Adjustment of convergence/divergence
    - Adjustment of specific water vapor content
- Passive clouds (Non precipitating)
  - MSG2 SAF products and observations of cloud cover and cloud base
    - Adjustment of specific water vapor content
    - Adjustment of specific cloud water content
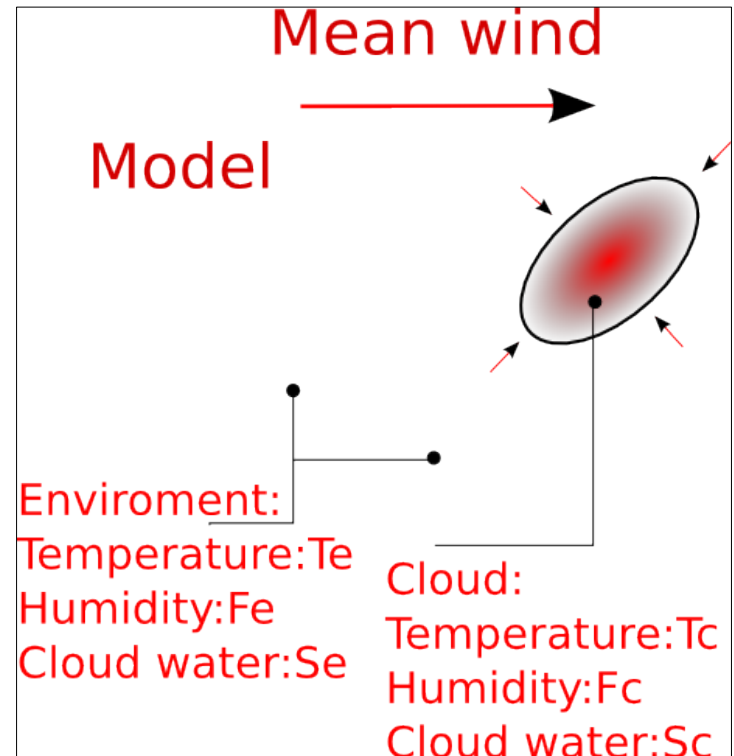   - Adjustment of cloud temperature

Increase precipitation through dynamic forcing
3D perspective
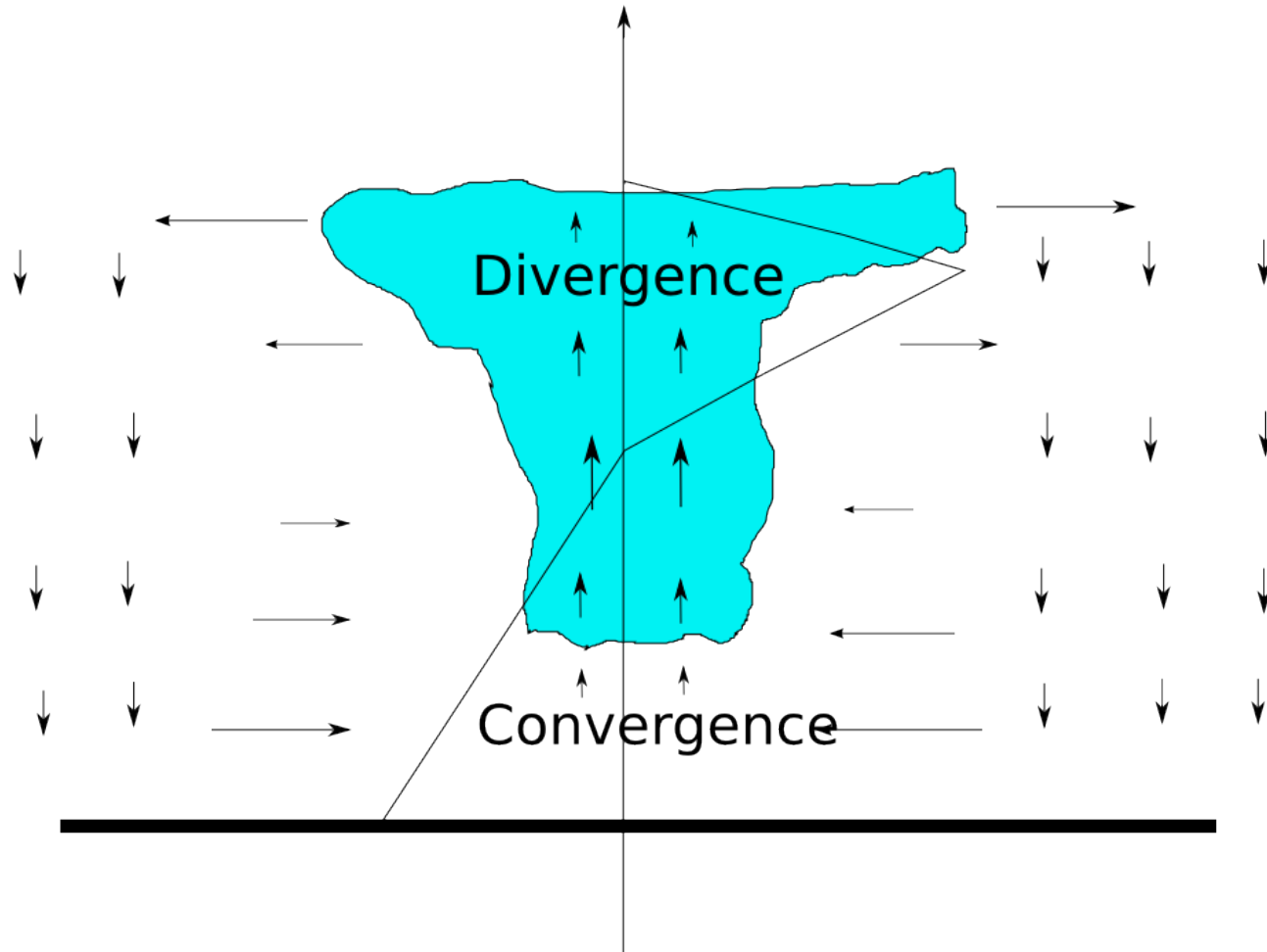
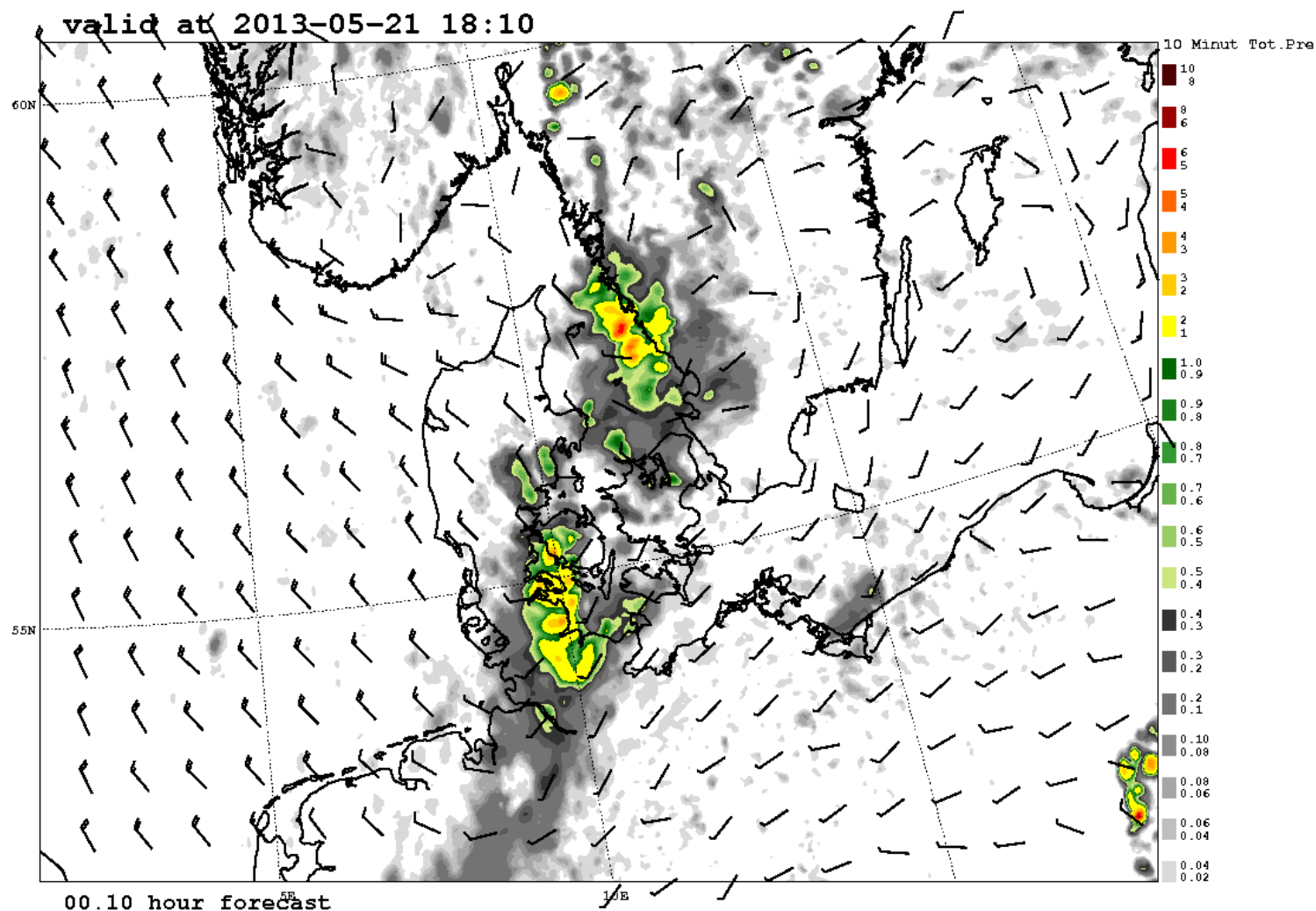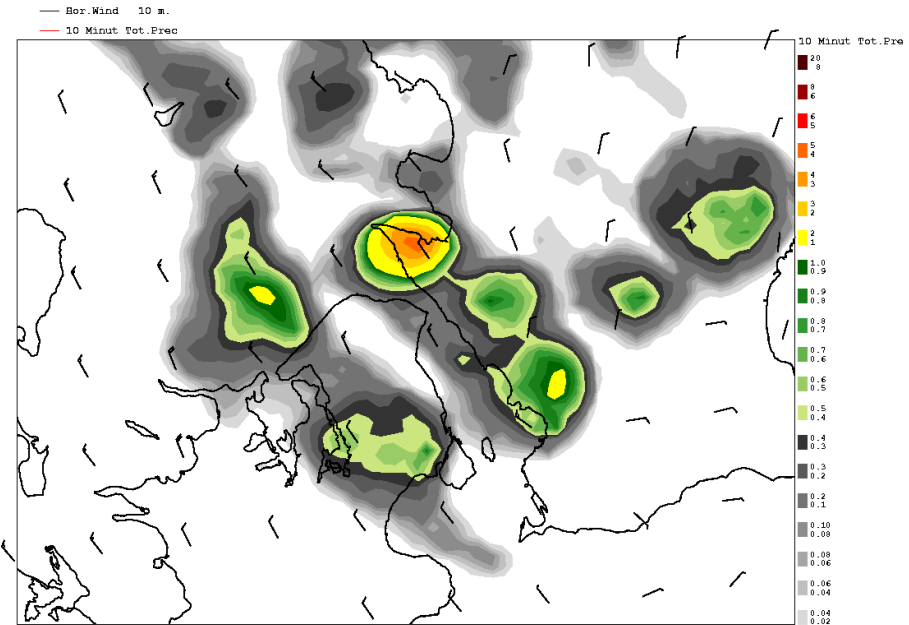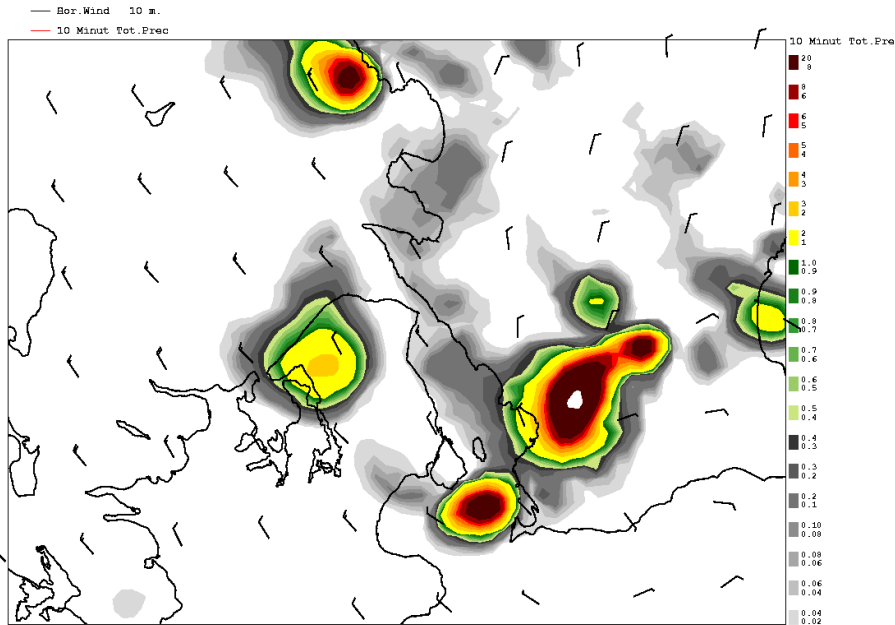# Increase precipitation through dynamic forcing
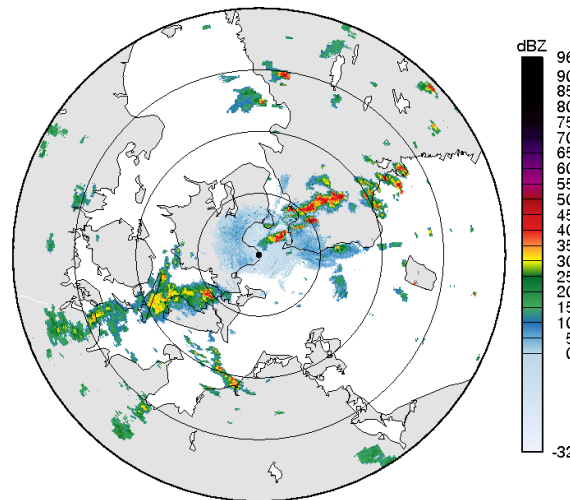# 2D perspective
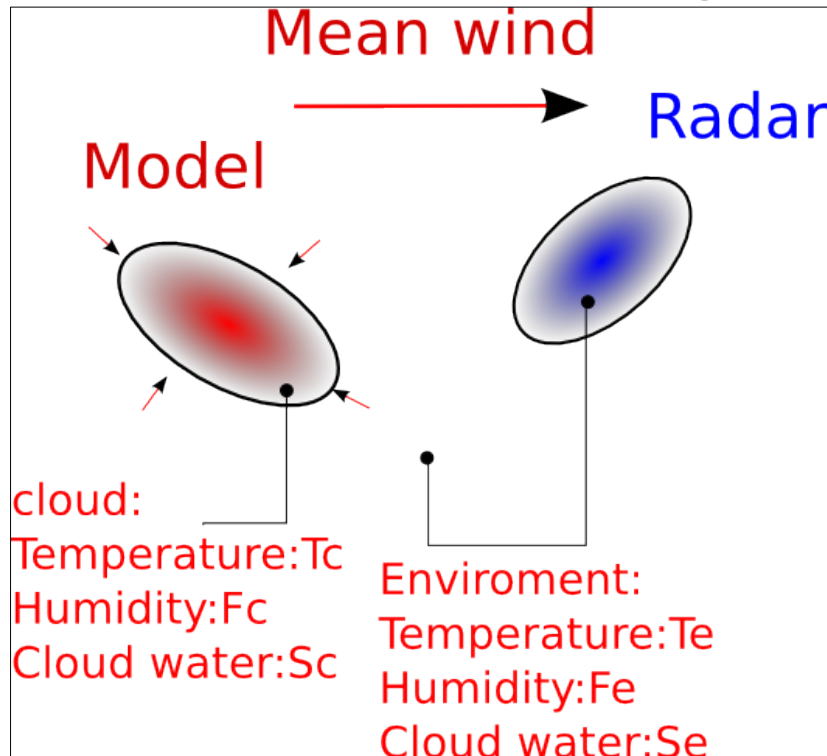
Initial state

After correction

Output

NWP: 10 minutes rain and 10 m wind

Flooding case 2 July 2011

Stevns reflectivity 201107021510

Thank you
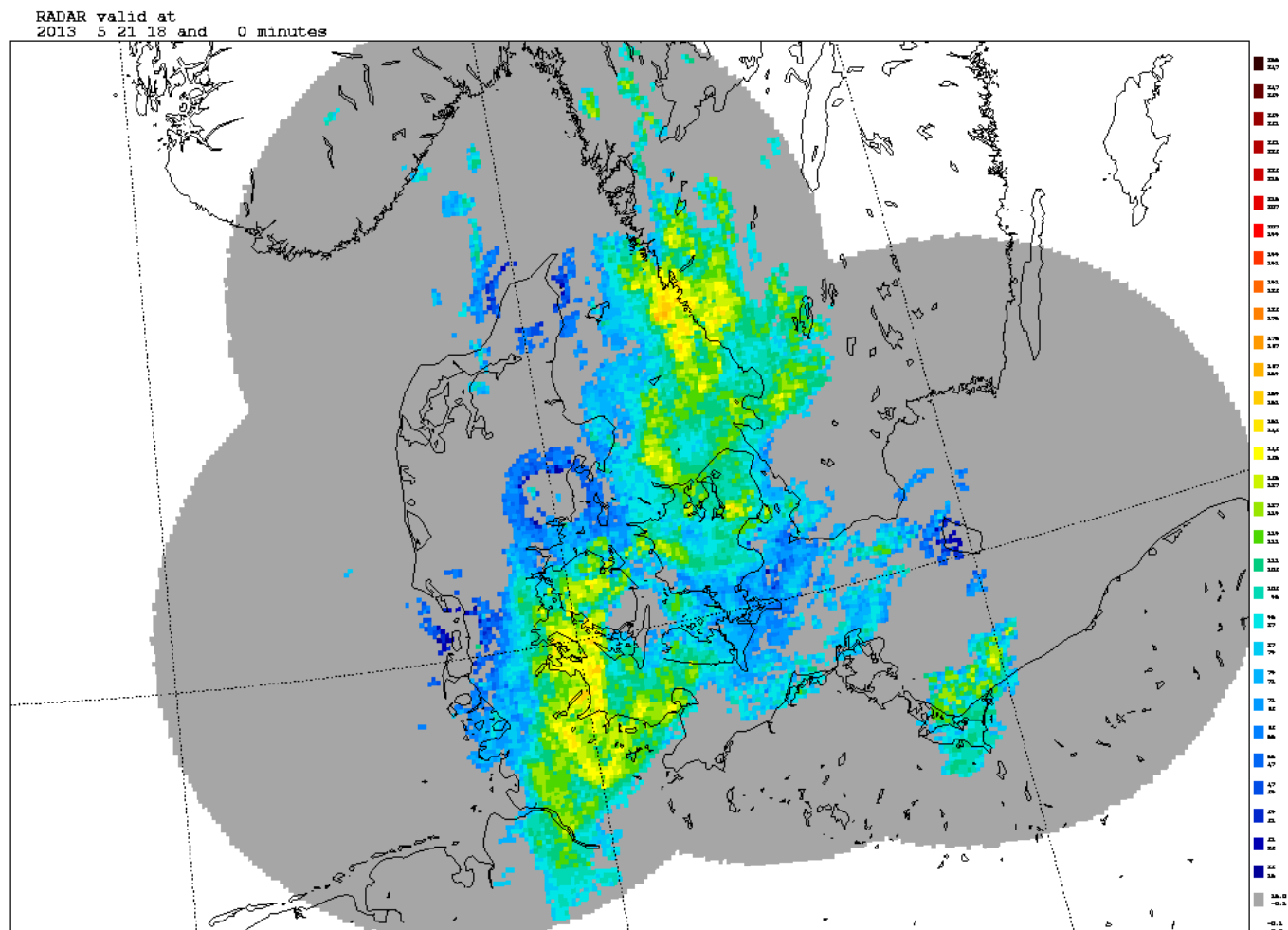# for your attention
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(Extra slide)Input

Rader

RADAR valid at
2013 5 21 18 and   0 minutes

(Extra slide)Input
Cloud mask from MSG-2