ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

SRNWP at FMI

Markku Kangas, Erik Gregow, Niko Sokka & Carl Fortelius

Operational

SRNWP SUITES	HIRLAM v7.4 ”RCR”	HARMONIE Cy38h12 *) ”AROME”
Mesh size	7.5 km	2.5 km
Number of grid points	1036 * 816	720 * 800
Number of levels	65	65
Initial times	00/06/12/18 UTC	00/03/06/09/12/15/18/21 UTC
Range	+54 h	+54 h
Upper air analysis	4D-var	3D-var
Surface analysis	Optimal interpolation	Optimal interpolation
Nestor forecast	ECMWF IFS, hh - 6 h	ECMWF IFS, hh – 6-9 h
LBC frequency	3 h	3 h

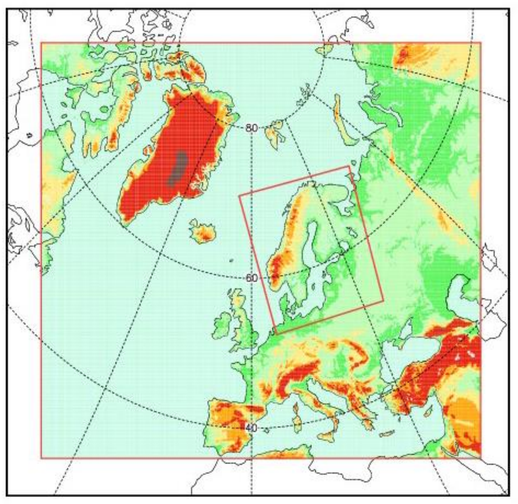
*) From 2017-09 replaced by MetCoOp HARMONIE-AROME EPS control member

COMPUTING RESOURCES

Cray XC30: 2 identical clusters, each with 3420 cores, 10.7 TB memory

Peak performance ca 70 Tflop/s for each cluster, ca 140 Tflop/s total

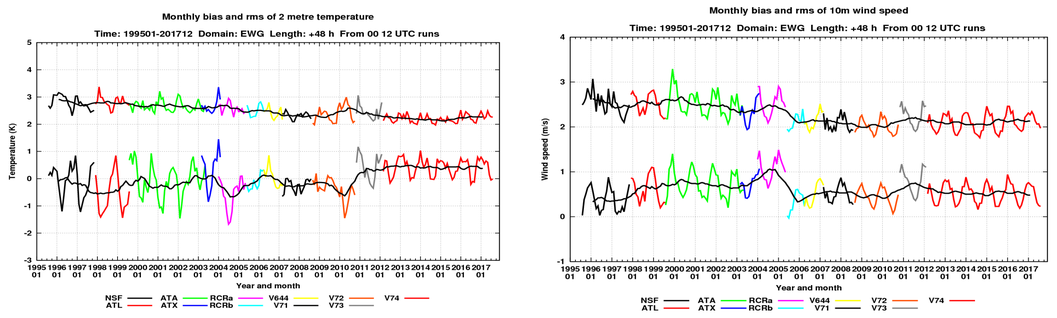
HIRLAM v74 / HARMONIE aro38h12



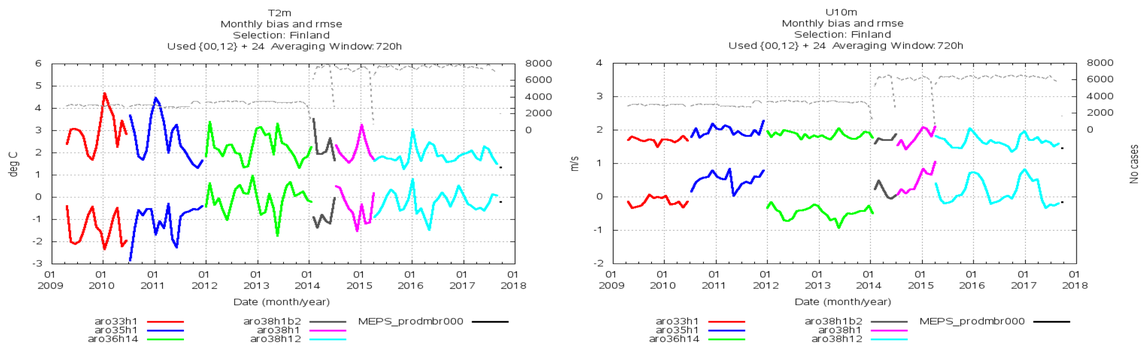
DOWNSTREAM & RELATED APPLICATIONS

SILAM dispersion and chemical transp. model -POLLEN -FAS -DMAT	Particle dispersion, jointly with the Radiation and Nuclear Safety Authority STUK	Nuclear emergency preparedness Forest fires Volcanic ash Long-range pollen transport
	Chemical transport modelling	SO_2, NO, O_3, CO, PM_{10}, $PM_{2.5}$, concentrations and deposition
HILATAR	Eulerian regional transport	SO_x, NO_x, NH_x, toxic metals, dust
Road model	State of road surfaces and pedestrian pavements Intelligent traffic applications	
Marine models	Baltic wave forecasts	WAM
	Sea level at Finnish coast	OAAS, WETEHINEN 2D
	Baltic ice	HELMI
	Baltic water circulation	HBM
Hydrological models	Managed by Finland’s environmental administration SYKE	
LAPS	Hourly analyses of surface and upper air variables	

Model verification



HIRLAM long-term verification for T_{2m} and V_{10m} years 1995 - 2017



HARMONIE-AROME long-term verification for T_{2m} and V_{10m} 04/2009 – 9/2017

Open data access

The Finnish Meteorological Institute has made its data sets freely available for public use. The data sets can be obtained in machine-readable, digital format. An online service that will make it possible to search for, browse and download the Institute's data sets has been developed.

Information about the open data access can be found from

https://en.ilmatieteenlaitos.fi/open-data

The available data includes e.g.

- Weather forecast models: HIRLAM, HARMONIE-AROME
- Sea models (surface level, temperature, waves)
- Climate change forecasts for 30 year periods
- Real time observations: weather stations, sea level and waves, weather radar and lightning flashes
- Observation time series: climate, sea level and waves

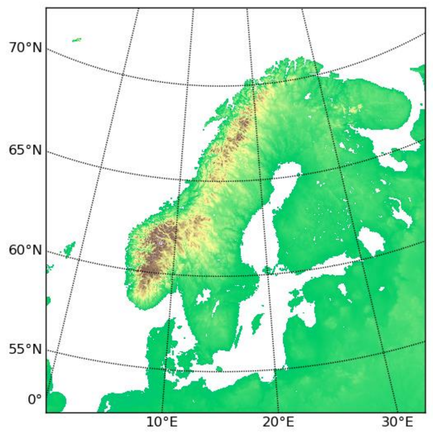
FMI joins Nordic MetCoOp cooperation

Starting from January 2017, FMI has been a member of a Nordic MetCoOp cooperation with Norway and Sweden, where the countries run a common ensemble prediction system called MEPS based on non-hydrostatic convection-permitting Harmonie-Arome developed in a code cooperation with Météo-France and ALADIN.

From September 2017, FMI has been integral part of the production chain, running one of the EPS members. The MEPS control member now also replaces FMI's own Harmonie-Arome runs.

MEPS main specifications

- Harmonie-Arome version cy40h1.1
- Horizontal resolution 2.5 km, 900×960 points (including extension zone)
- Non-hydrostatic dynamics, semi-Lagrangian advection
- HARMONIE-AROME atmospheric physics, SURFEX (v.7.3) surface scheme
- 1+9 ensemble members with initial value, surface and boundary perturbations



MEPS integration area

FMI - LAPS

FMI - Local Analysis and Prediction System (LAPS)

FMI-LAPS 3D-analysis use background fields from the latest forecast and observational datasets:

- ECMWF-IFS and in near future HARMONIE-MEPS
- In-situ and remote-sensing observations (see below figure)
- 3 km horizontal grid, 44 vertical levels, covering Scandinavia

Special focus is on improved precipitation and cloud-related analysed fields. Forecasts are used within FMI nowcasting and short-range applications and several other end-user applications, including hydrological, fire-weather and road models, hot-start of HARMONIE-AROME, post-processing of radiation quantities etc.