Wind profiler, a useful tool for NMHS

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- European level
  - CWINDE
  - COST720-TUC
- Swiss level : CN MET

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Summary (2)

- National Meteorological and Hydrological Services main uses
  - NWP model assimilation (ECMWF, UK Met Office, LM, Arpege)
  - weather forecasters (nowcasting)
  - integration for improvement of free atmosphere measurements (temperature, humidity)
  - airport and special installation survey

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(1) EUMETNET-WINPROF

- Main goals
  - maintain operational delivery of wind profiler data to the users community via CWINDE
  - re-enforce the collaboration between the wind profiler community and the users (NWP model community in particular)
  - re-enforce the European network of wind profilers
  - contribute to the defense of radiofrequency bands allocated for wind profilers

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Wind profilers in Europe

http://www.metoffice.com/research/interproj/cwinde/profiler/index.html

- Active ground-based remote sensing systems
- 3 main types:
  - low-tropospheric **(LT)**
  - strato-tropospheric **(ST)**
  - meso-strato-tropospheric **(MST)**

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Wind profilers and NWP model assimilation

- Assimilation of CWINDE wind profilers and weather radars winds (>60%)
  - ECMWF
  - UK Met Office model
  - ARPEGE
  - LM
- Causes for no-assimilation of wind profilers
  - occasional poor data quality
    - hardware problem
    - software problem
    - contamination
  - topography poorly represented in model

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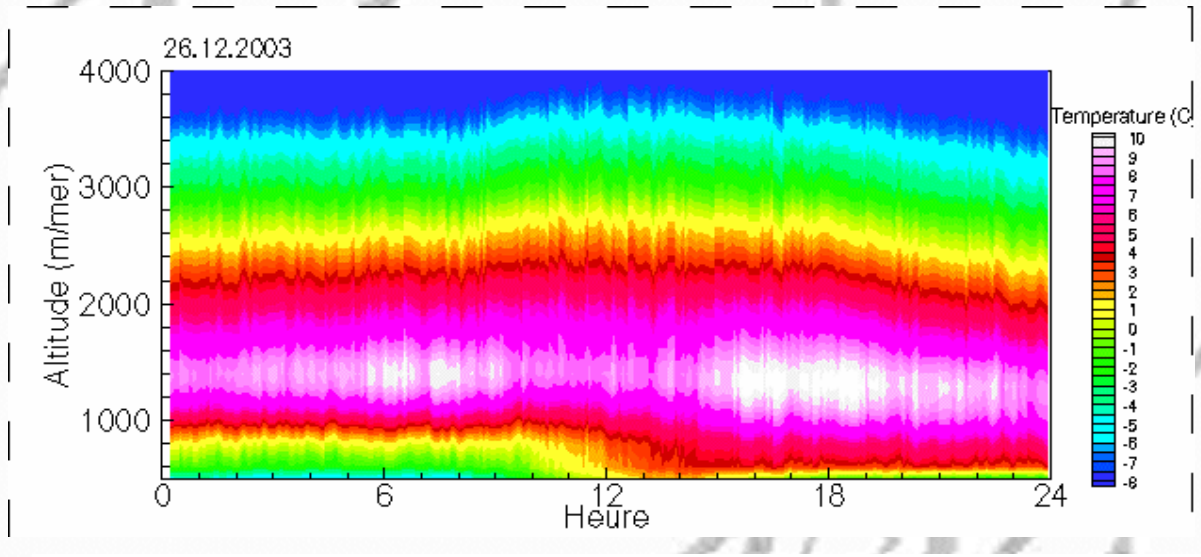
(2) COST720

"Integrated ground-based remote-sensing stations for atmospheric profiling"

- combine various systems in order to improve the quality of a ground-based remote sensing measured parameter
- COST720 TUC campaign at Payerne (Winter 03-04)
- CSIP campaign (Summer 2005)
- LAUNCH campaign (Summer 2005)
- ex: the microwave radiometer is measuring profiles of temperature and humidity


26.12.2003
Altitude (m/mer)
4000
3000
2000
1000
0
6
12
18
24
Heure
Temperature (C
10
9
8
7
6
5
4
3
2
1
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-1
-2
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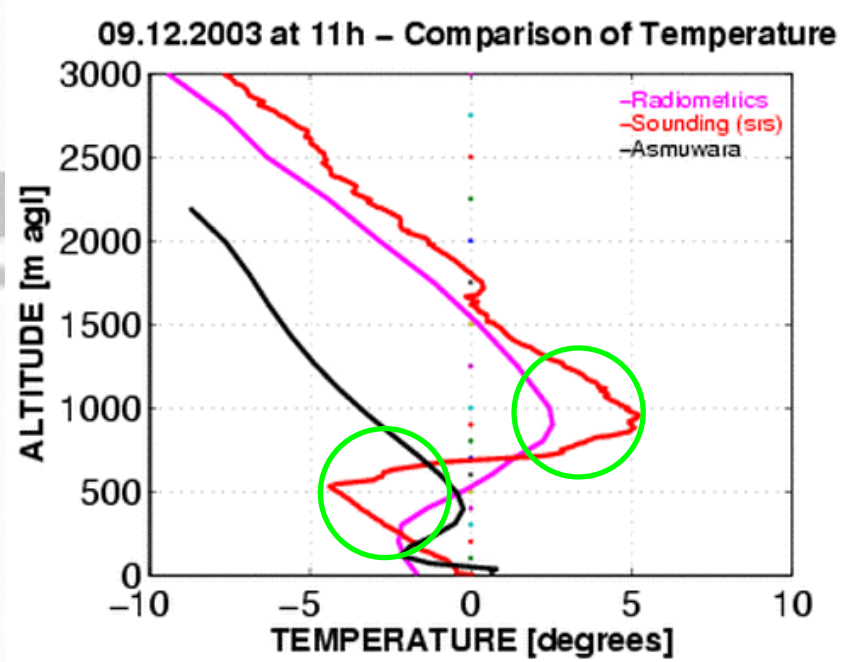
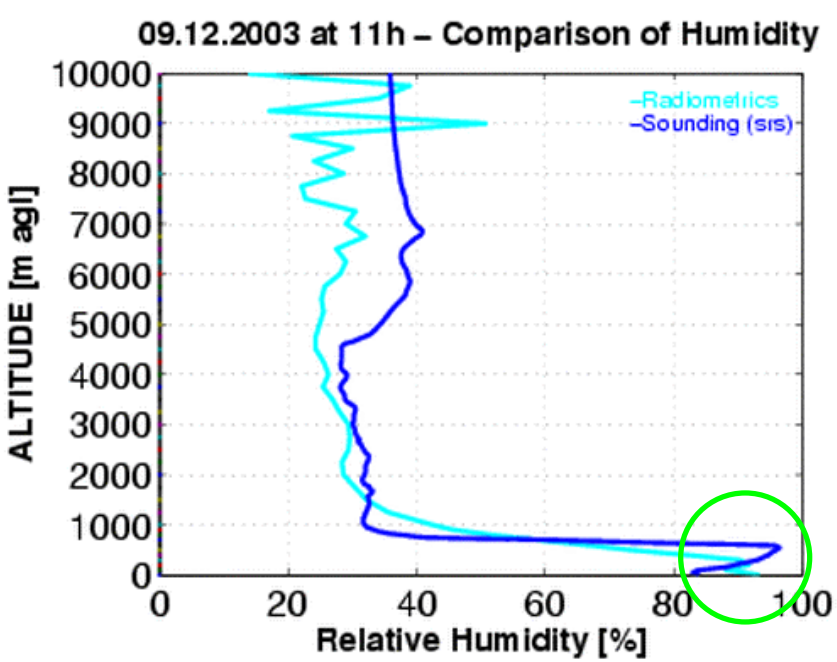
-7
-8


09.12.2003 at 11h – Comparison of Temperature
ALTITUDE [m agl]
3000
2500
2000
1500
1000
500
0
–10
–5
0
5
10
TEMPERATURE [degrees]
–Radiometrics
–Sounding (srs)
–Asmuwara


09.12.2003 at 11h – Comparison of Humidity
ALTITUDE [m agl]
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
20
40
60
80
100
Relative Humidity [%]
–Radiometrics
–Sounding (srs)

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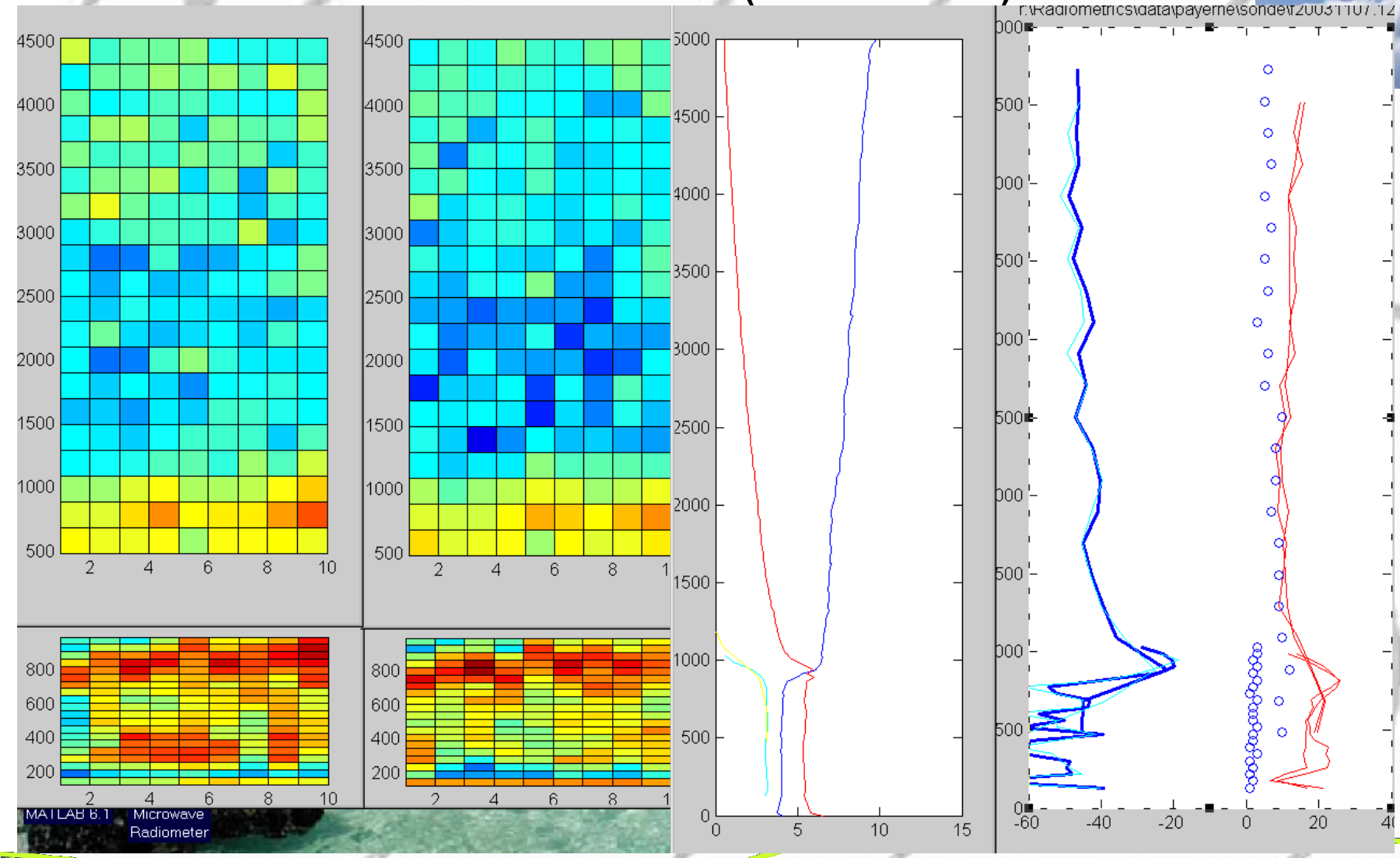
Analysis of Wind Profiler Data (preliminary)

Catherine Gaffard (UK Met Office)



Good agreement

COST 720 Action – TUC

- only some of the COST720 activities
- ongoing work
- quite a challenge to go from experimental to operational stage
- special issue planned for early 2006 (Meteorologische Zeitschrift)

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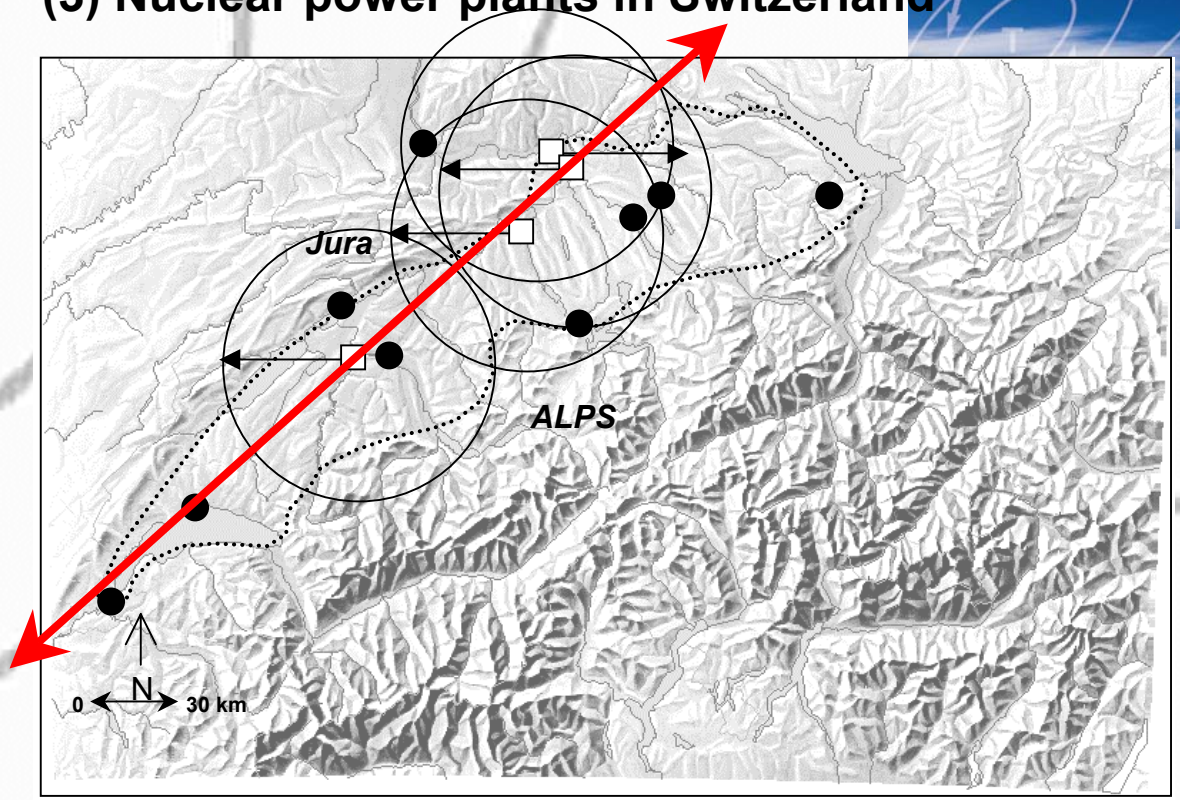
(3) Nuclear power plants in Switzerland



Swiss plateau defined by
- highly urbanized area
- its complex topography
- the location of nuclear power plants

Idea:
not a site-related network combined with a statistical model (current situation), but a

- regional integrated network
  - in-situ surface measurements
  - remote sensing systems at dedicated locations
- combined with a non-hydrostatic model with high-resolution

} **CN MET**

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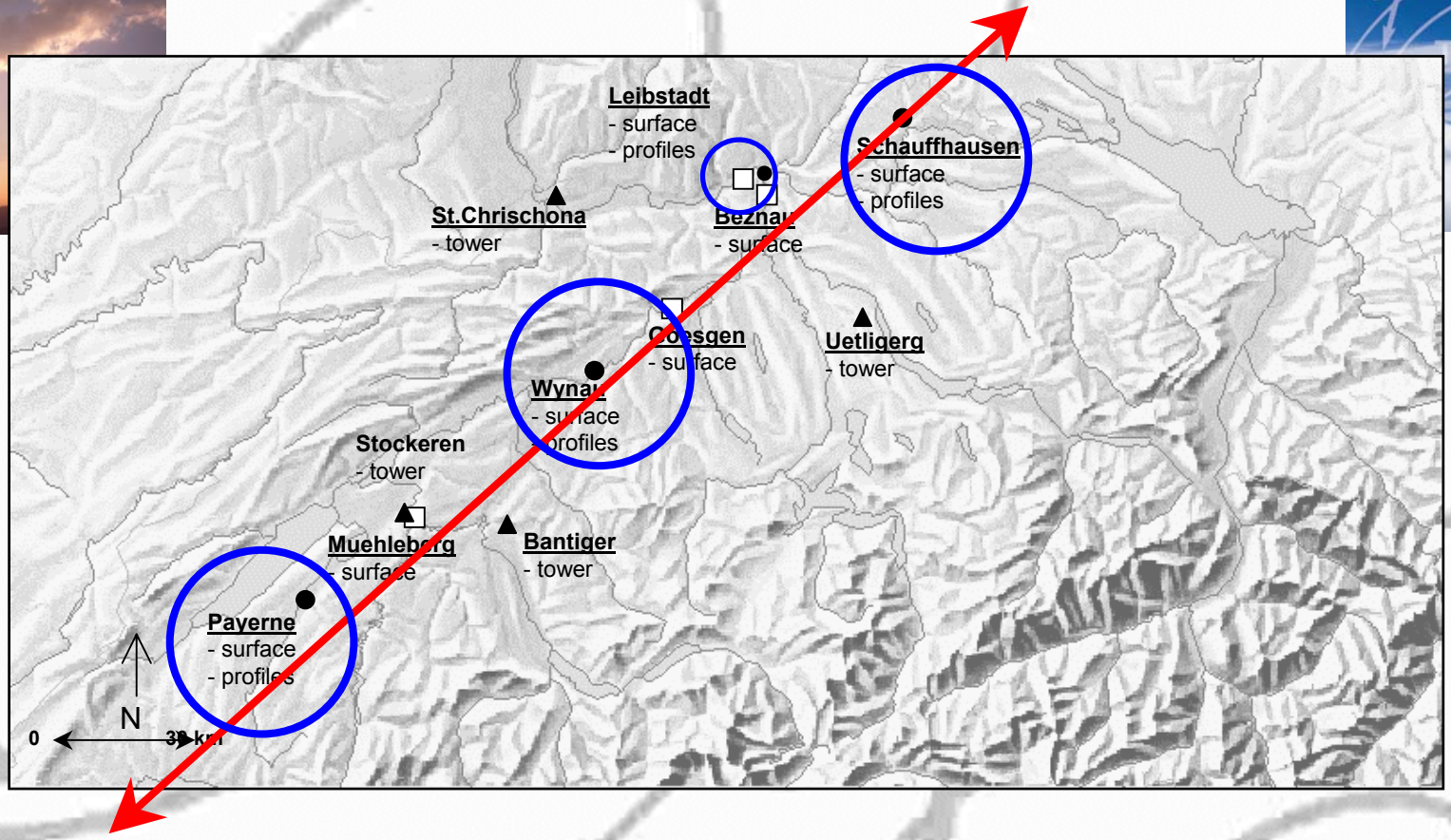

"Surface" = 2m agl radioactivity + temperature + radiation + 10m agl winds + turbulence +

"tower" = 70-250m agl temperature + winds + radiation

"profiles" = low-tropospheric wind profiler (winds) + microwave radiometer (temperature)

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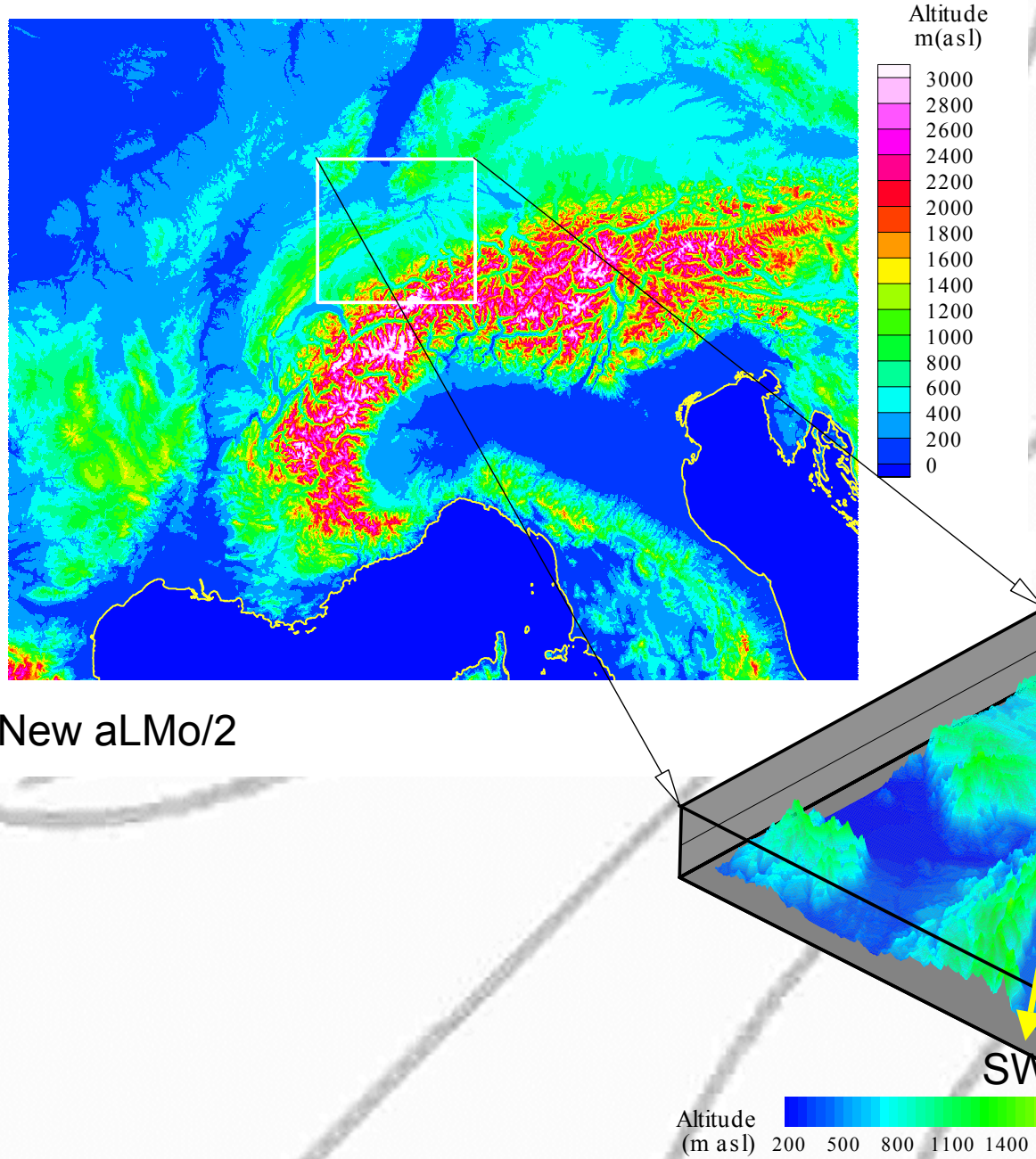

New aLMo/2

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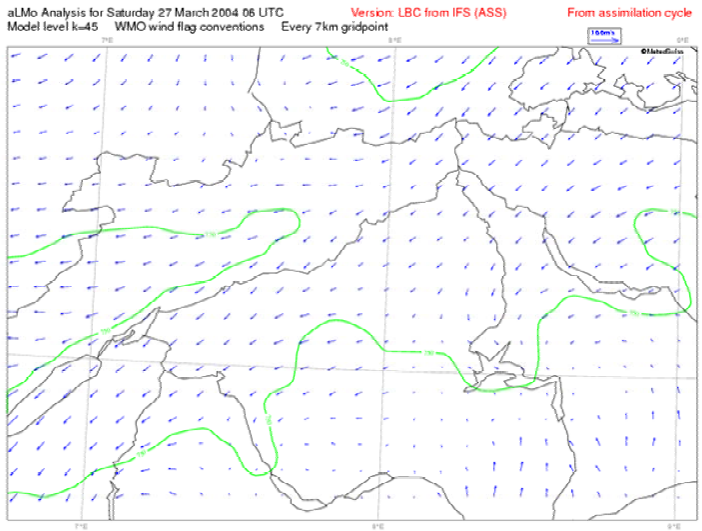
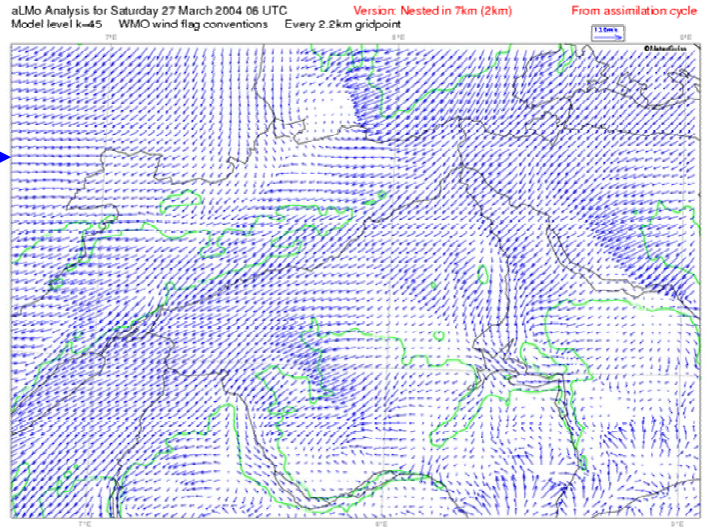
aLMo/2

- non-hydrostatic NWP model
- nesting: ECMWF-> aLMo-> aLMo/2
- 2.2 km horizontal grid over “alpine” domain
- assimilation of data from CN MET
- 18 hour forecasts every 3 hours
- 30 minute temporal resolution
- emergency mode on demand





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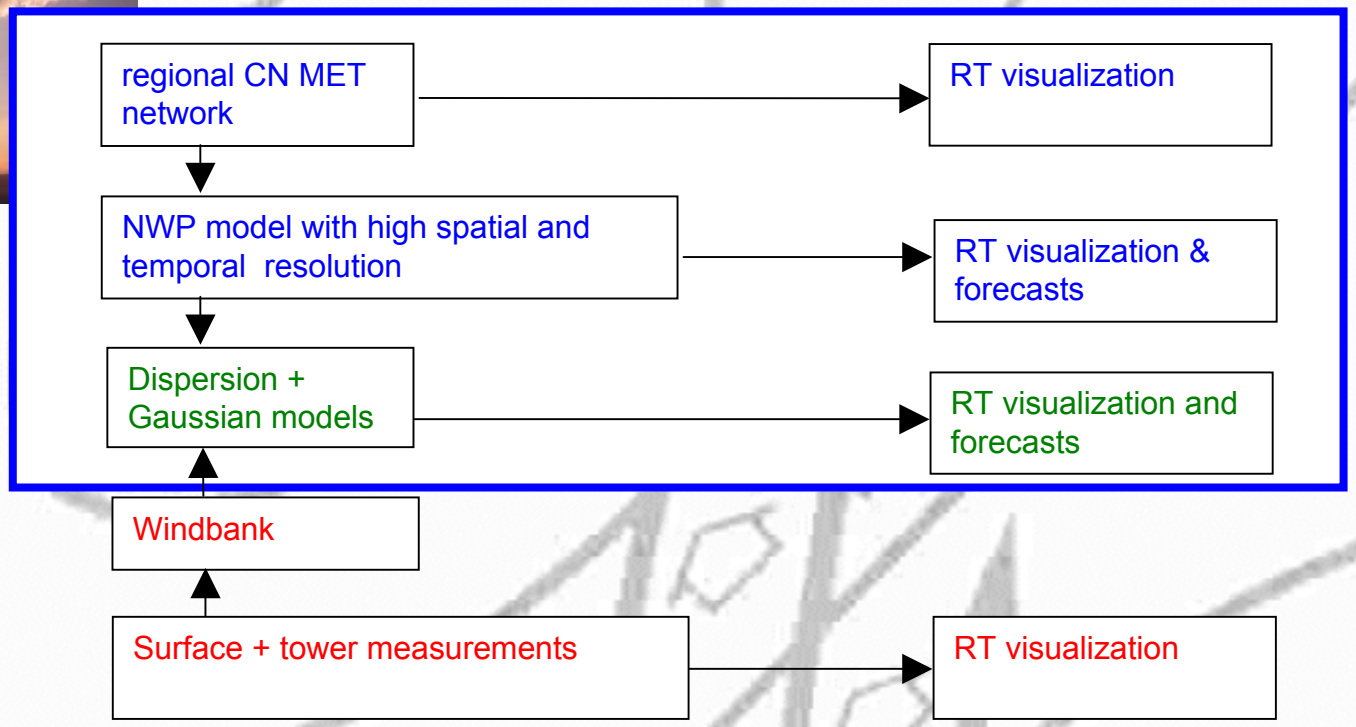

- concept currently in discussion
- regional approach vs site-related approach
- 4-dimensional approach
- combination of surface + remote-sensing measurements and model information
  - dedicated real-time products
  - dedicated forecasting (nowcasting) products

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In summary, the wind profiler is a useful operational tool for NHMS

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