ILMATIETEEN LAITOS
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On-line boundary layer verification of weather models

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INTRODUCTION

Starting from 2002, operative on-line comparison of mast measurements to model forecasts have been performed as a part of HIRLAM RCR operational runs at FMI.

The web site at hirlam.org is used as a data pool, to where all comparison participants transfer their data, and from where the data is then retrieved by the plotting routines.

The plots provide a near-real-time information about the performance of the models and can be used for example to study nocturnal winter-time surface temperature inversions, which still pose a difficult challenge to weather forecast models.

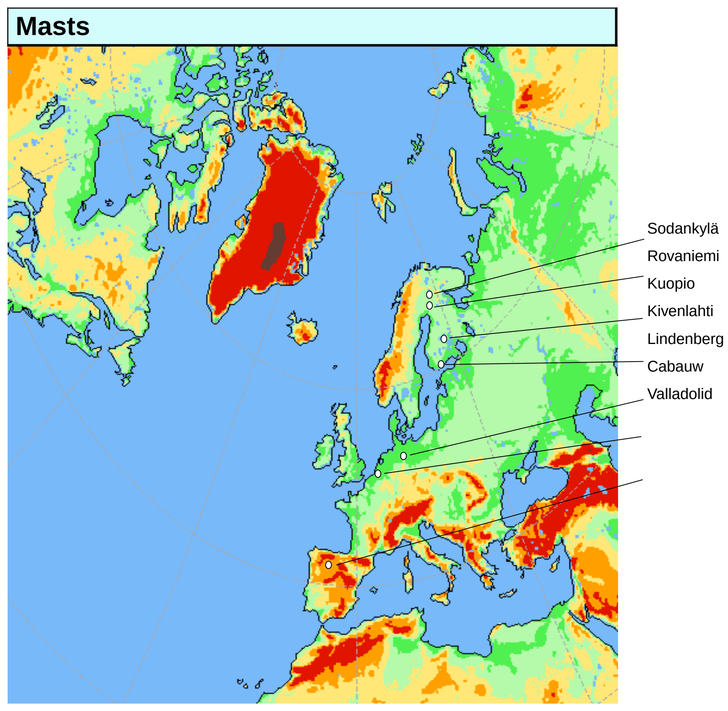
Being a part of HIRLAM RCR runs at FMI, the plots are produced in connection of each forecast cycle. The resulting comparison plots can be viewed through RCR HIRLAM visualisation web pages at http://fminwp.fmi.fi.

COMPARISONS

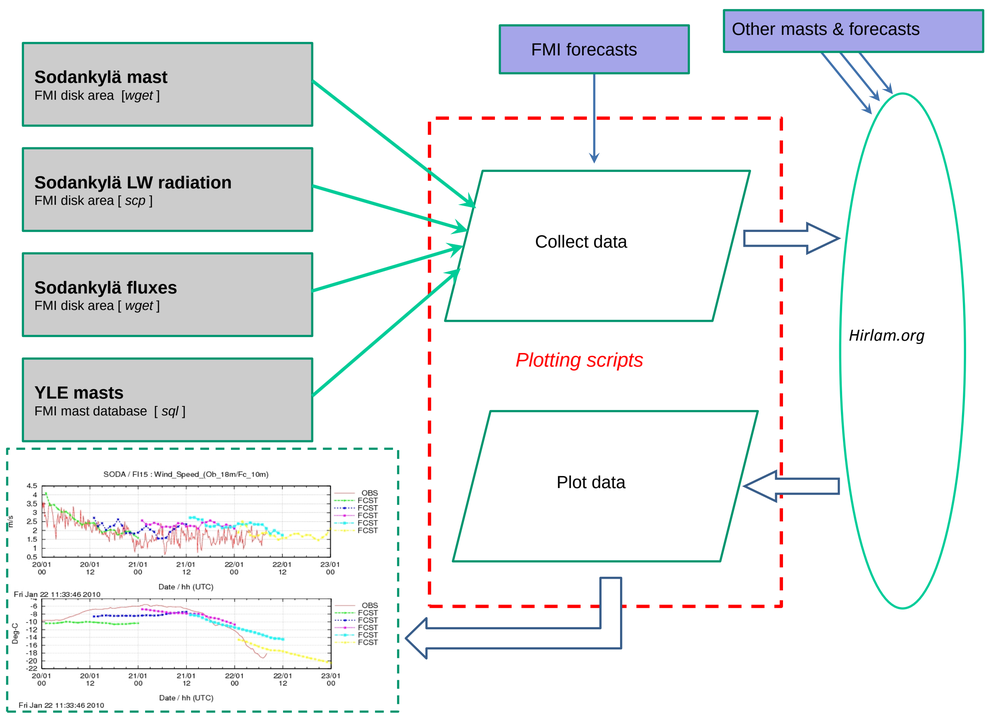
Models
Hirlam RCR (Fin)
Hirlam MB71 (Fin)
Hirlam AEMet (Spa)
Arpege (Fra)
Aladin (Fra)
”Mini”Arome (Fra)
FMI Arome (Fin)
IFS (ECMWF)

Parameters
Temperatures
Wind speed
Relative humidity
Radiation components
Heat fluxes
Momentum flux

Masts



PLOTTING SYSTEM

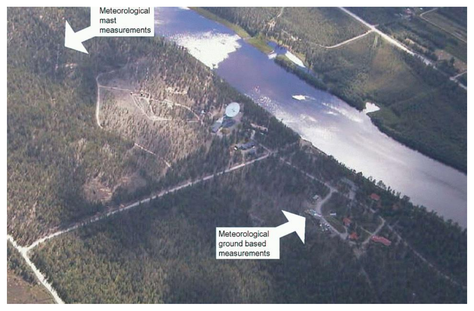


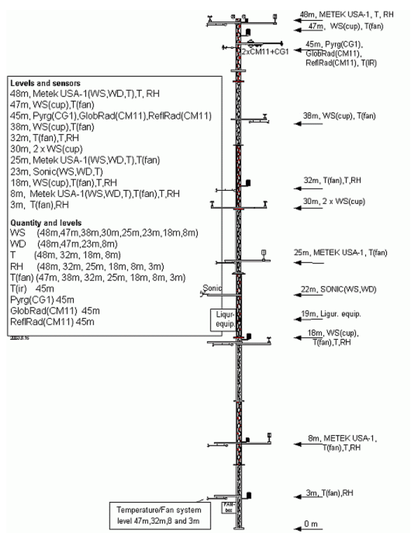
SYSTEM APPLICATION : NORDIC TEMPERATURE PROBLEM

The nocturnal winter-time surface temperature inversions still pose a difficult challenge to weather forecast models. The aim with this model-mast comparison system is to produce pictures, which would act not only as a verification tool but also as a kind of "alarm bell" for model developers, giving them real-time alerts about possible problems with the model.

FMI Arctic Research Centre at Sodankylä : ”test bench”

- 67.4ºN, 26.6ºE, 179 m.s.l.
- 48 m mast
- CEOP, SRNWP data pool
- SYNOP, soundings, ABL mast, CO2 ,...

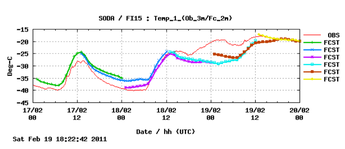




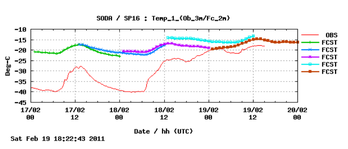
Example 1 : cold spell in mid-February 2011

- Most models having difficulties when predicting screen-level temperature

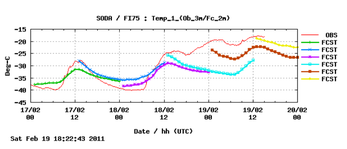
Hir v73 (RCR, FMI)



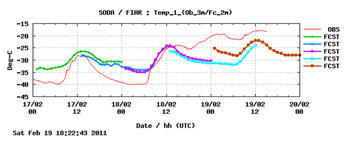
Hir v72 (AEMet)



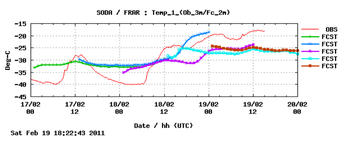
Hir v71 (MB71, FMI)



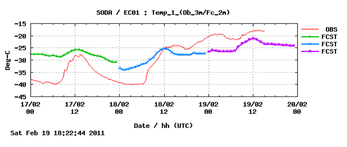
Harmonie (FMI)



Arpege (MetFr)



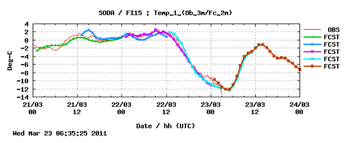
IFS (ECMWF)



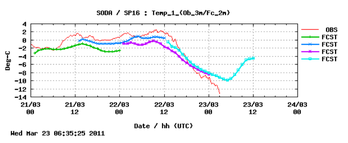
Example 2 : warmer weather in March 2011

- Models fare better

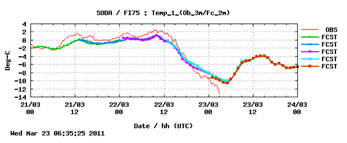
Hir v73 (RCR, FMI)



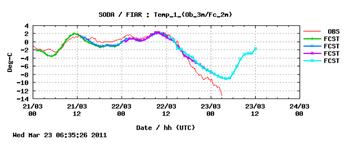
Hir v72 (AEMet)



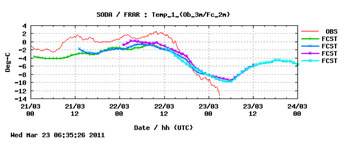
Hir v71 (MB71, FMI)



Harmonie (FMI)



Arpege (MetFr)



IFS (ECMWF)