TARTU ÜLIKOOL
1632

Nonhydrostatic HIRLAM with semi-lagrangian semi-implicit dynamic core in high resolution NWP environment

Aarne Männik, R. Rõõm, A. Luhamaa
University of Tartu

aarne.mannik@ut.ee

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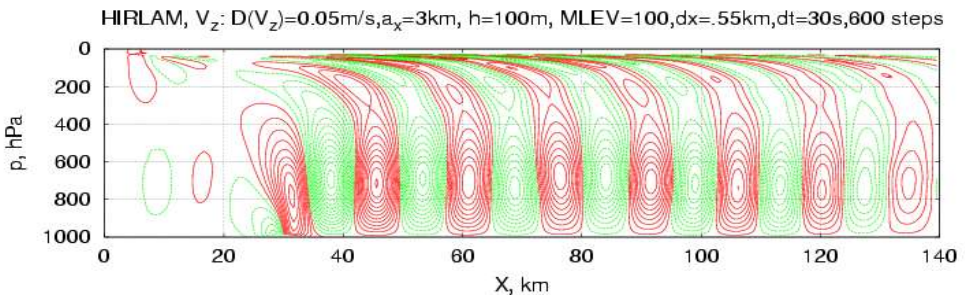
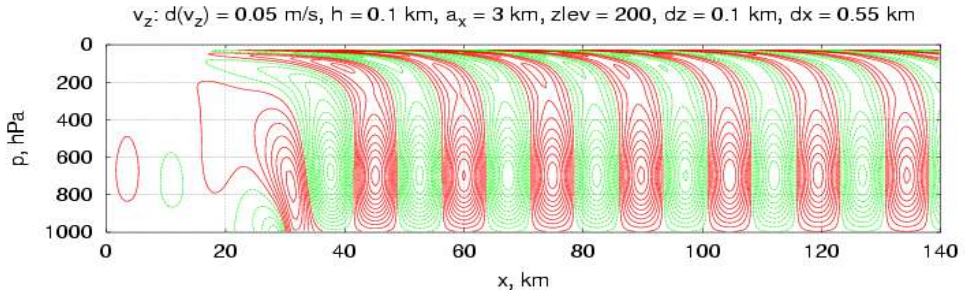
NH SISL and HIRLAM

- Developed at University of Tartu
- Extension to HS HIRLAM routines
- adiabatic core
- White (1989) model
- Two-time-level
- Non-constant with height temperature background profile
- Ported to HIRLAM 6.4.0 in June 2005



a) NH SISL HIRLAM



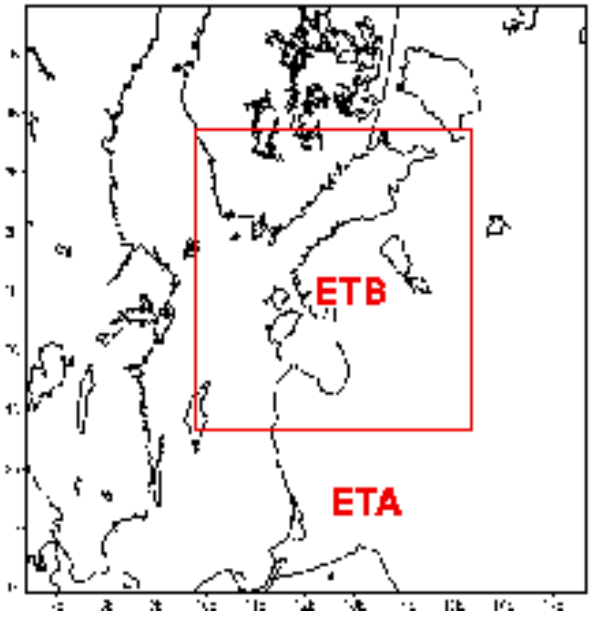
b) linear analytical

NWP environment at EMHI (I)

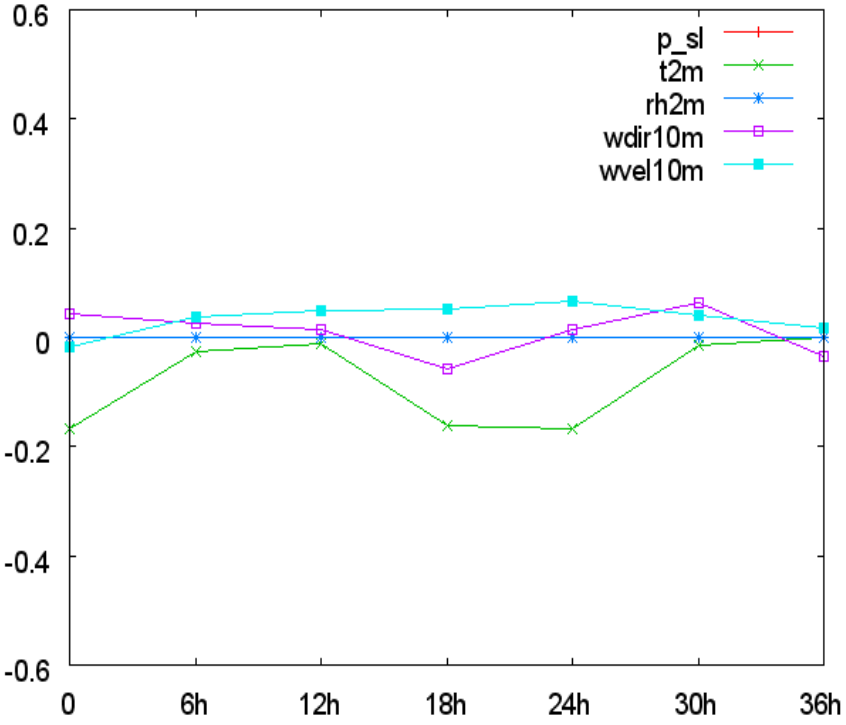
- Experimental „operational“ NWP environment
- Joint project of University of Tartu (UT), Estonian Meteorological Hydrological Institute (EMHI), Finnish Meteorological Institute (FMI)
- EMHI provides computing and operating environment
- FMI provides boundary fields and know-how
- UT maintains and develops the environment and NH model

NWP environment at EMHI (II)

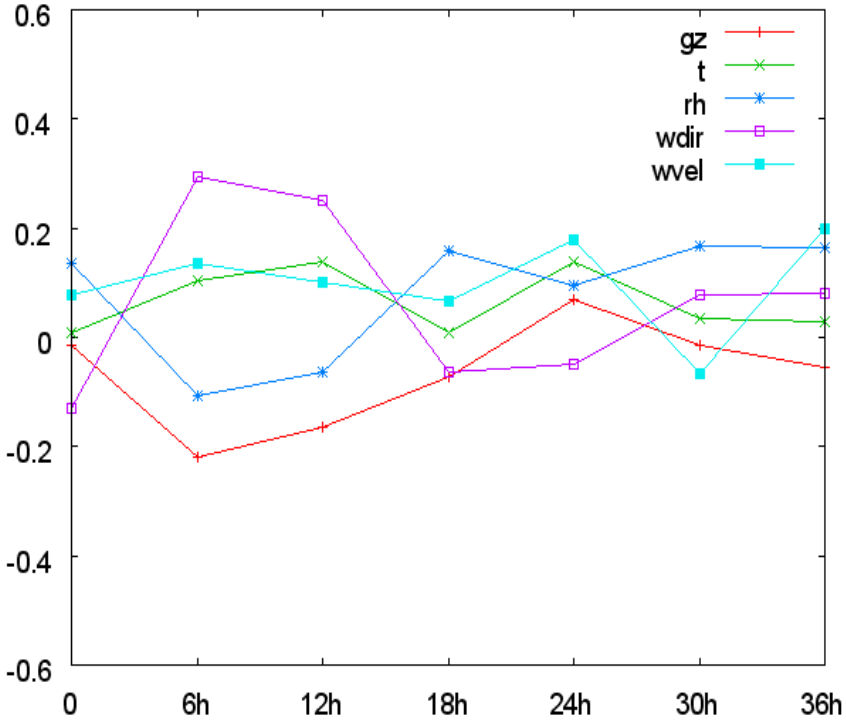
- ETA 114×100×40
  - 11.1 km resolution
  - HS SISL Δt=400s
- ETB 186×170×40
  - 3.3 km resolution
  - NH SISL Δt=120s
- Continuous 36h forecasts at 00 and 06 GMT + 6h forecasts to maintain analysis cycle
- HIRLAM 6.4.0 (since October 2005)
  - 3DVAR
  - NMI
  - STRACO, CBR, Savijärvi radiation



Verification examples (I)



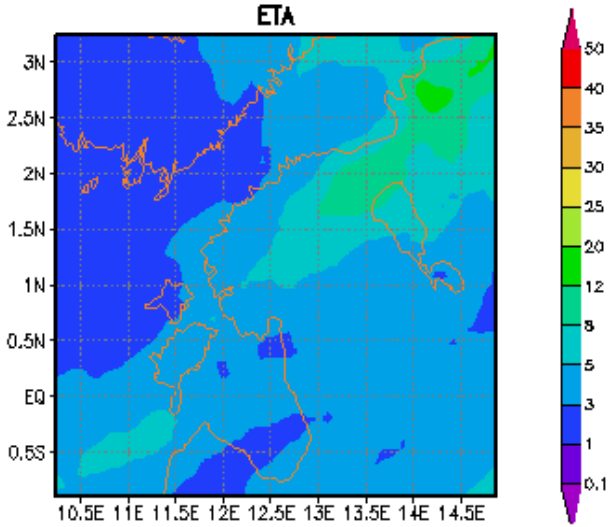
skill of surface variables

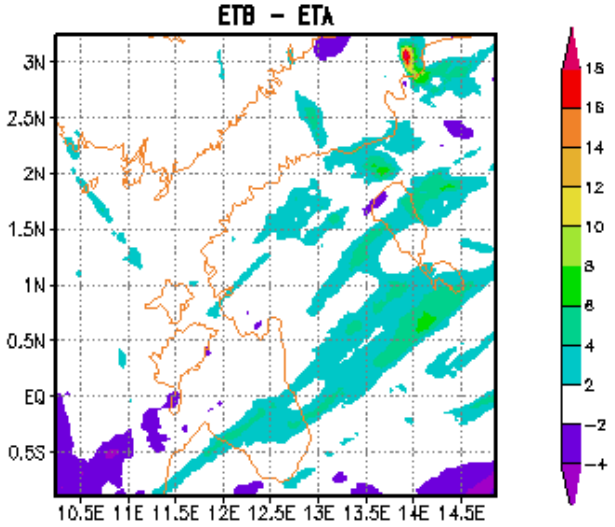


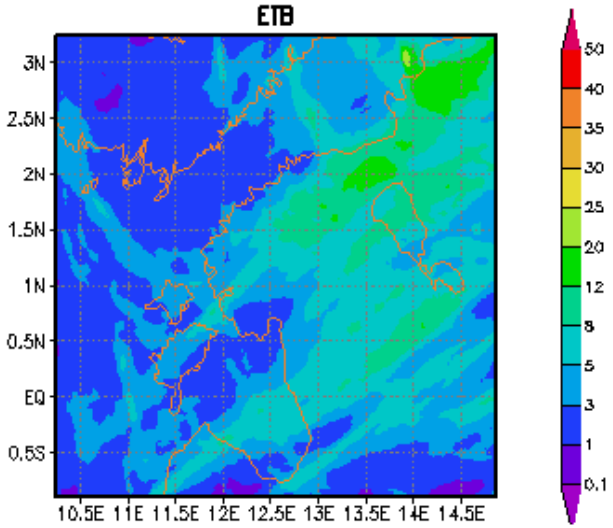
skill of 500 mb variables

$$MSESS = 1 - \frac{MSE_{ETB}}{MSE_{ETA}}$$

Verification examples (II)







36h precipitation comparison
2005102300

Future plans

- Explicit deep convection and parameterized shallow convection
- Develop better precipitation verification capabilities
- Closer look at local/coastal wind properties
- Critical evaluation of output with the respect of air quality modelling (COST 728)
- Increase vertical resolution (if computing power increases)