

# HIRLAM Physics Developments

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# HirLAM Contents



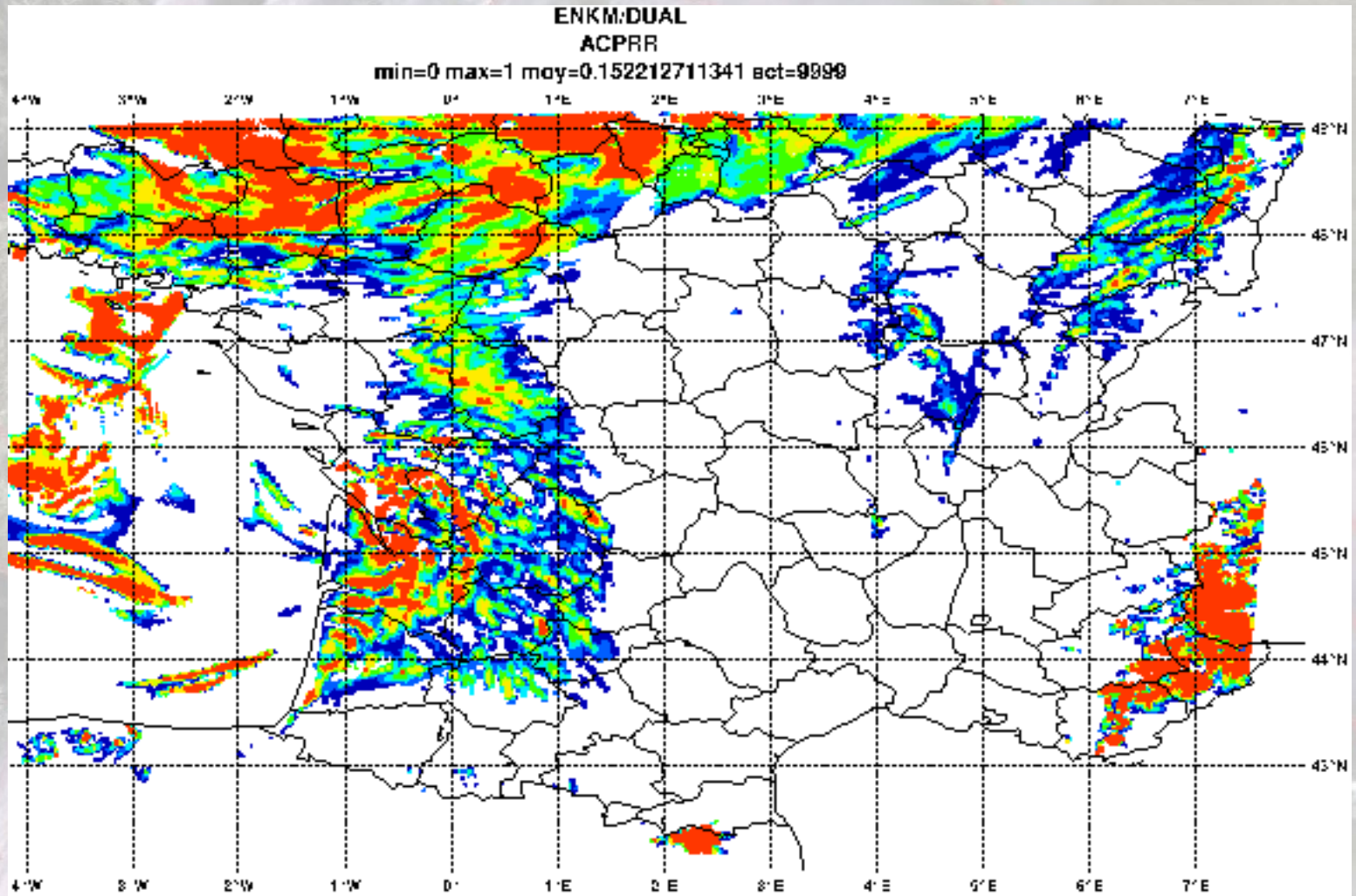
- Results mesoscale
- Questions mesoscale
- Results synoptic scale



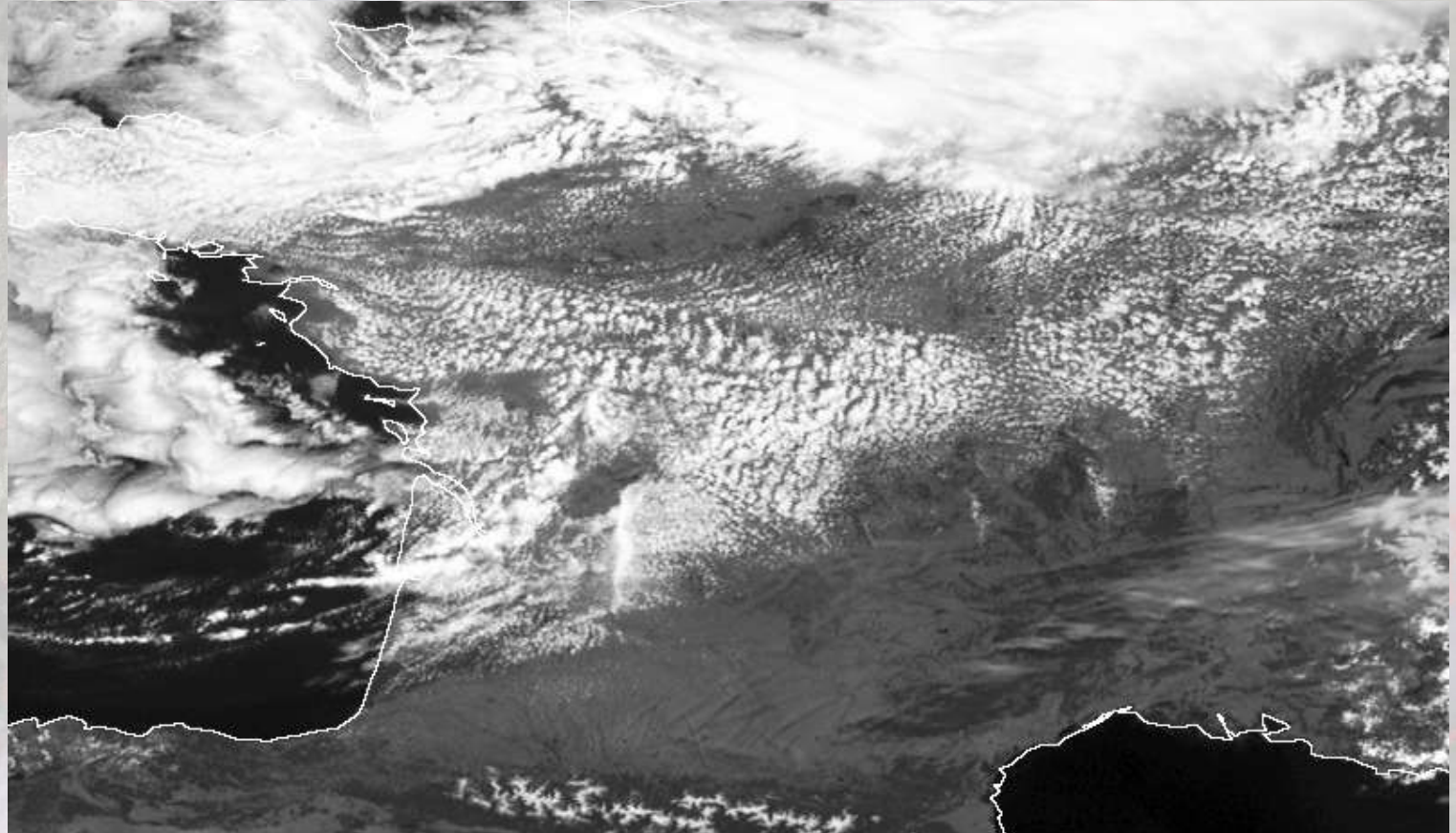
# HirLAM Mesoscale



- EDMF
- Impact of initial/boundary conditions on HARMONIE forecasts\*
- FLAKE implementation\*
- Comparison/optimization of radiation schemes
- Impact of deep convection parameterization (not started yet)
- PBL validation database
- Testing of HARMONIE
- Participation GABLS3









## Validation of pbl-schemes



- Developments in EDMF important for pbl state, transition to deep convection
- Compiling dataset to validate shallow convection in mesoscale model output
- Some deep convection cases included also
- Observations include: Cabauw tower, Radiosonde, MSG, GPS IWV, 10-min syn obs NL, Radar, PBL from ceilometers





## Validation of pbl-schemes



- Archive stored at ECMWF
- Open for anyone to use
- Description at:

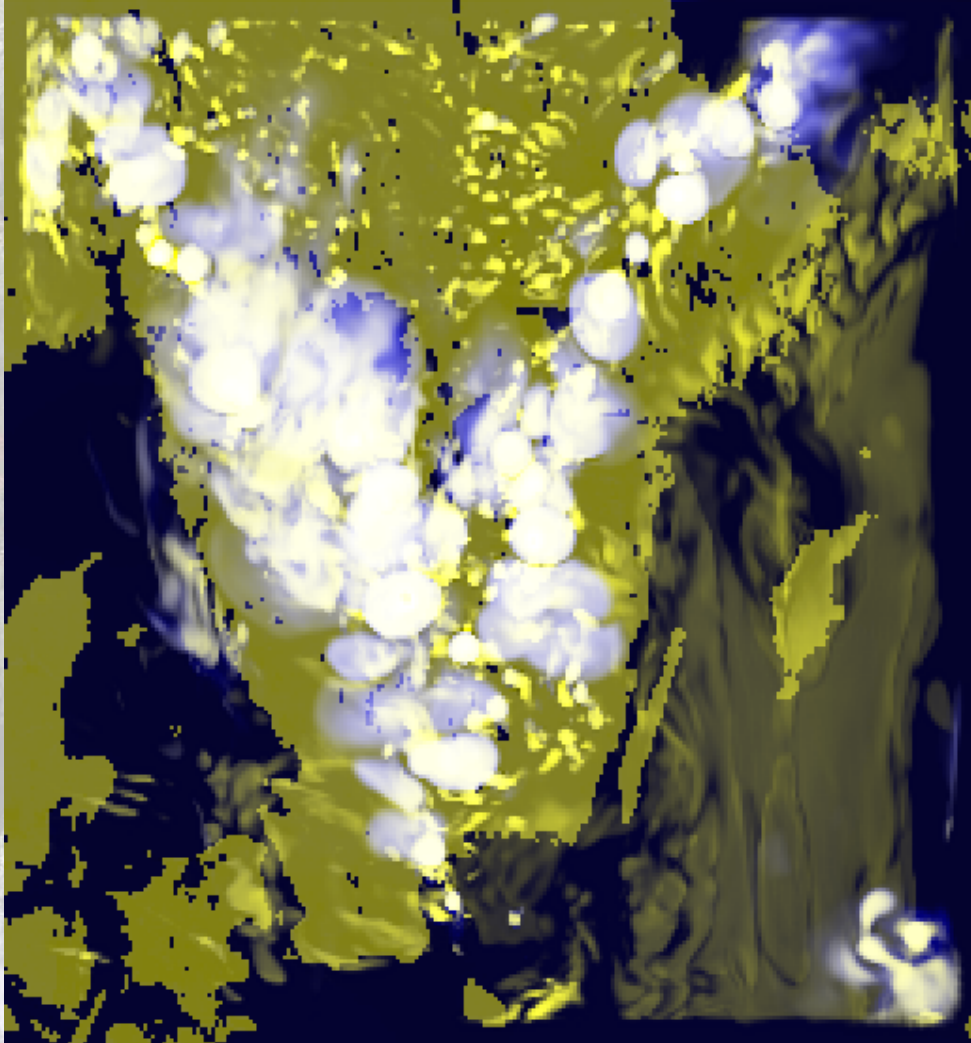
[http://www.knmi.nl/~tjm/HARMONIE\\_cases.html](http://www.knmi.nl/~tjm/HARMONIE_cases.html)



# Hirnam | Fair weather cumulus



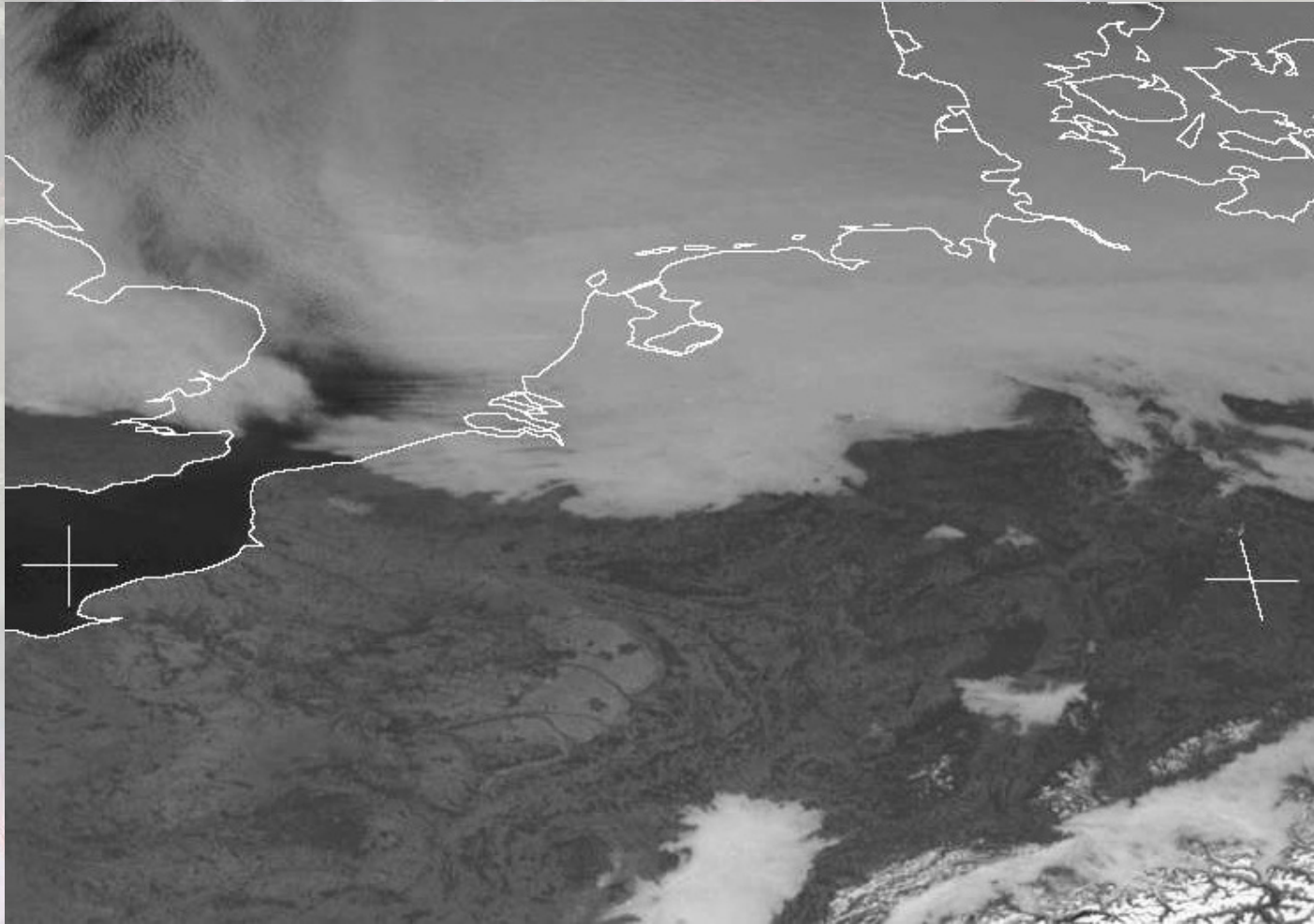




- See talk of Lisa/Sami
- Big impact of initial and bc
- Visualisation very important for validation
- Too many large anvils?



# Monitoring HARMONIE



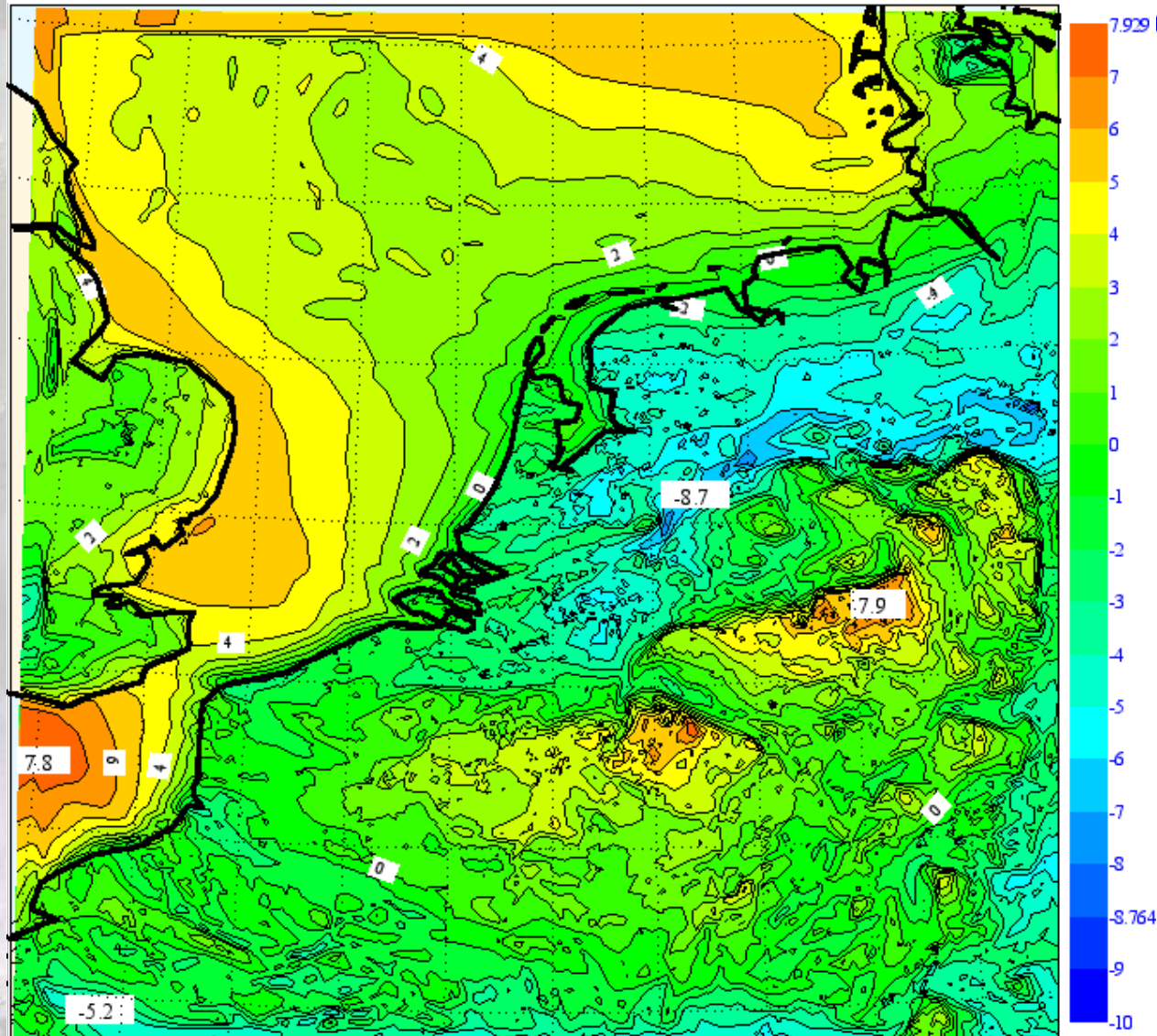




# Monitoring HARMONIE

HARMONIE t+23 2m Temperature

forecast VT:23 UTC on 20 December 2007









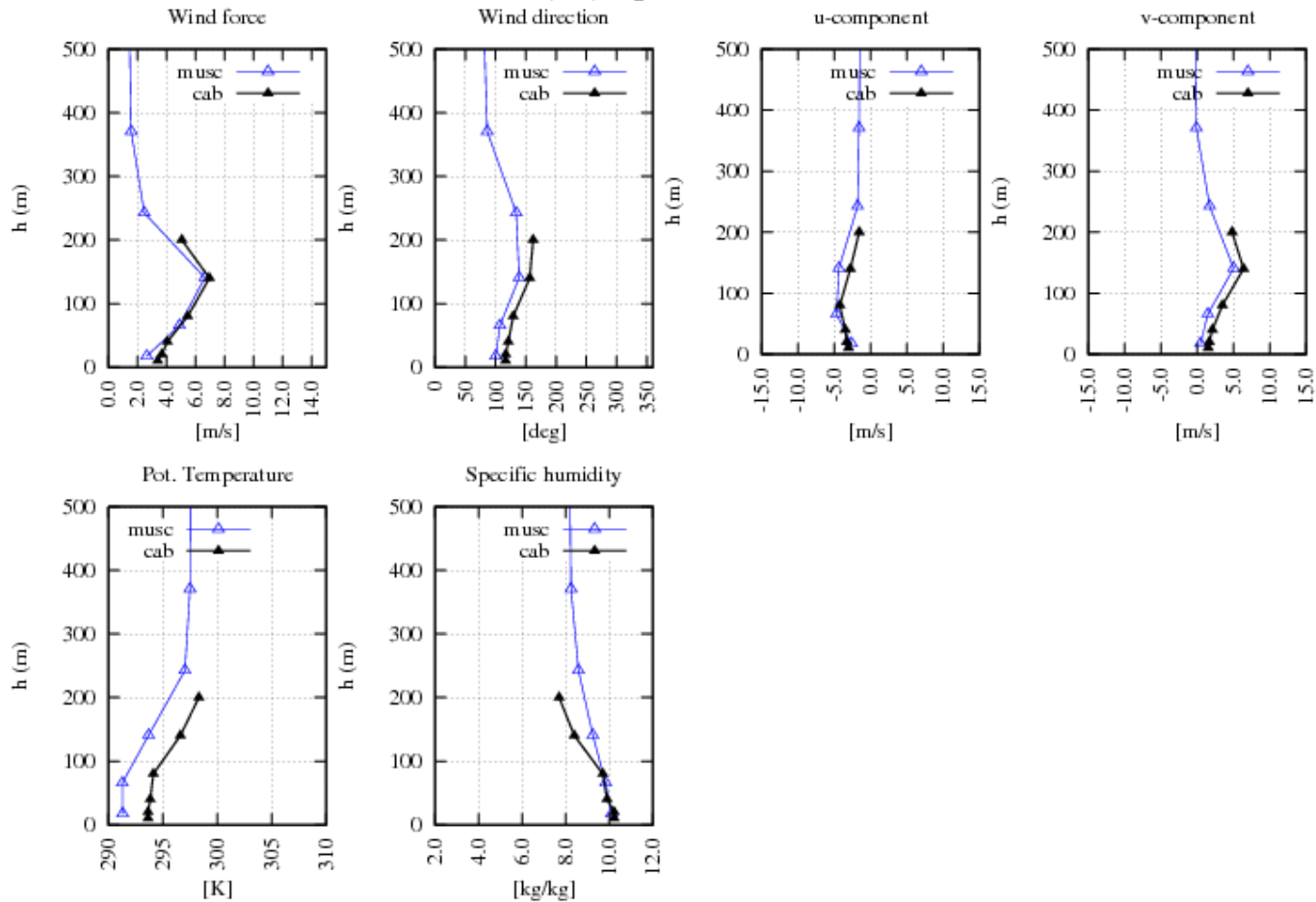


# GABLS3 participation



- Focus on stable boundary layer
- Looking at daily cycle
- Strength low level jet
- Very sensitive to settings in vertical diffusion
- AROME TKE works quite well for GABLS3

**Cabauw (NL) dtg: 2006070206 +18**







# Mesoscale questions



- Impact EDMF/EDKF on deep convection
- Horizontal diffusion settings in HARMONIE
- Deep convection parameterization necessary at 2.5 km?
- 3D-turbulence, influence of environment on updraft
- Optimal nesting strategy, coupling parameters
- Verification of high resolution forecasts, standard verification not enough/suitable

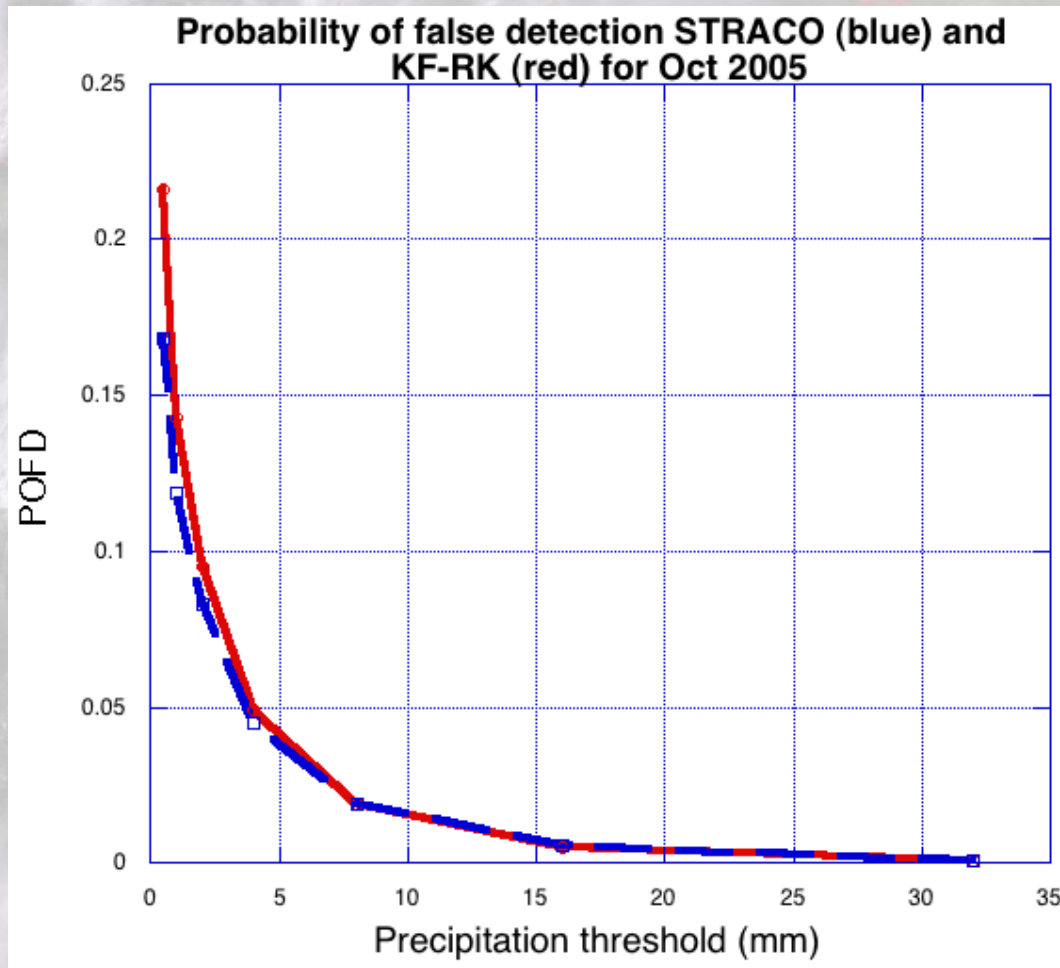
# HirLAM Synoptic scale



- Intercomparison STRACO and KF-RK
- New surface scheme
- CAM3-RK and KF-ETA\*
- Improvements in STRACO\*
- CBR-tuning
- Greenland problems\*
- HIRLAM-Chemistry connection
- KPT



- Chosen for KF-RK on basis of many different verification parameters and scores
- Relatively small differences
- Difficult to choose when weight of scores are not determined in advance
- Many parameters for balanced view
- One final objective score important







# New surface scheme

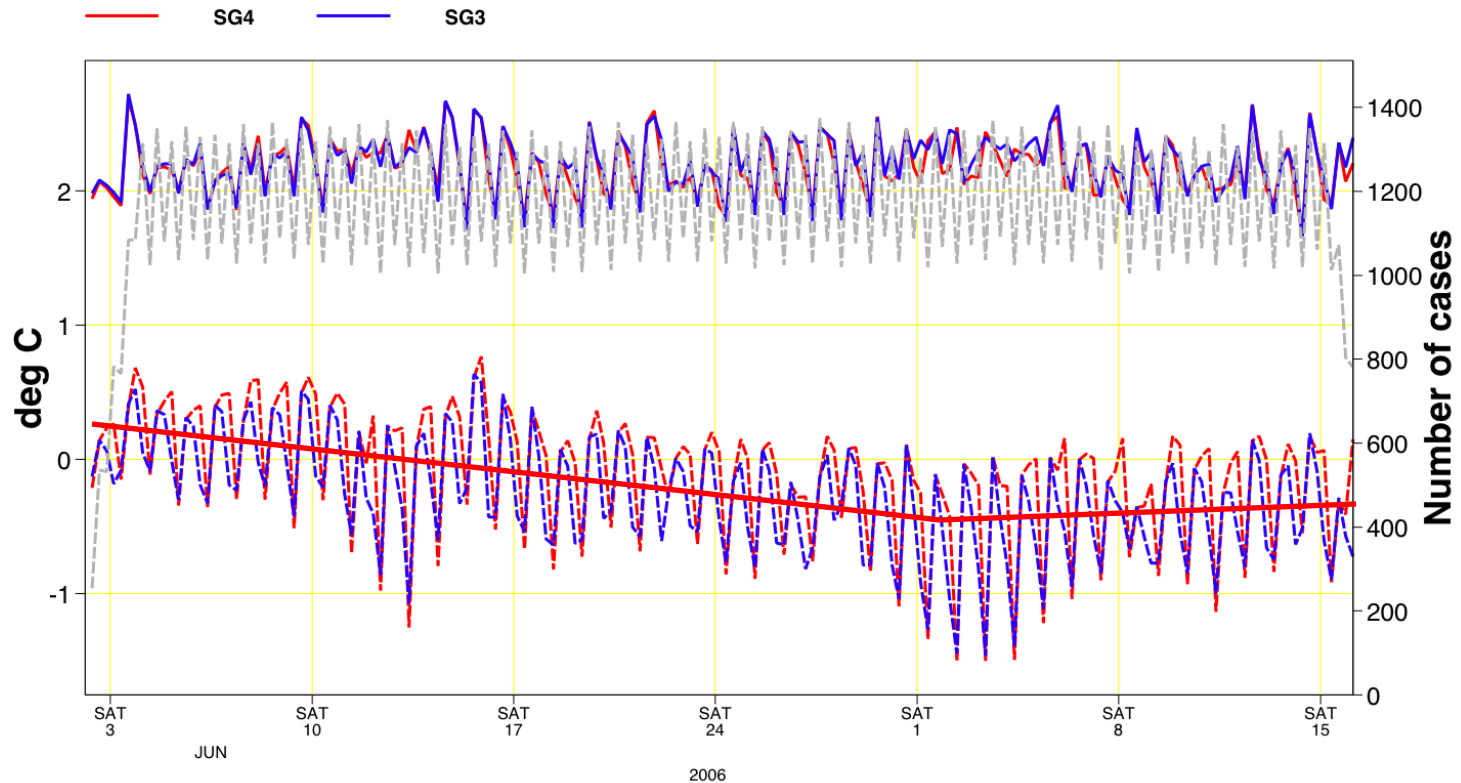


275 stations Area: EWGLAM

Temperature

At {00,12} + 00 06 12 18 24 30 36 42 48 Window: 6h

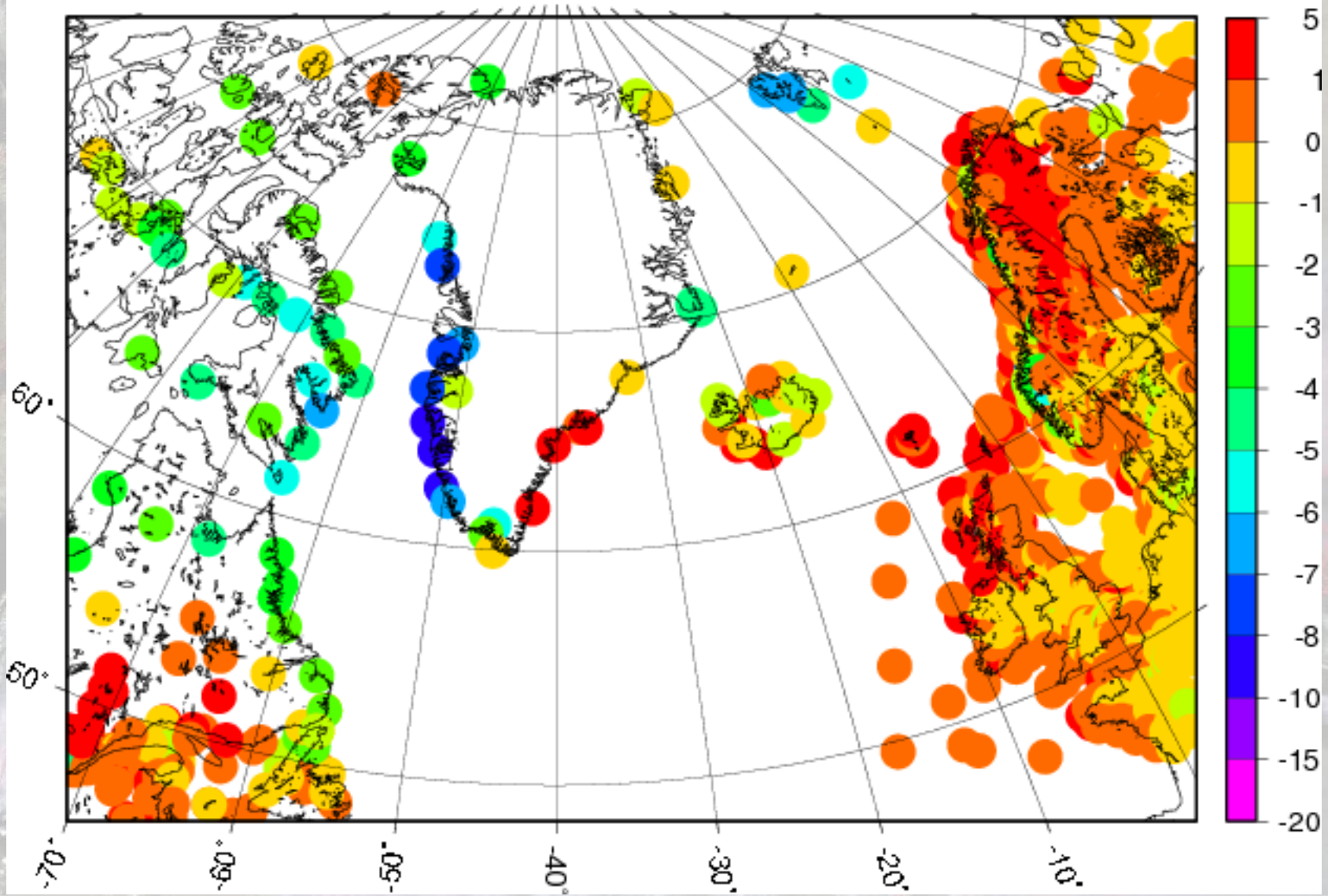
Solid RMS; Dashed BIAS; Dashed grey is number of cases



# Greenland problems



713si +24 t2m bias valid 00 UTC





# HirLAM HIRLAM-Chemistry



- Contacts between ACT and HIRLAM
- Improve HIRLAM output for ACT use
- Start HIRLAM chemistry branch, based on ENVIRO-HIRLAM
- Danish development, interest from Finland, Sweden, Estonia, Netherlands
- Benefit for ACT (impact meteo every timestep) and NWP (impact of chemistry on meteo)!



# KNMI param. testbed



- 1-D models with different physics parameterizations
- Forced by single 3D-model tendencies
- 1D models, cheap, many models and different settings can be tried
- Run every day, comparison with Cabauw, cloud radar, tower, ceilometer, radiometer, wind profiler, radiosonde
- Archive and verification



# HirLAM KNMI param. testbed

