

Running the SILAM model comparatively with ECMWF and HIRLAM meteorological fields

A case study in Lapland



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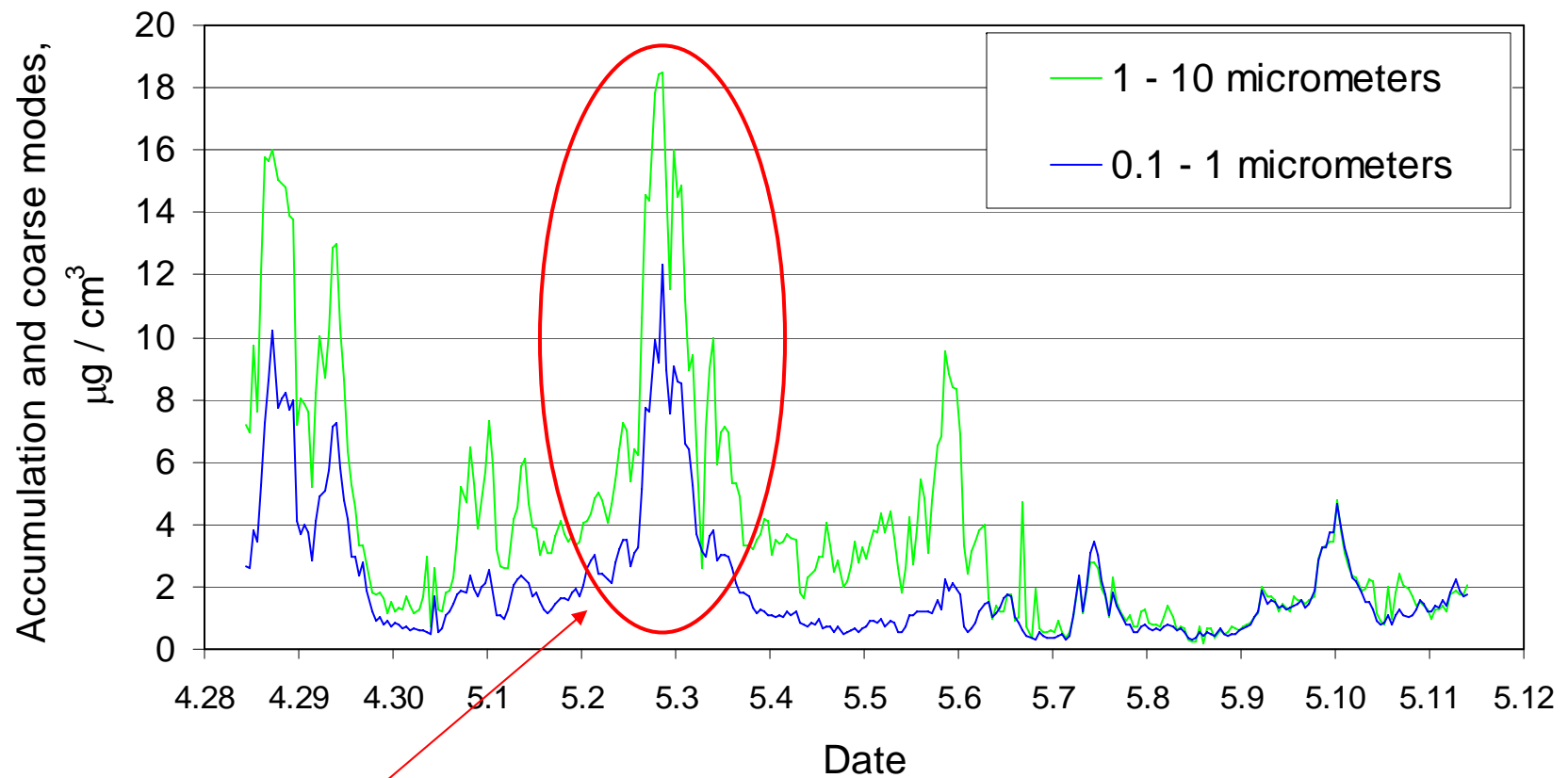


Monitoring station:
aerosol size
distribution

3 nm – 10 μm , SO_2

April 28 – May 11
2003

Measurement record: coarse and accumulation mode aerosol

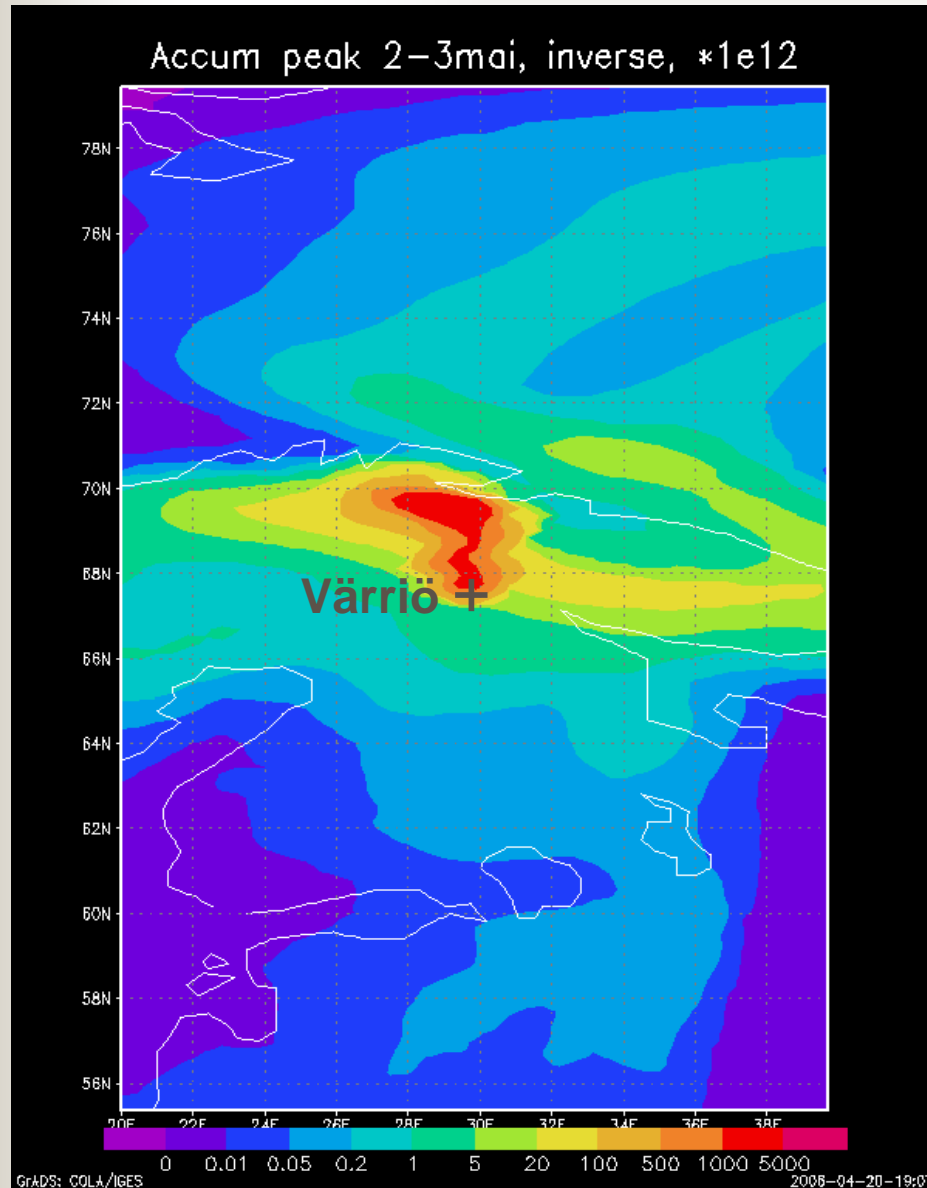


We focus on this peak: where it came from?



SILAM (FMI):

- Version 3.7 (released 2005) –
Lagrangian kernel (particle model)
- Version 4.0 (released late 2006 for testing):
Lagrangian kernel
Eulerian kernel



Running SILAM in adjoint mode:

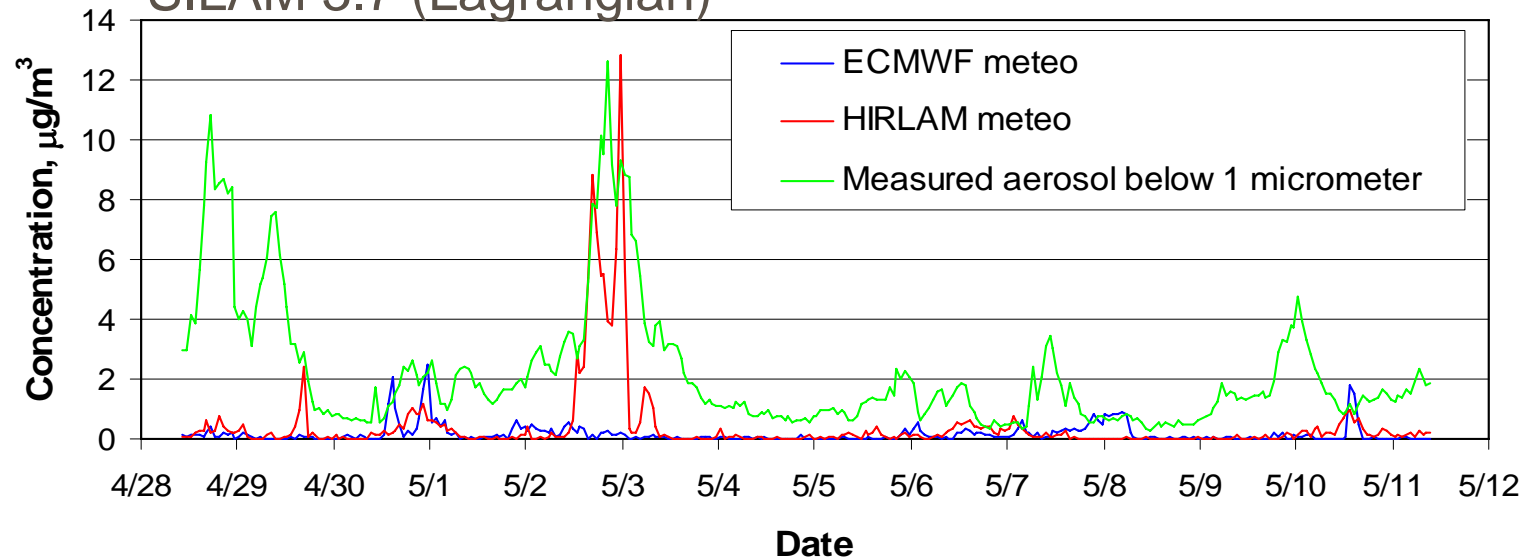
Area, where the accumulation mode particles came from.

Meteorological data from HIRLAM, FMI

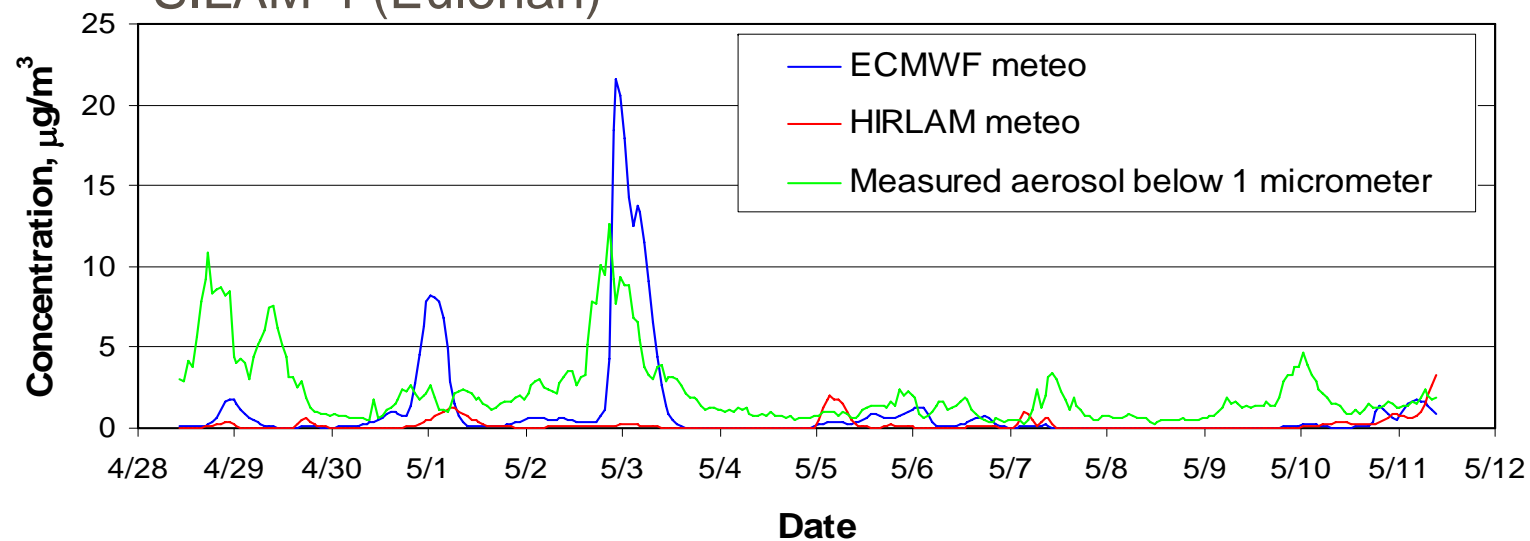
SO₄, SILAM runs in direct mode

(with improved EMEP database of sources)

SILAM 3.7 (Lagrangian)

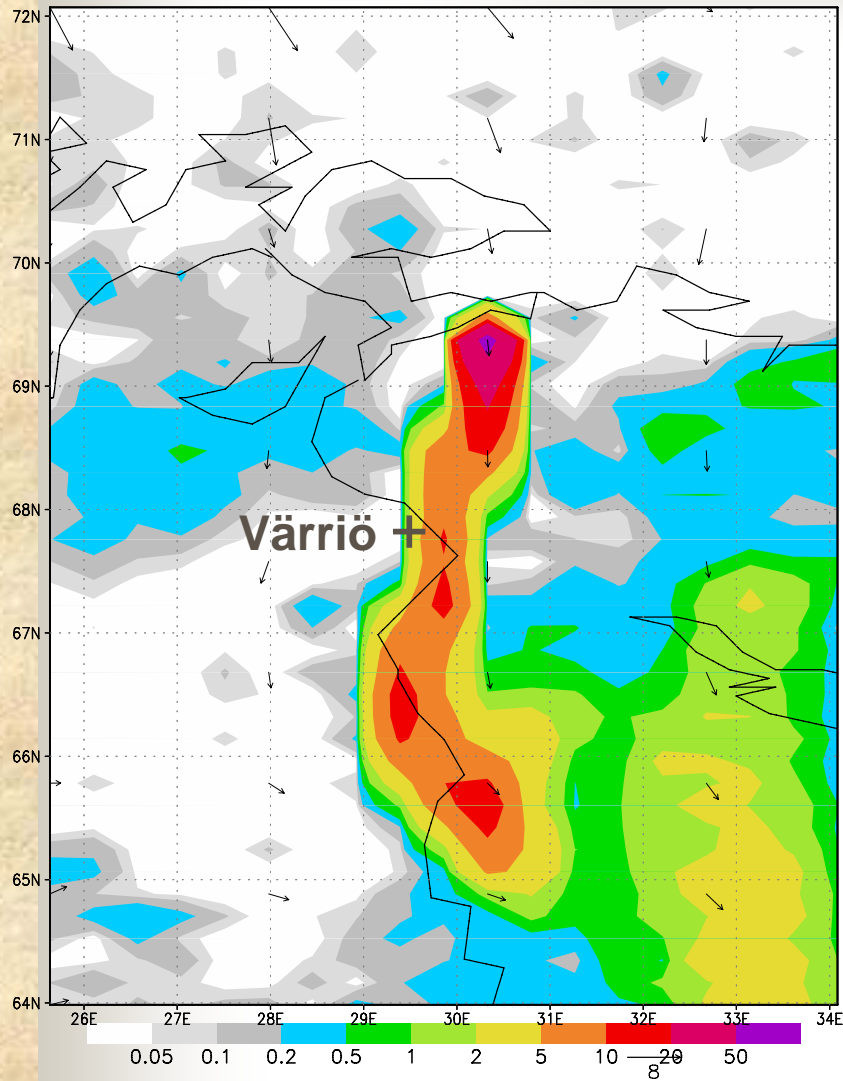


SILAM 4 (Eulerian)



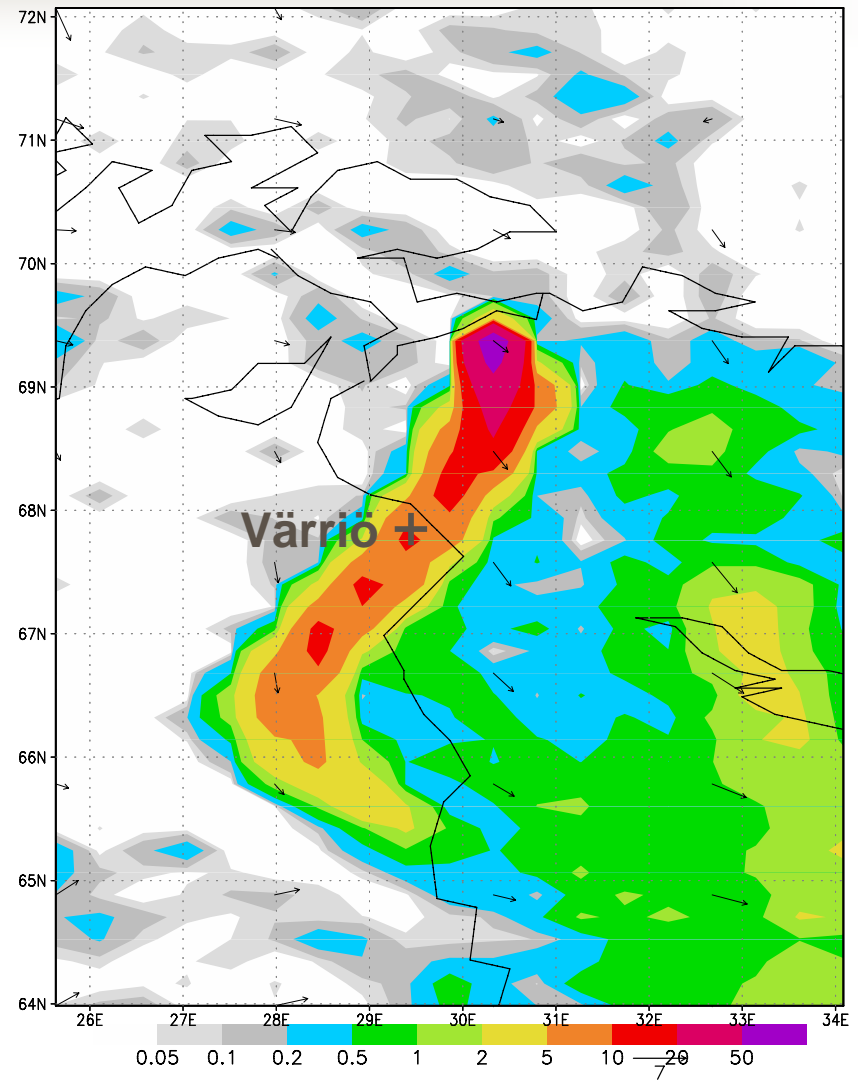
SILAM 3.7 (Lagrangian), SO₄ surface level

Level 1, 25m, 00Z03MAY2003



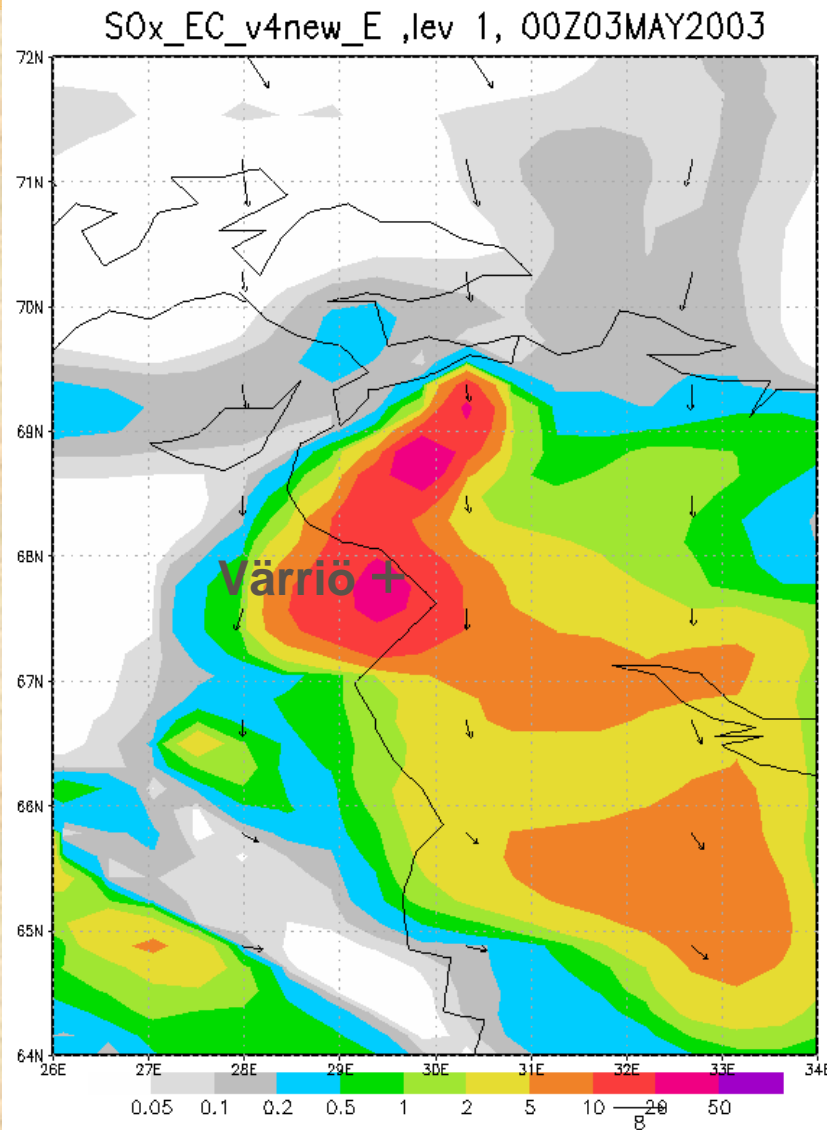
a) ECMWF meteo

Level 1, 25m, 00Z03MAY2003

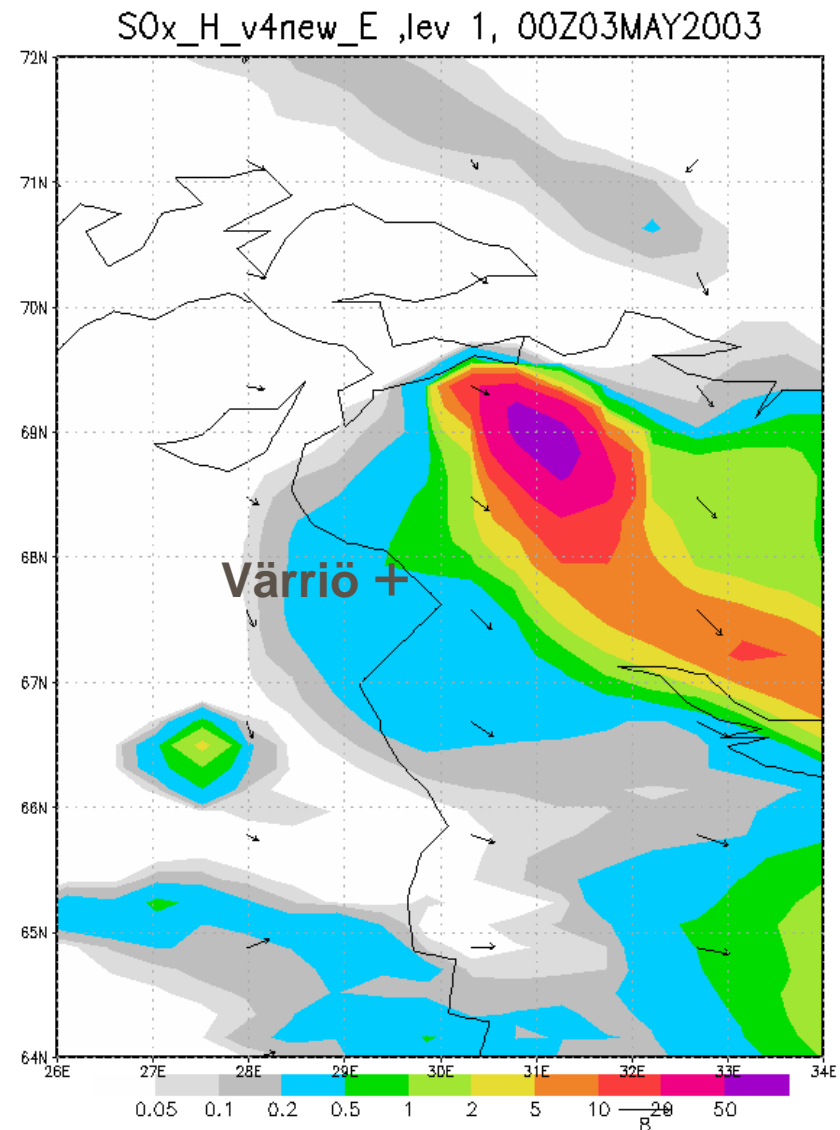


b) HIRLAM (FMI) meteo

SILAM 4 (Eulerian), SO₄ surface level



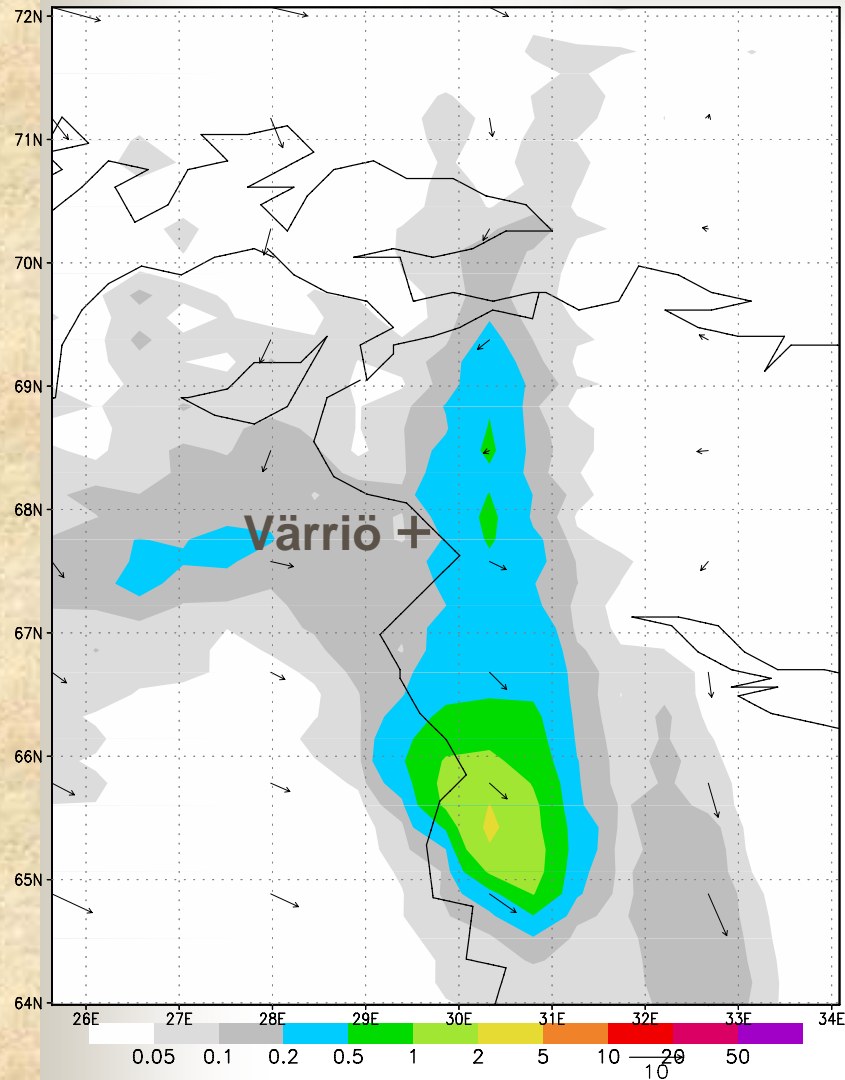
a) ECMWF meteo



b) HIRLAM (FMI) meteo

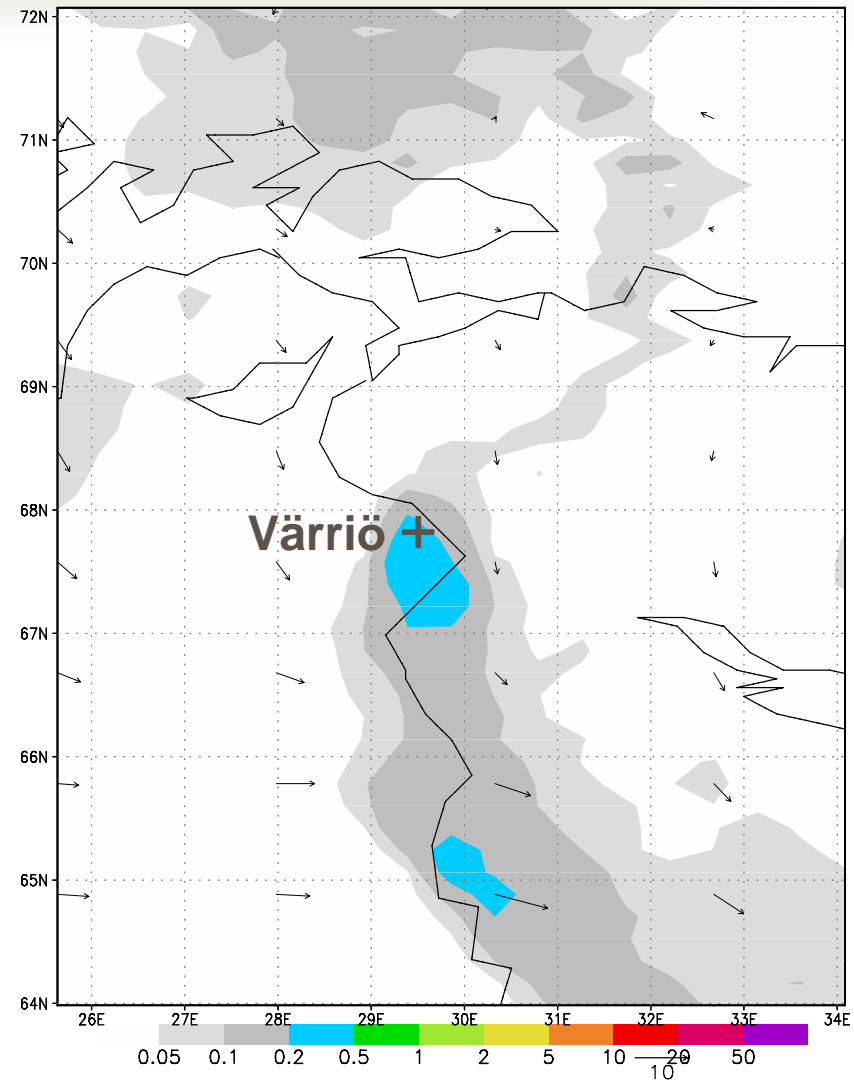
SILAM 3.7 (Lagrangian), SO₄ lower free troposphere

Level 5, 1850m, 00Z03MAY2003



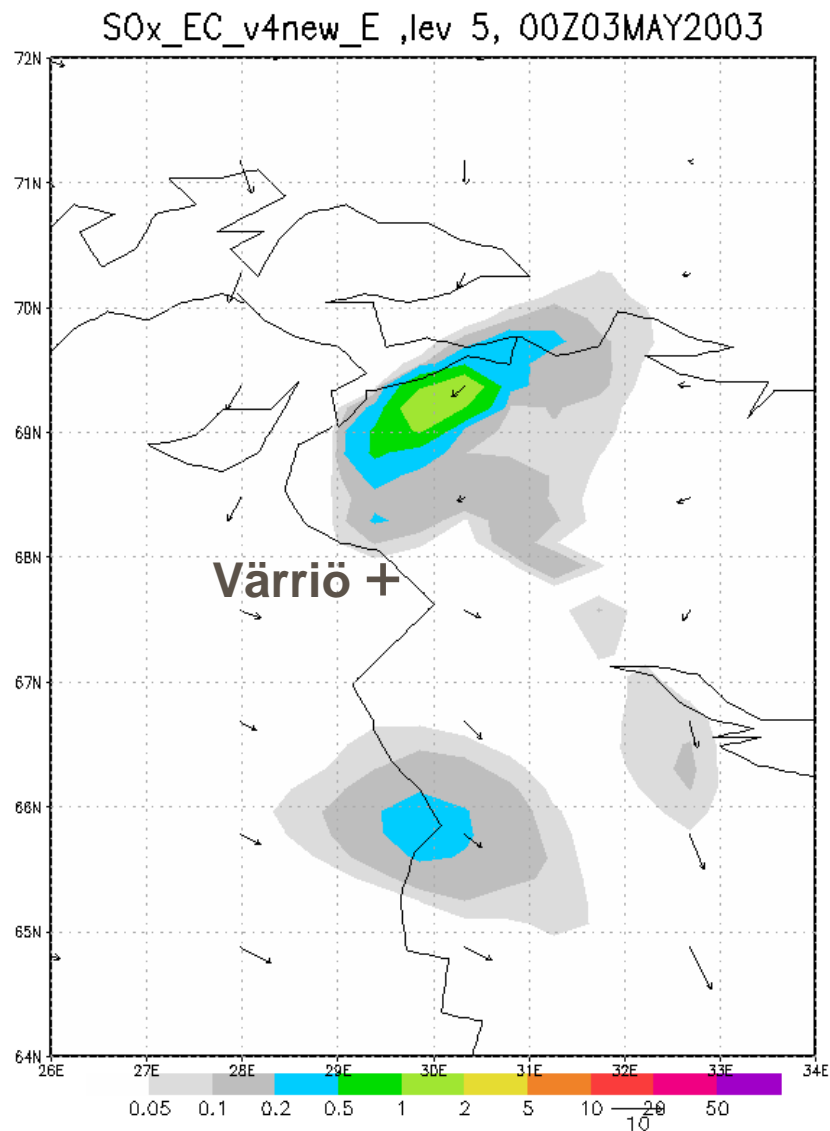
a) ECMWF meteo

Level 5, 1850m, 00Z03MAY2003

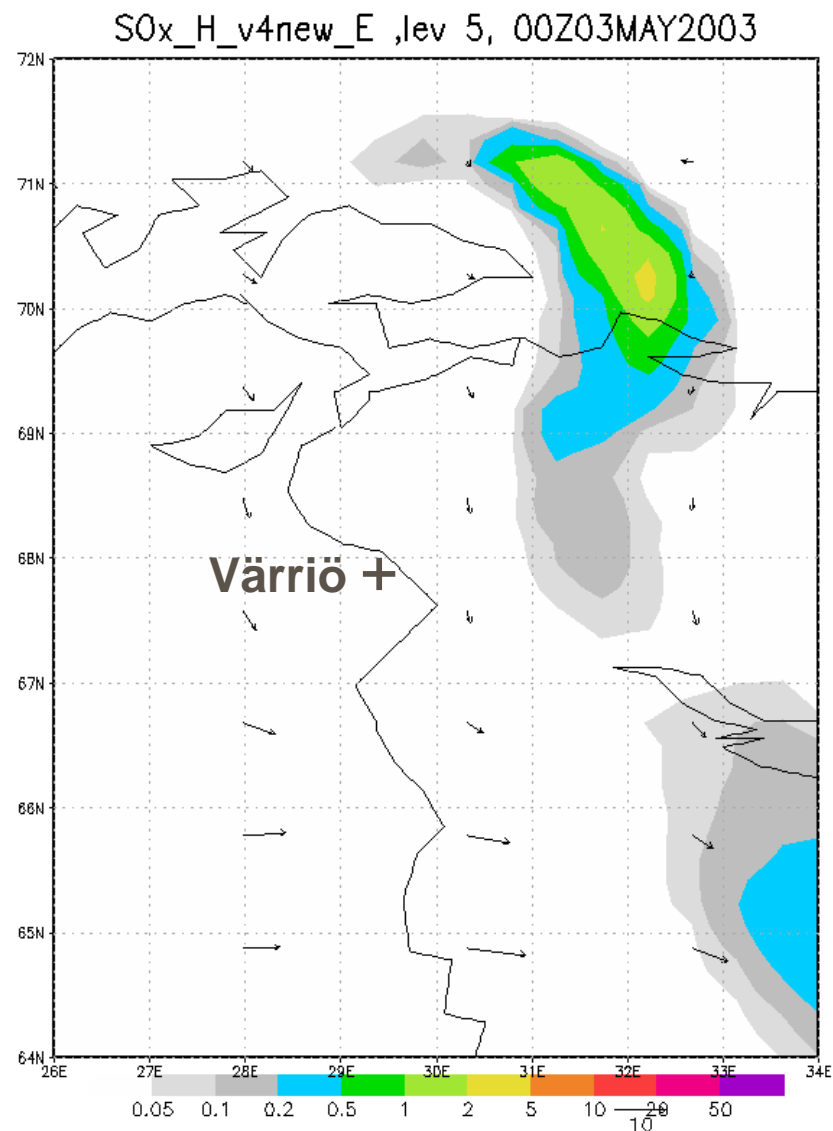


b) HIRLAM (FMI) meteo

SILAM 4 (Eulerian), SO₄ lower free troposphere



a) ECMWF meteo



b) HIRLAM (FMI) meteo



Conclusions

- Both nearly correct and severely wrong predictions for a single-point measurement can be done by several ways.
- Interaction between a NWP and an AQ model produces non-linear effects for the accuracy of end results.