ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

SRNWP at FMI

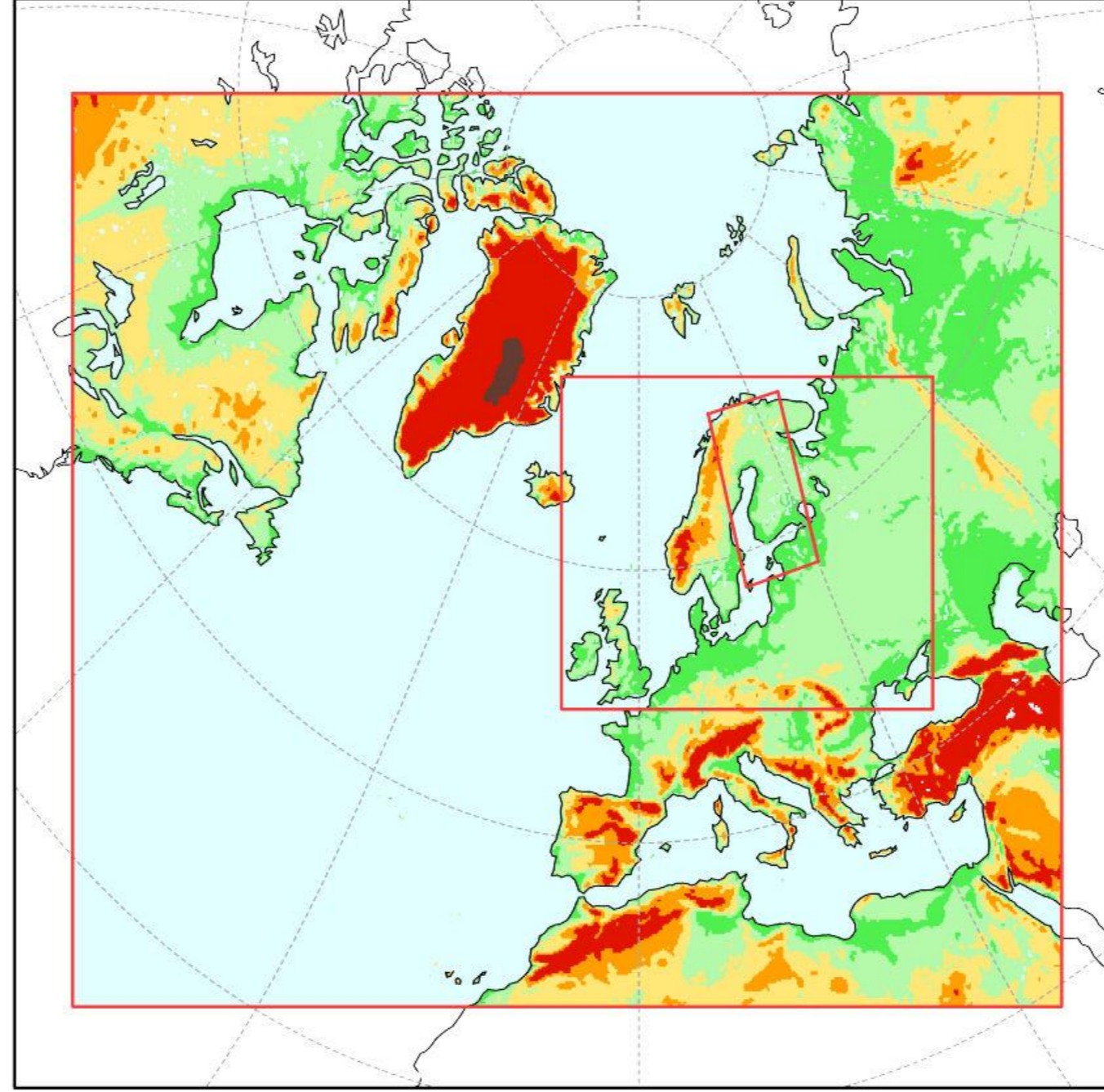Carl Fortelius, Erik Gregow and Ekaterina Kourzeneva

Operational

HIRLAM RCR --> HIRLAM MB71 --> AROME

| SRNWP SUITES:	HIRLAM v7.3 "RCR"	HIRLAM v7.1 "MB71"	HARMONIE Cy35h1 "AROME"
Mesh size	16 km	7.5 km	2.5 km
Number of grid points	582 * 448	480 * 360	300 * 600
Number of levels	60		
Initial times	00/06/12/18 UTC		
Range	+54 h		+24 h
Upper air analysis	4D-var	3D-var FGAT	Interpolated LBC
Surface analysis	Optim interpolation		Interpolated LBC
Nestor forecast	ECMWF IFS, hh - 6 h		HIRLAM MB71, hh-6 h
LBC frequency	3 h		1 h
Computing resource:			
2 Identical Cray XT5m clusters			
Peak performance 17.3 TFlop/s for each, ca 35 Tflops/s total			

DOWNSTREAM APPLICATIONS

SILAM dispersion and CTM model	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
Road model	State of road surfaces and pavements	
Marine models	Wave forecasts in the Baltic sea	
	Sea level along the Finnish coast	
	Trajectories of objects or oil spill	
	Vessel icing	
Hydrological models	Managed by Finland's environmental administration SYKE	
and more		

Under development

New meso-scale forecasting suite based on HARMONIE Cy 36h1.4, including data-assimilation

Mesh size	Number of grid points	Number of levels	Initial times	Range	Upper air analysis	Surface analysis	Nestor forecast	LBC freq.
2.5 km	300 * 600	**65, lowest at 12 m**	00/06/ 12/18	**36 h**	3D-var	**Optimal interp.**	ECMWF IFS, hh-6 h	3h

New features **in boldface**
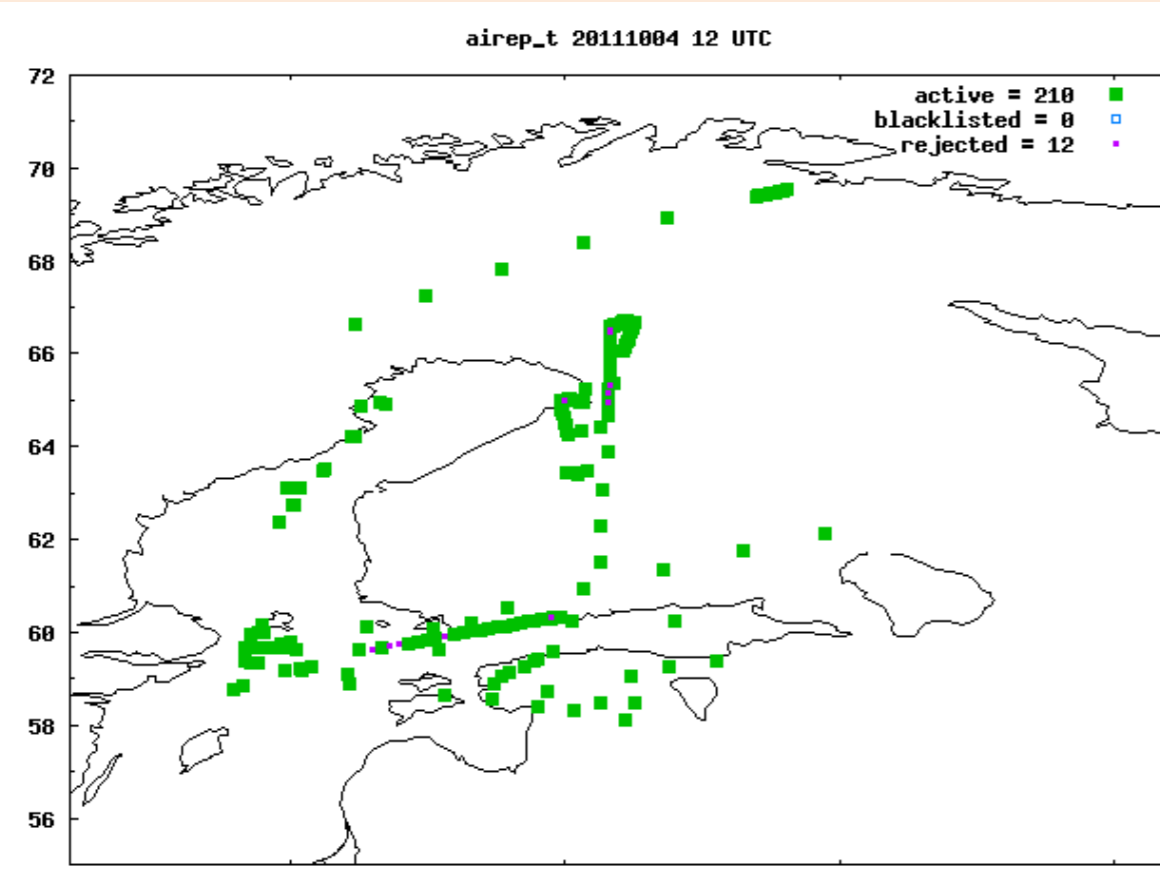
Left: AMDAR observations 4th October 2011, 12 UTC

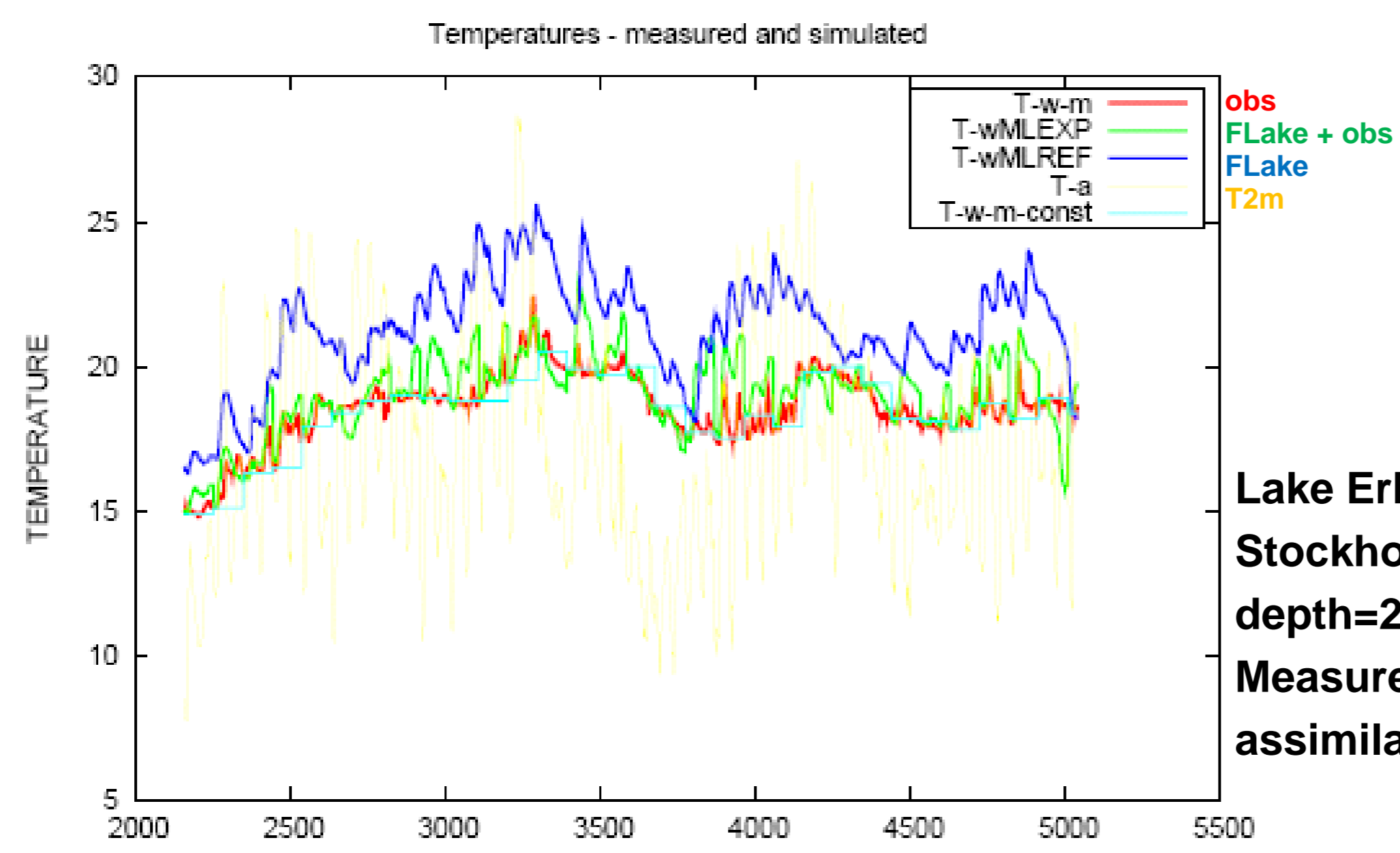**Right: Results of parallel testing: New vs. oper: Finnish stations September 2011:**
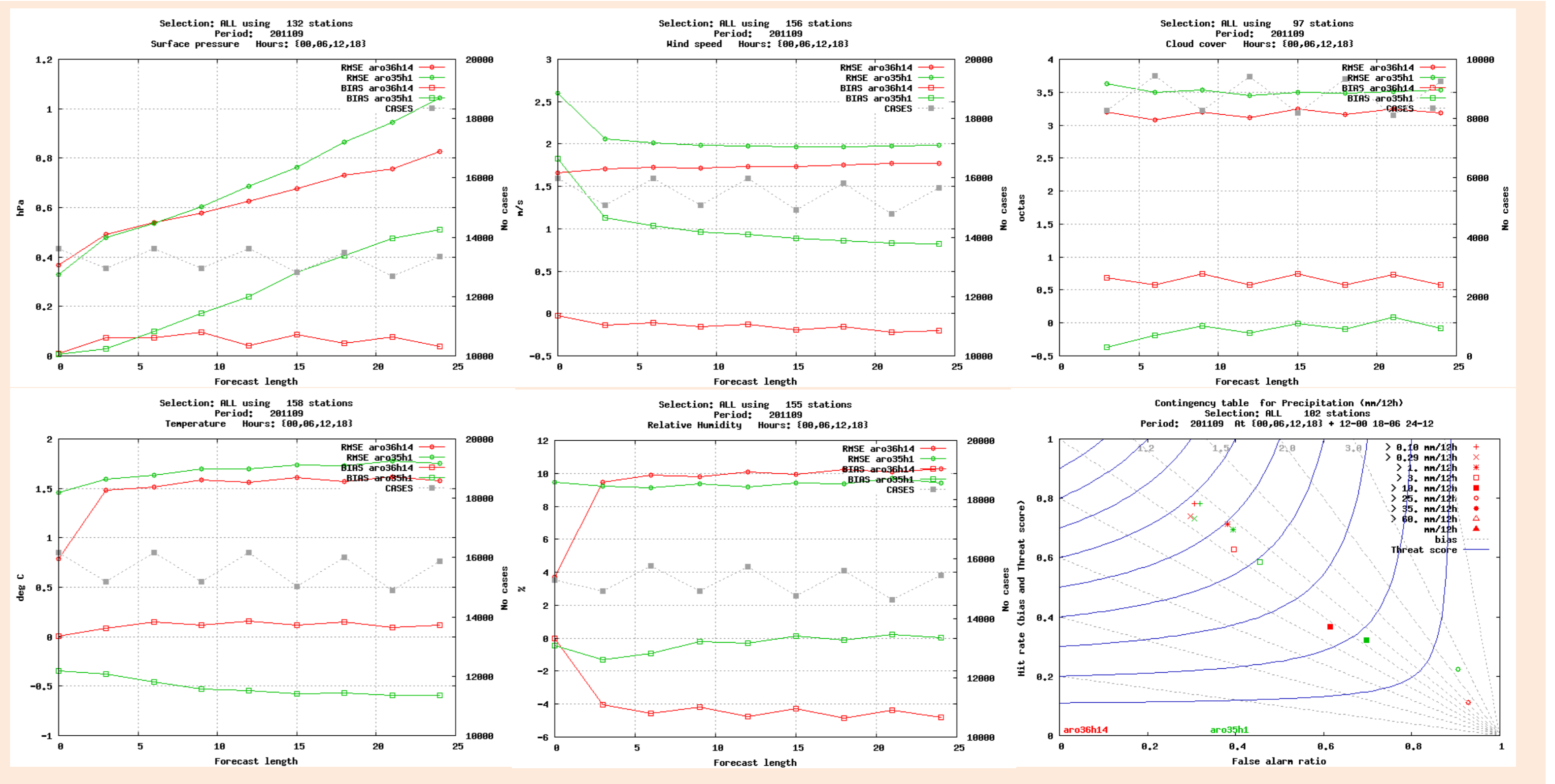
Data assimilation for lake temperature Using Flake and the Extended Kalman Filter (EKF)

Flake is a 2-layer parametric representation of the vertical temperature profile in lakes, based on the concept of self-similarity. For more details, see: http://www.flake.igb-berlin.de/

Prognostic variables of Flake	Mean temperature Bottom temperature Mixed layer depth Temperature profile shape factor
Diagnostic variable of Flake	Mixed layer (surface) temperature
Observations:	Lake surface water temperature

LAPS: Local analysis and prediction system

Univariate analyses for forecasters and downstream applications
Upper-air and surface fields
Clouds, precipitation
Experimental: variational analysis for "0" - 6h numerical "nowcasting"
LAPS FMI: http://testbed.fmi.fi/history_browser-laps-finland-public.php
LAPS home: http://laps.noaa.gov/

Lake Erken near Stockholm Non-mixed lake, depth=21 m, Measured every hour, assimilated every 48 hours

Summer period: 15.06-15.08.1989

LAPS cloud analysis, lines indicate icing: