



HIRLAM

highlights of recent activities

Jeanette Onvlee (with thanks to many others)
EWGLAM meeting, 10/10/2011

Organizational aspects

New phase for HIRLAM: HIRLAM-B programme 2011-2015

- ✓ Main deliverables:
 - ✓ Operational use and optimization of Harmonie at 2.5km scale, research on moving towards (sub)km scale application
 - ✓ Operational use and optimization of GLAMEPS, development of convection-permitting ensemble forecasting capability
 - ✓ Set up operational cooperation activities
 - ✓ Continue and strengthen cooperation with ALADIN

- ✓ New project leaders => new SRNWP ET members
Ulf Andrae, Jelena Bojarova, Mariano Hortal, Trond Iversen, Laura Rontu, Xiaohua Yang

Highlights (1): Upper air data assimilation

Algorithms: development, testing of more flow-dependent methods vs 3D-VAR

- ✓ Testing of ETKF and hybrid ensemble assimilation in HIRLAM
- ✓ Introduction of ETKF etc in Harmonie. Further development of Harmonie 4D-VAR
- ✓ Experimentation with image warping methods (displacement errors)

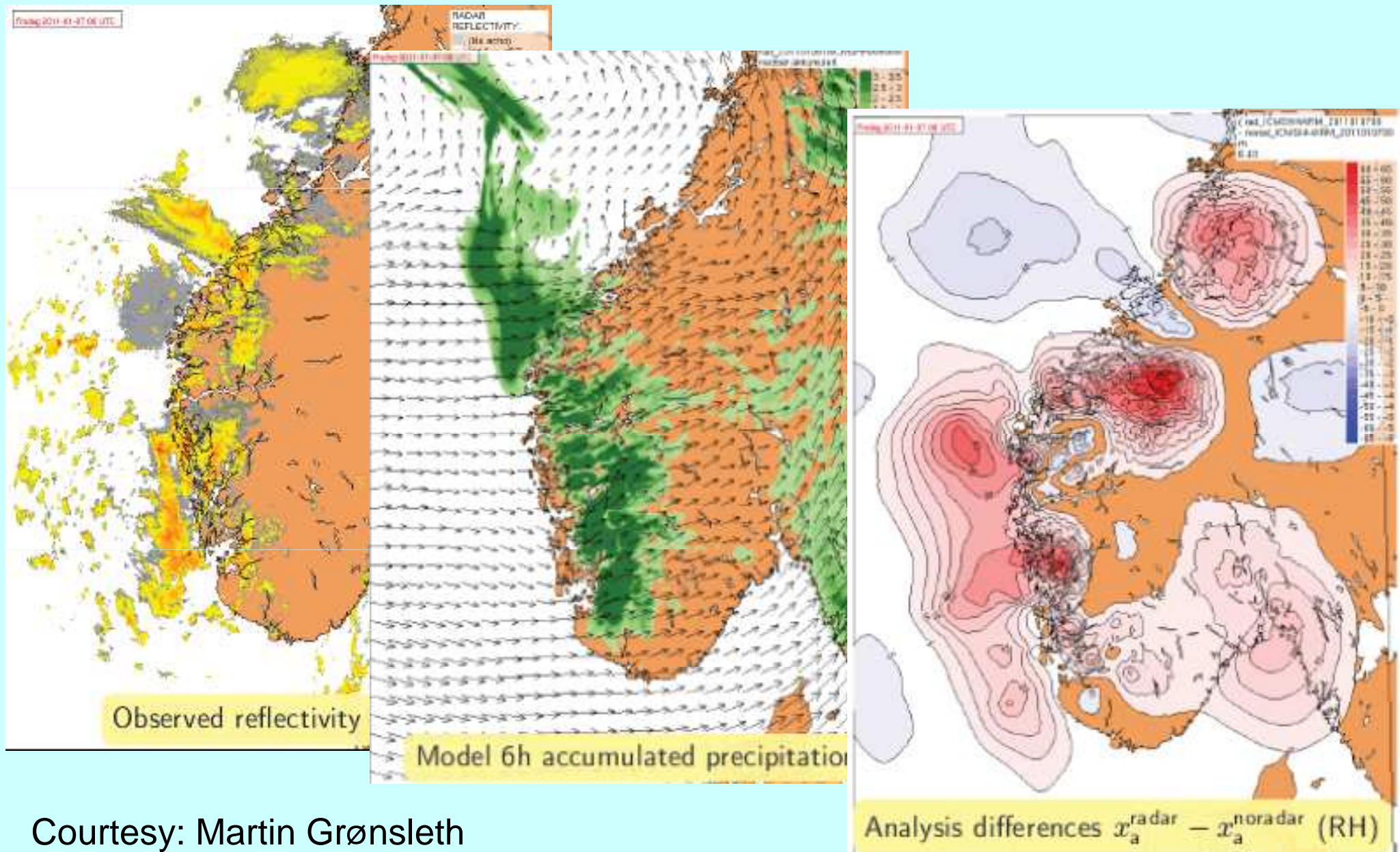
Rapid update cycling experiments:

- ✓ Harmonie 3h, 1h cycling
- ✓ HIRLAM 1h cycling

Use of observations:

- ✓ Preparations of ingest of radar reflectivity, radial wind data
- ✓ Soon to start: test/refine radar QC where needed. Comprehensive obs impact studies, incl radar, GPS, ...

Highlights (1): Radar data assimilation



Courtesy: Martin Grønsleth

Highlights (1): Radar data assimilation

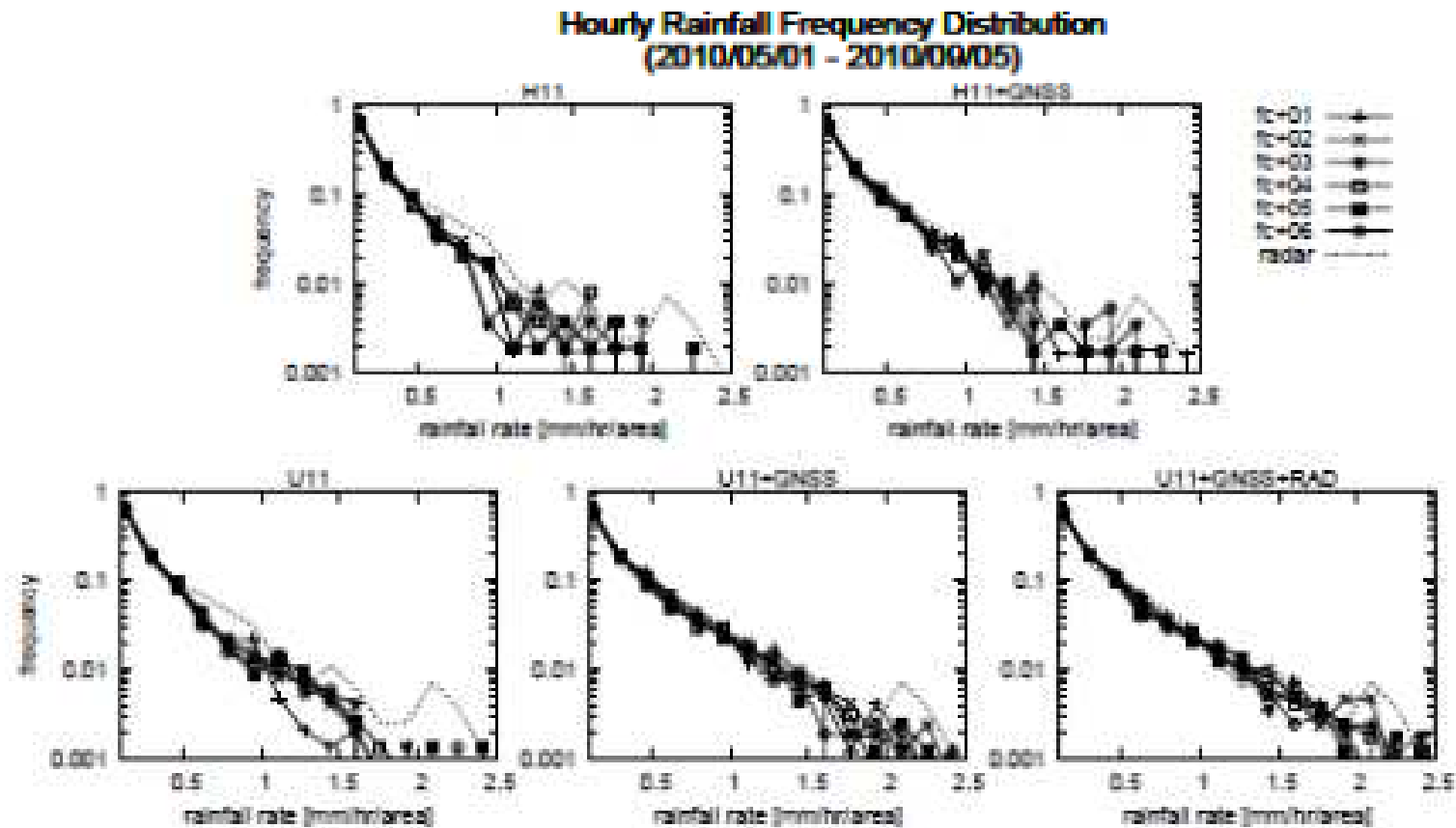


Figure 6. Frequency distributions of total corrected hourly radar rainfall estimates (dashed lines) and the six hourly NWP rainfall forecasts (solid lines with symbols) in the the Netherlands (see Fig. 4) for the summer period. Each panel shows the distribution for the five different experiments.

Courtesy: Siebren de Haan

Highlights (2): Upper air physics and dynamics

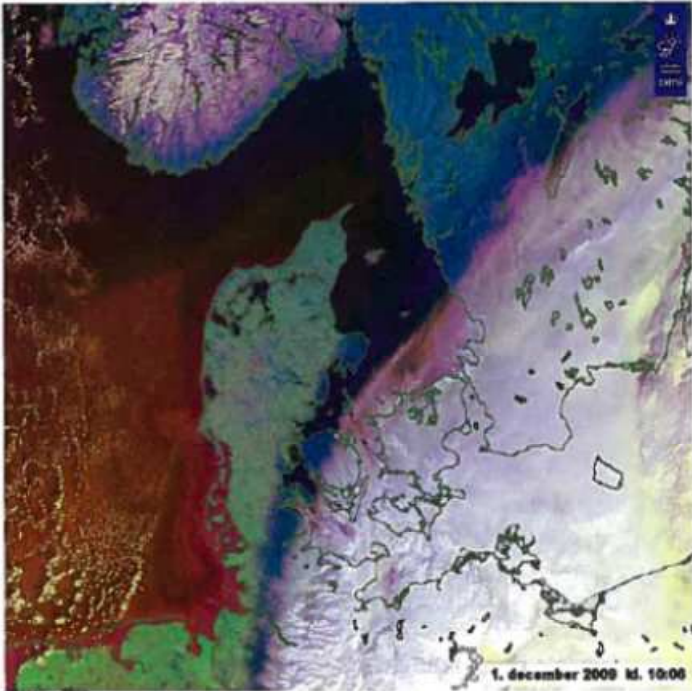
Dynamics:

- ✓ Nesting studies: direct nesting of Harmonie-2.5km in ECMWF
- ✓ Continued work on NH VFE formulation

Physics:

- ✓ Quasi-3D turbulence and tilted radiation schemes
- ✓ Experimentation with introduction of stochasticity through cellular automata
- ✓ Start introduction of direct/indirect aerosol effects
- ✓ Harmonie regional climate modelling setup introduced
- ✓ ENVIRO-HIRLAM studies of coupled atmospheric chemistry modelling

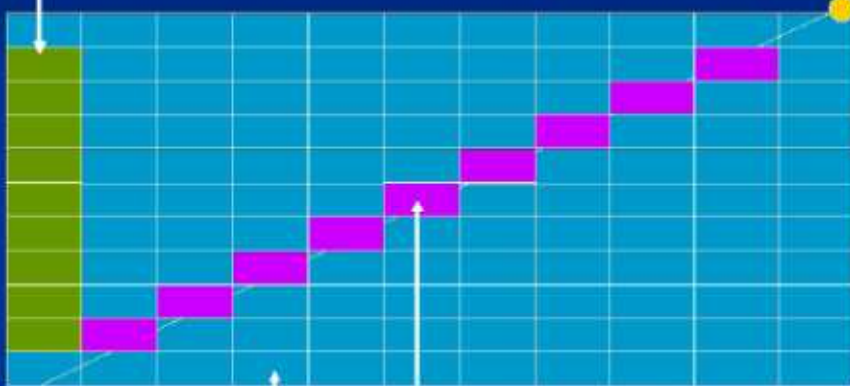
Highlights (2): Upper air physics and dynamics



Tilted column modelling

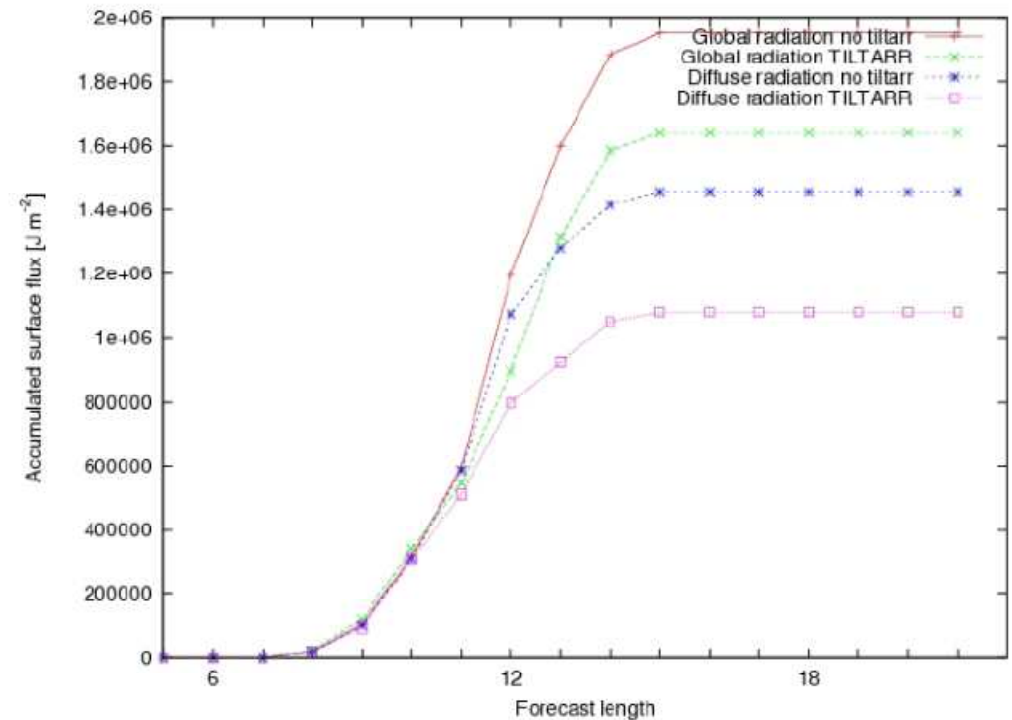
'classical' vertical air column
for model physics computations

Position
of the sun



Planned new configuration:
Each time step a tilted air column is
determined in the direction of the sun
for computations of solar radiation

Results for mixed cloud conditions



(Courtesy: Kristian P. Nielsen)



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