HIRLAM strategy and the connection with ACT

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Contents of presentation

- Main goals of the HIRLAM-A project
- HIRLAM and ACT

Main goals of HIRLAM-A

- Mesoscale model 2.5 km
- Continued development of synoptic scale model
- Ensemble forecast system
- Continued development of 3D- and 4D-Var
- Increase usefulness for community outside NWP, (Climate, Chemistry)
- Quality assurance and user friendliness
- User consultation

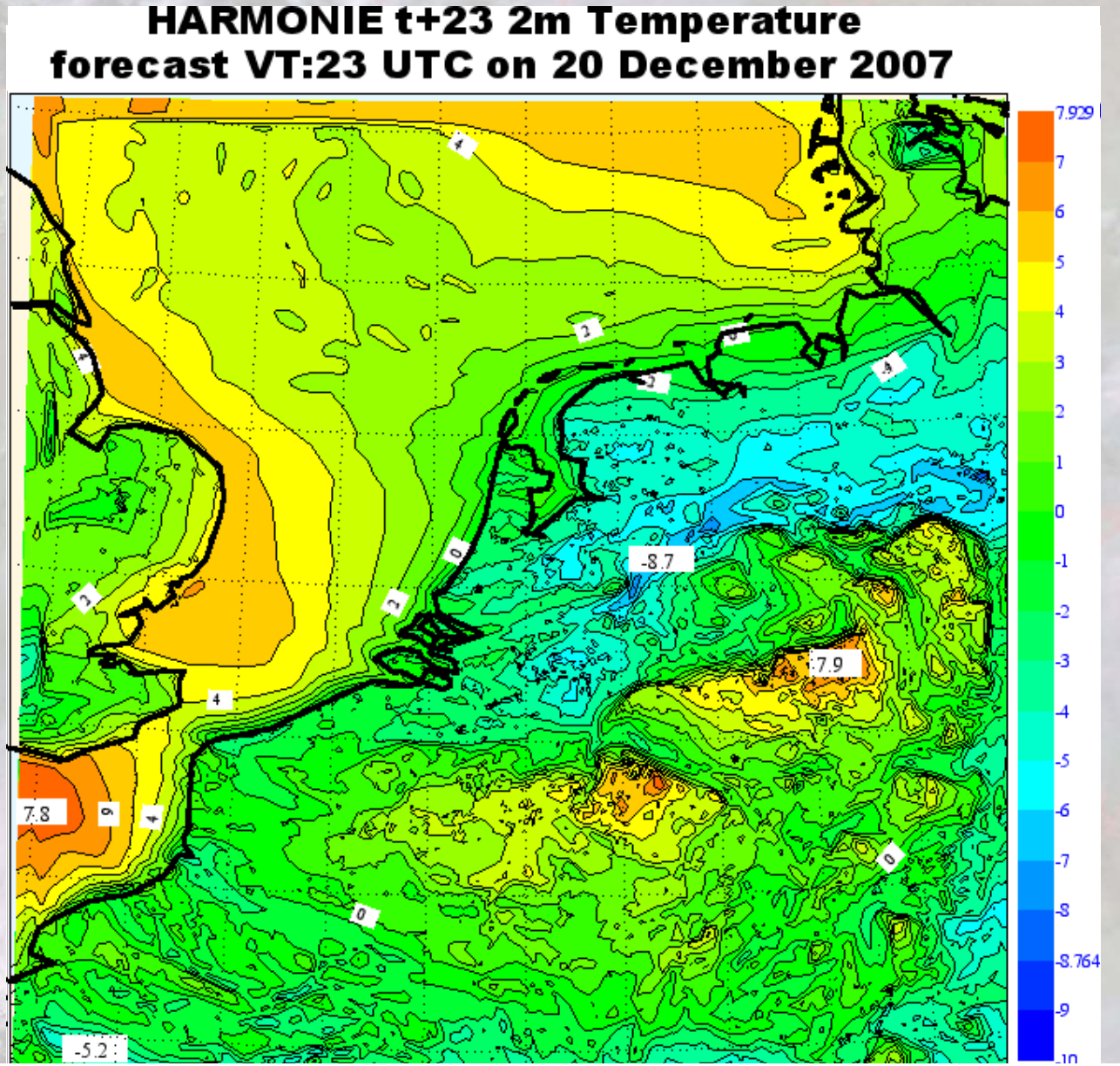
Development mesoscale model

- Cooperation with ALADIN on development of mesoscale model
- AROME basis for these developments
- Aim is resolution of 2.5 km that can be used operationally in 2009
- Two acronyms used, AROME: mesoscale model; HARMONIE: AROME plus HIRLAM system shell around it.
- Main subjects AROME: cycling, deep convection, analysis of upper air and soil, surface scheme.

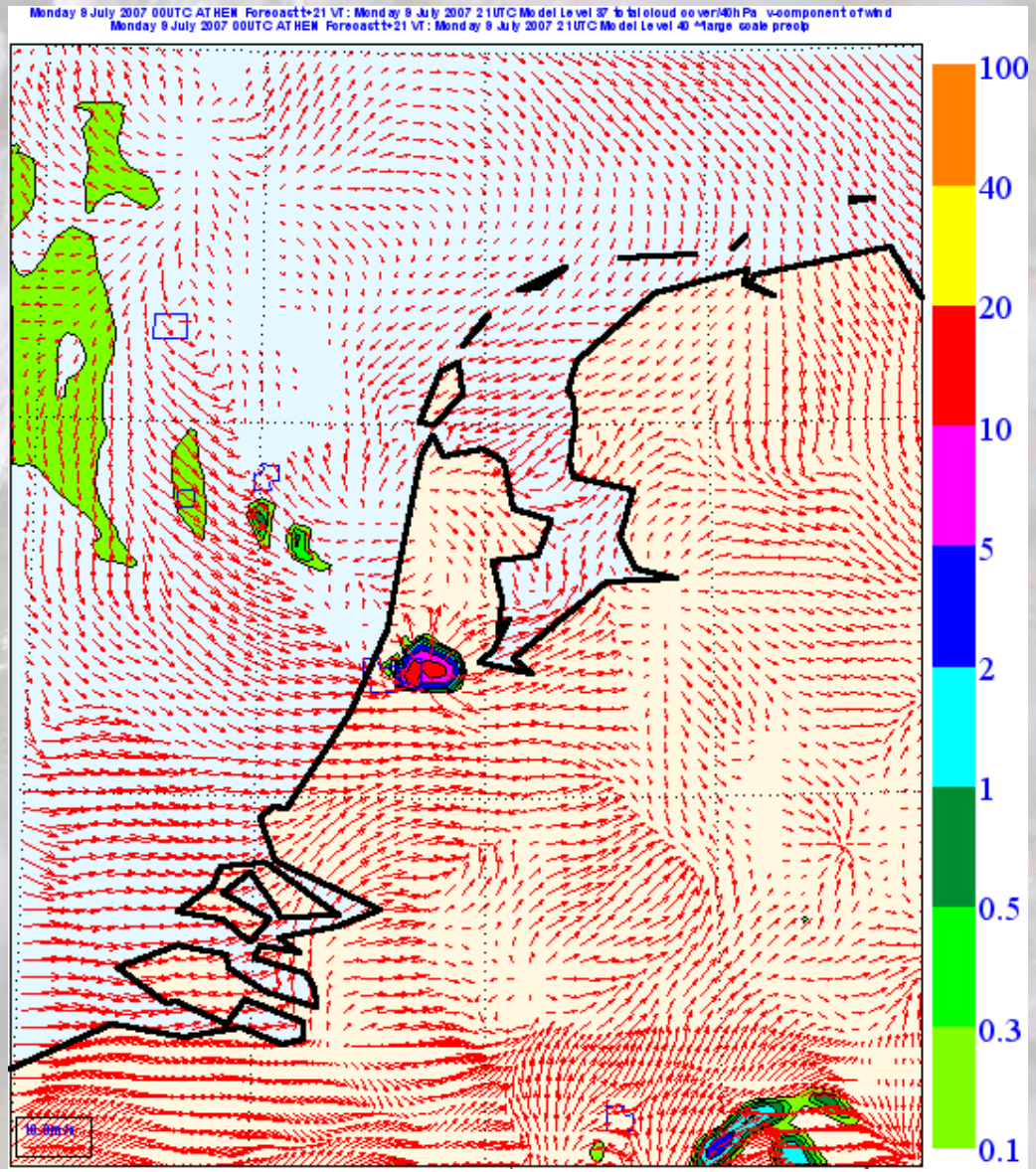
Development mesoscale model

- Note: AROME already contains coupled chemistry modules!
- Chemistry from Meso-NH

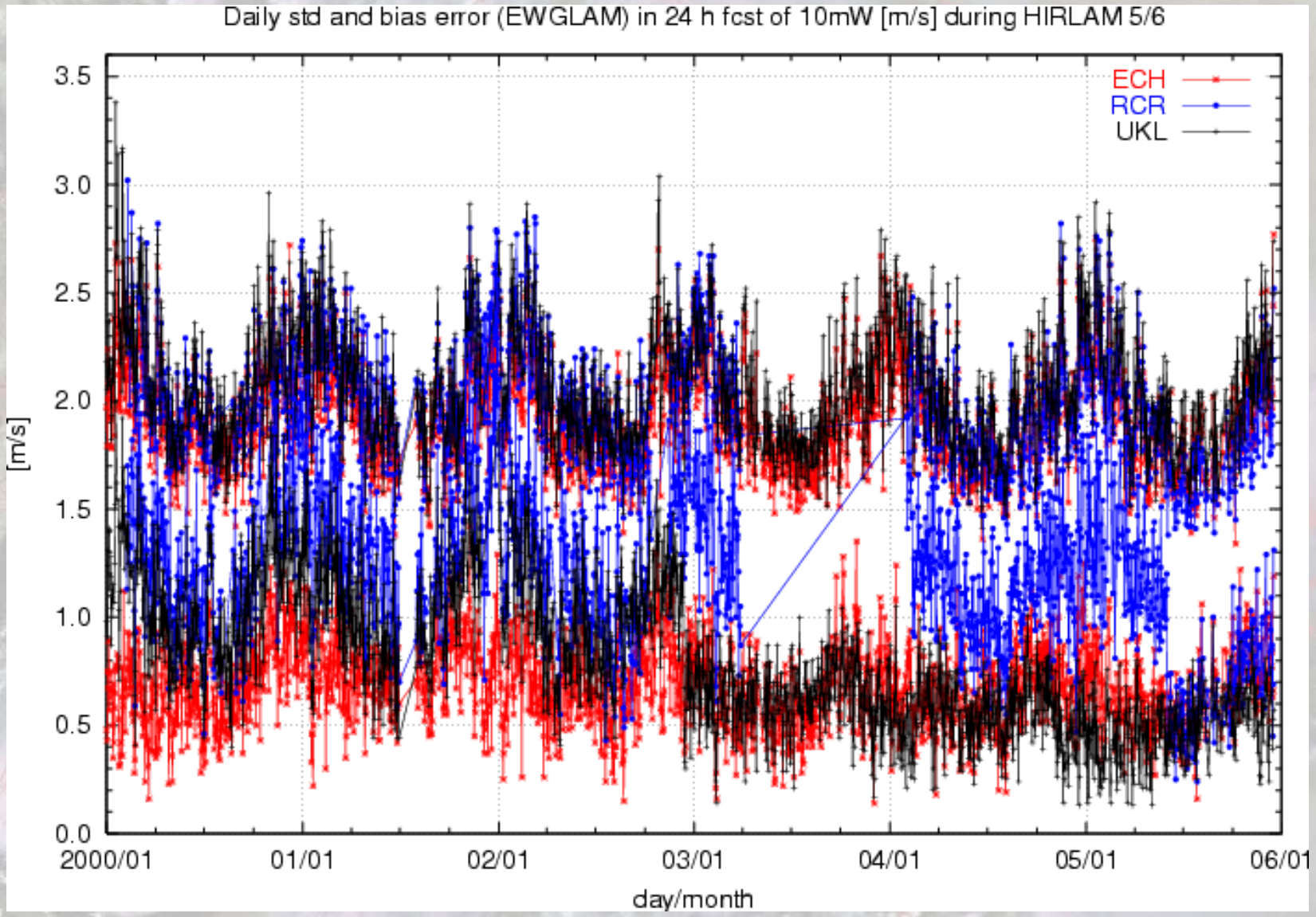
Development mesoscale model



Development mesoscale model



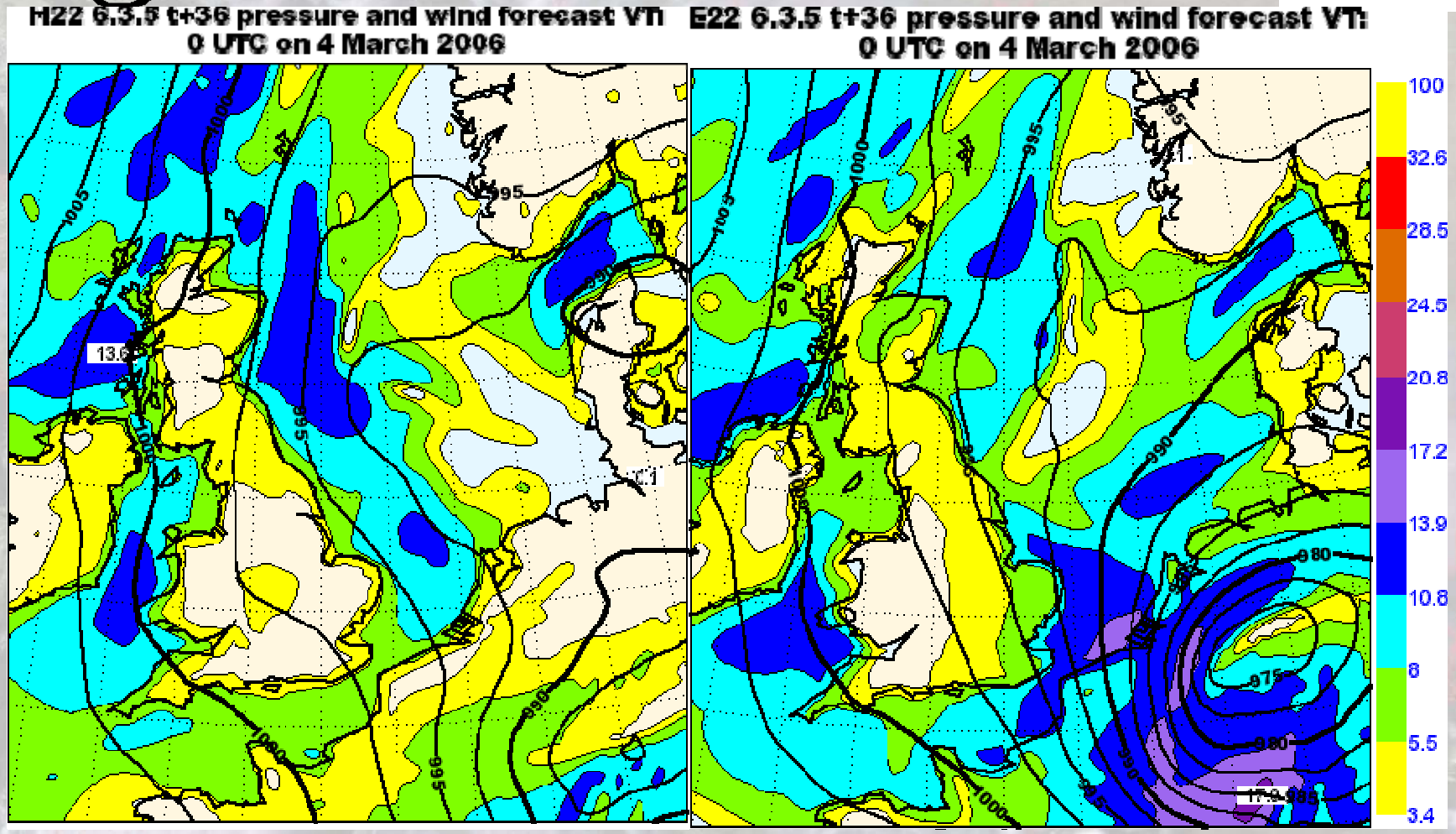
Synoptic scale development cont.

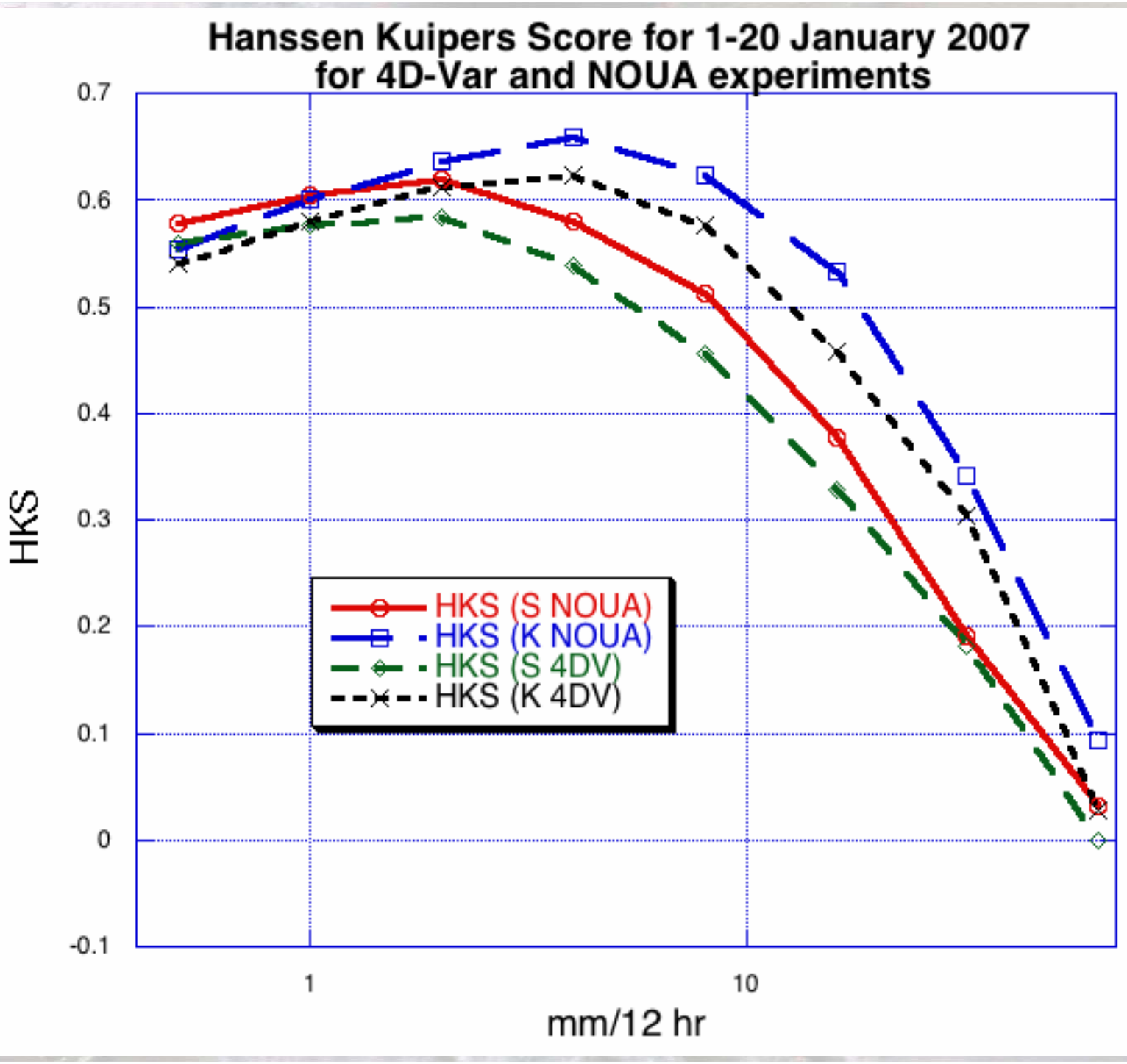


Development of EPS-system

- Deterministic forecasting not enough, even on the short range
- Development of short range ensemble system
- Cooperation in Europe: GLAMEPS
- Aim: ensemble system with ~100 members, based on different models, initial conditions and forcings in models
- Distributed production
- Collect, process at ECMWF and redistribute results from ECMWF
- Europe and N-Atlantic, out to +72 hours

Development of EPS-system




Hanssen Kuipers Score for 1-20 January 2007
for 4D-Var and NOUA experiments
HKS
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
1
10
mm/12 hr
HKS (S NOUA)
HKS (K NOUA)
HKS (S 4DV)
HKS (K 4DV)

User-friendliness of model

- Increase system support
- Make system more easy to run
- Make university tool for research purposes

- User consultation to best accommodate wishes of operational users

Increase usefulness HIRLAM syst.

- Make HIRLAM suitable for wider use, not only in NWP, also climate research
- Make output more suitable for users of model data
- University model
- Coupling to ocean model
- Coupling to chemistry

Chemistry in HIRLAM

- Why?
  - Wider use of model
  - NWP and chemistry world closer together
  - Information exchange
  - Improve NWP (direct and indirect effects)
  - Enable visibility forecasts
  - Improve ACT
  - Provide framework for further development
  - Improve cooperation in Europe

HIRLAM for chemistry

- Make output more suitable for offline ACT
  - Average flow instead of instantaneous
  - Stability parameters from model like Monin-Obukhov length and/or Richardson number
  - ???

Chemistry in HIRLAM

- How
  - Visit special HIRLAM session in COST 728 meetings (Copenhagen and De Bilt)
  - Agreement on starting of HIRLAM branch
  - With HIRLAM branch easier to follow HIRLAM developments (semi-automatic updates to new HIRLAM versions)
  - Start development based on ENVIRO-HIRLAM
  - Interest (in principle) from Denmark, Sweden, Finland, Estonia, the Netherlands.

Chemistry in HIRLAM

- When?
  - Branch will be based on HIRLAM 7.? (upgrade of ENVIRO-HIRLAM necessary)
  - Waiting for migration of DMI-models to new supercomputer
  - After establishment of HIRLAM branch anyone within HIRLAM can use this model version, test it and possibly extend it with their own chemistry modules

Chemistry in HIRLAM

- What has to be done?
  - Upgrade ENVIRO-HIRLAM
  - Establish HIRLAM-chem branch
  - Enable the easy plugging in of chemical modules in HIRLAM-chem
  - Adjust the radiation and condensation schemes to include the aerosol effects
- Make coupler with HIRLAM, as modular as possible for easy plugging of other chemistry or aerosol modules

Conclusions

- Closer cooperation between NWP and ACT communities, established through COST-728 meetings
- Hopefully there will be a benefit for both
- Intention for more cooperation within HIRLAM countries, chance for increase in speed of online coupling developments and better exchange of information between NWP and ACT