Numerical weather prediction environment in Estonian Environmental Agency

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THE NWP ENVIRONMENT

- Two level system with ETA and ETB areas (Fig. 1)
- ETA II
  - 4 x 54 h forecasts
  - Version 7.4.0
  - 366x280x60 11.1 km resolution
  - Time-step 300 s
  - 3DVAR
  - ASCAT assimilation (Fig. 2)
  - Boundaries with 1h interval from ECMWF
- ETB II
  - 2 x 36 h forecasts.
  - Version 7.1.2
  - 306x306x60 3.3 km resolution
  - Time-step 120 s
  - 3DVAR
  - Boundaries with 1h interval from ETA
- HIRLAM model usage (Fig. 3, 4)
  - HS SISL
  - DFI
  - ISBA surface scheme
  - Kain-Fritsch condensation scheme for ETA and STRACO for ETB
  - Savijärvi radiation
  - CBR -turbulence scheme

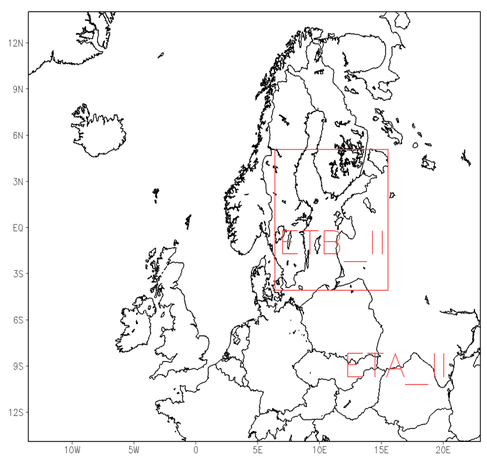
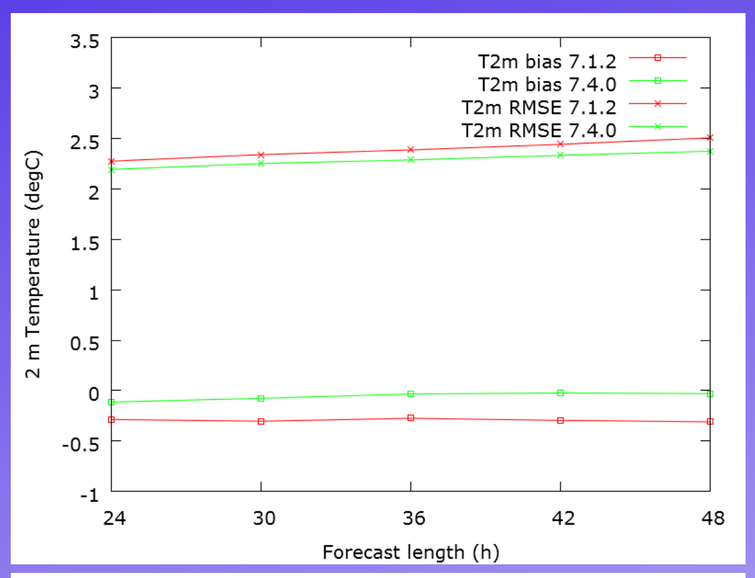


Figure 1. Modelling areas.

DEVELOPMENT AND RESEARCH

In cooperation with University of Tartu, research and development is focused:

- Research on convective processes and convective storms (Fig. 5)
- Interaction with aerosols (see poster by V. Toll)
- Growing interest to apply HARMONIE as a regional climate model



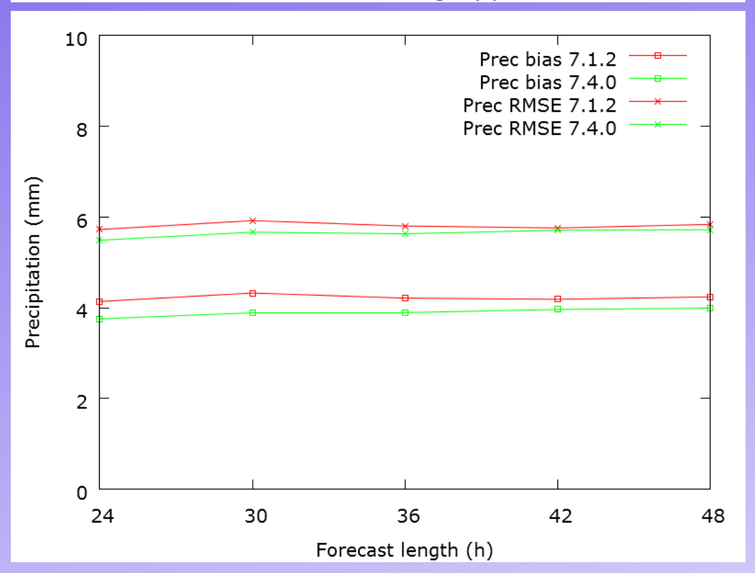


Figure 3. Biases (squares) and RMS errors (crosses) of 2 m tempe-rature and precipitation of HIRLAM 7.1.2 (red) and HIRLAM 7.4.0 (green) from October 2013 to February 2014.

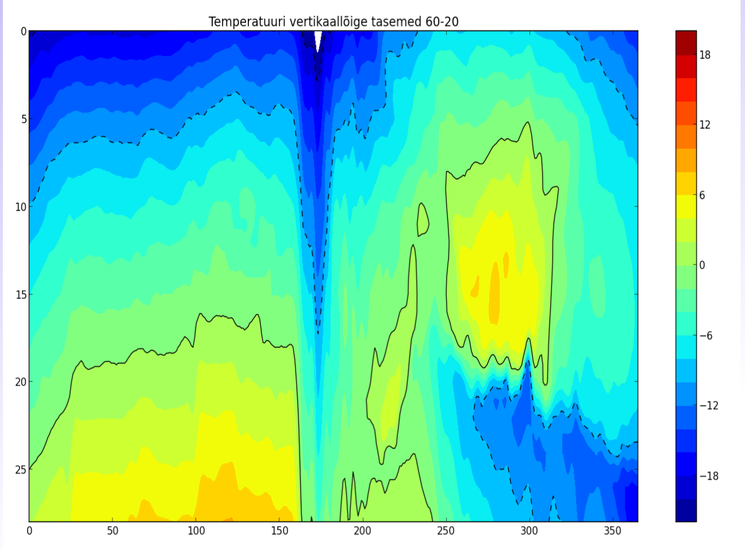


Figure 4. A successful 12 h forecast of freezing rain on 02.02.2014. A vertical cross-section of the temperature field.

COMPUTING ENVIRONMENT (since 2007 😕)

- 32 nodes with 2 dual core processors
- AMD Opteron 2220 2.8 GHz dual core processors
- Each node has 8G RAM
- Myrinet 2000 interconnects
- Diskless cluster computer
- 1.2 TB disk space
- Operational system is Debian Linux stable
- gcc/gfortran compilers
- OpenMPI with mx

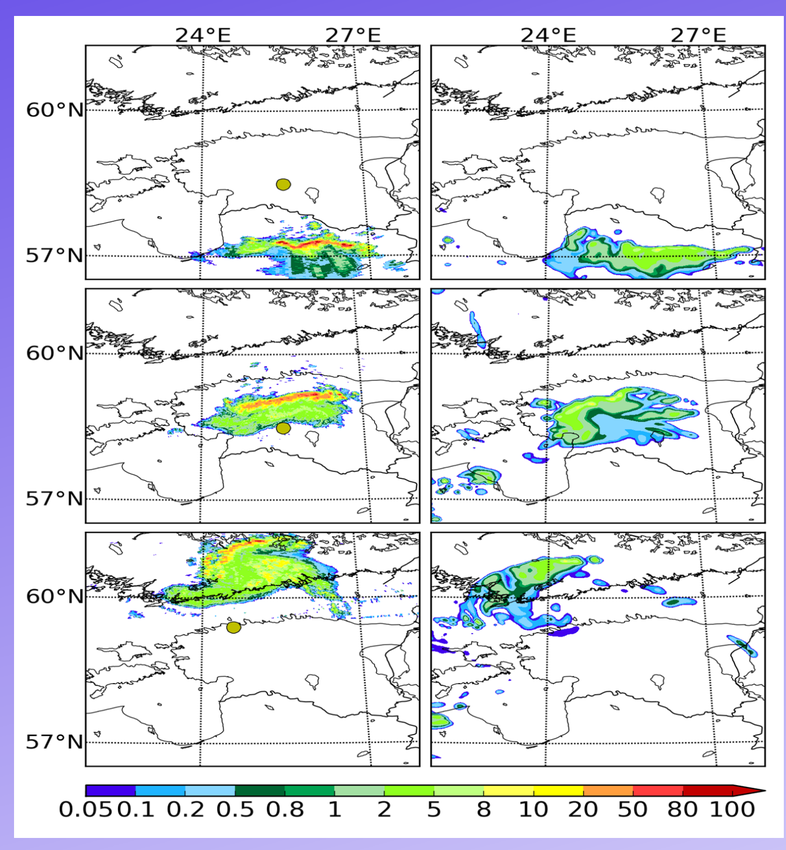


Figure 5. Prediction of severe convective storm with HARMONIE (right column) compared to radar observations (left column) of precipitation intensity (mm/h).

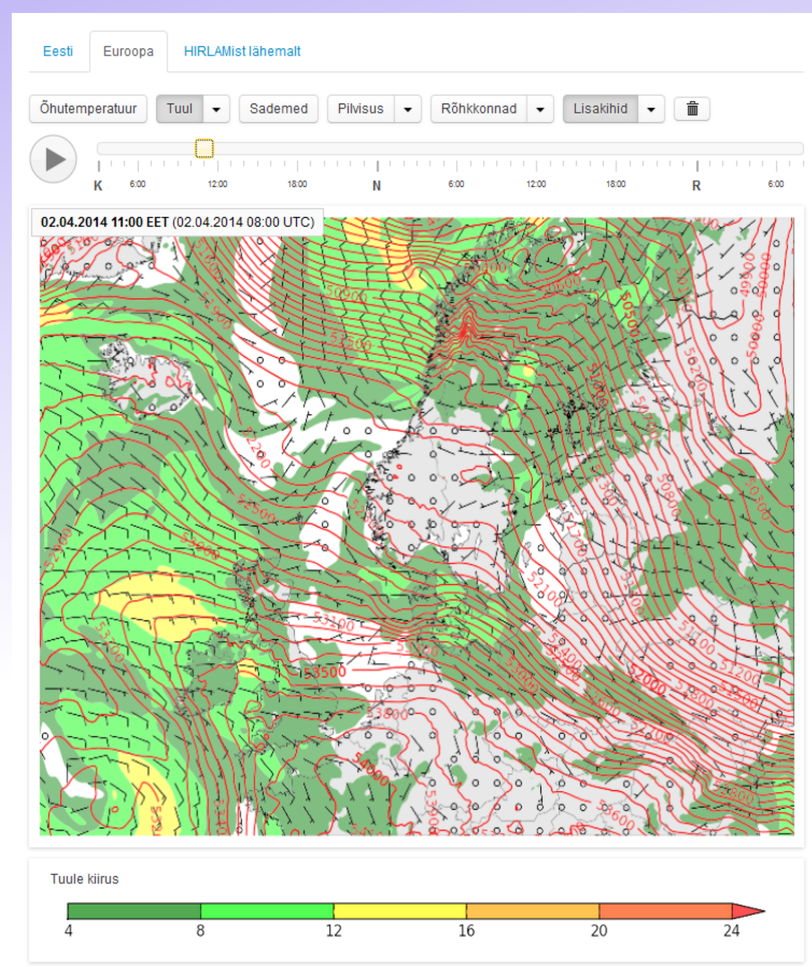


Figure 6. A new interface for NWP environment visualisation in web.

FUTURE PLANS

In near future the NWP environment at EtEA will focus on the following goals:

- New cluster computer
  - HARMONIE has been used as a benchmark
- New web visualisation environment (Fig. 6)
- Main operational area based on HIRLAM 7.4.0 (larger domain) ETB will be replaced with HARMONIE

ACKNOWLEDGEMENTS

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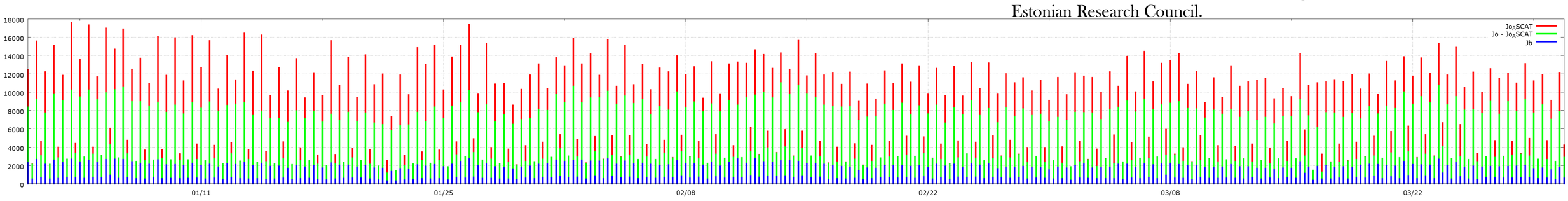

Figure 2. The impact of ASCAT winds assimilation to cost function.