

SMHI operational HIRLAM

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Operational HIRLAM

- 4 forecasts a day. 00, 06, 12 and 18 UTC
- HIRLAM C22 – analysis +48 hours
2 hours data cutoff
- HIRLAM E11 – analysis +72 hours
1 hour 25 min data cutoff
- HIRLAM G05 – analysis + 48 hours
nested to E11
- SYNOP,SHIP,TEMP,PILOT,
BUOY,AIREP,AMDAR
- BUFR AMDAR
- ATOVS AMSU-A radiances
- HIROMB oceanographic model for ice cover and SST

HIRLAM system

HIRLAM version 7.1.2

- 4D-VAR on C22 domain
- 3D-VAR FGAT on E11 and G05
- Rasch-Kristjansson from CAM3
- Kain-Fritsch – 'old' version

PLANS

- 4D-VAR on E11 domain
- Combine C22 and E11 to 11km/60 levels on large area
- Introduce Large-Scale mixing
- Upgrade analysis code to use RTTOV8
- Major upgrade in the use of new data:
NOAA-18, AMSU-A over land, AMSU-B, AMW,
- Decision will be based on results from CIS (Comprehensive observation Impact Studies)

4D-VAR at SMHI

Operational 20080130

66 km linear grid
SL, SETTLS
vert. diff. + large scale cond. linearised simplified physics
weak digital constraint
linear propagation of assimilation increments
statistical balance background constraint

Contingency table for precipitation

	OBSERVED PRECIPITATION mm/12 hour						
	0.1	0.3	1.0	3.0	10.0	30.0	100.0
F1	165524	2152	2454	1208	1060	101	0
O1	27016	1581	2627	1206	869	102	0
R1	31009	3209	6229	3130	2455	307	0
E1	20635	3819	9363	6451	6015	867	0
C1	9918	2331	7757	8510	12247	3481	4
A1	1146	263	1102	1547	4313	3675	60
S1	14	5	6	17	49	196	55
T1	0	0	0	0	0	1	0

	OBSERVED PRECIPITATION mm/12 hour						
	0.1	0.3	1.0	3.0	10.0	30.0	100.0
F1	190608	3854	5196	2404	1767	175	0
O1	19309	1941	3572	1840	1223	147	0
R1	20886	2726	6056	3423	2852	331	0
E1	14244	2621	7018	5513	5562	789	0
C1	8684	1920	6482	7095	10996	3352	5
A1	1233	295	1205	1760	4535	3752	62
S1	28	3	12	34	73	227	52
T1	0	0	0	0	0	0	0

SMHI HIRLAM area C22 (22 km) E11 (11 km) G05 (5 km)

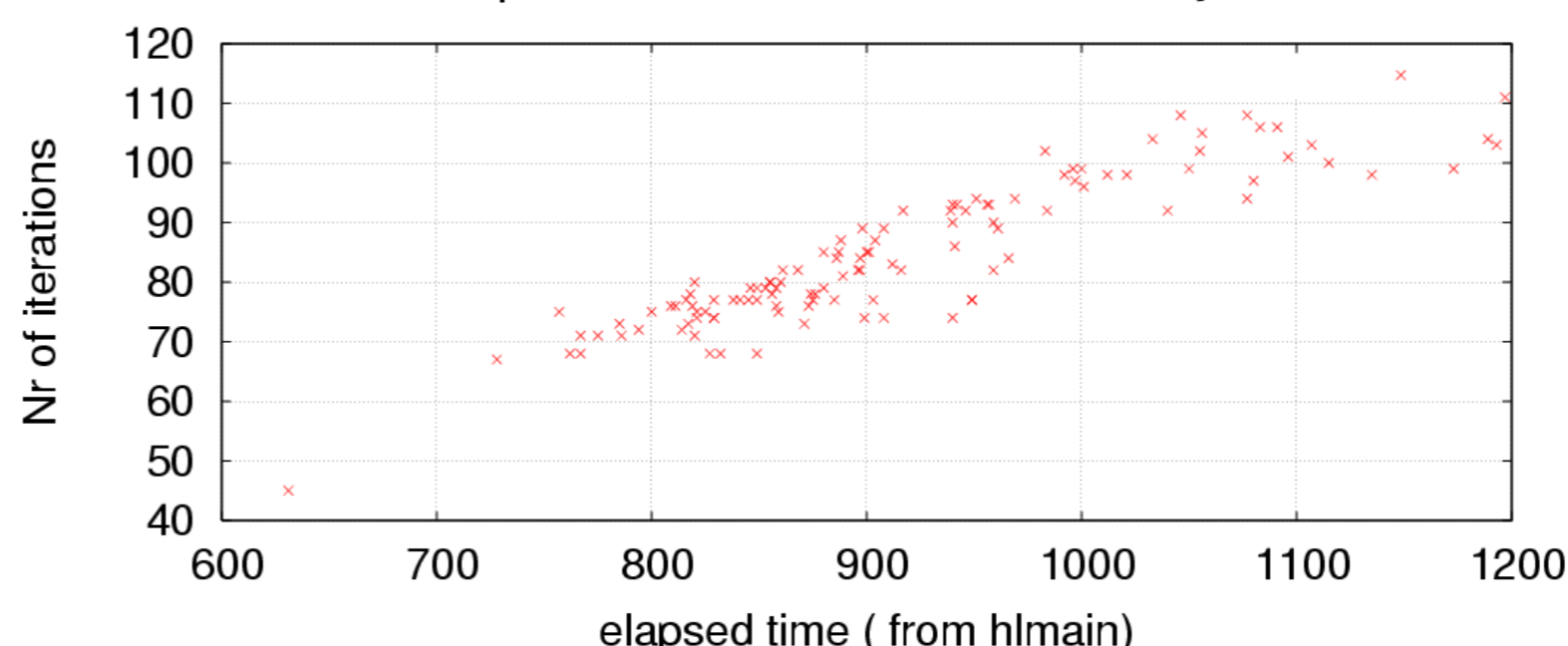


Rotated lat/lon South pole at -30 / -10

HIRLAM domain's

	C22	E11	G05
Levels:	40	60	60
Hor. Res.	0.2° (22 km)	0.1° (11 km)	0.05° (5.6 km)
Gridpoints	306x306	256x288	294x441
Boundaries	ECMWF 3 hour	ECMWF 3 hour	E11 every hour
Time step	600 sec	300 sec	150 sec

Computational cost av 4DVAR - February 2008



To compare computational cost

C22-domain 306x306x40 gp
600 sec timestep **+48 hours**

hlprog.x 750 sec

3DVAR 80 – 160 sec

HIRLAM-A at SMHI

cy32t3

ALARO: 300x450x60 gridpoints. 5.5 km at { 00 , 18 } + 30 hours
domain as Hirlam G05
boundaries Hirlam E11
at present hydrostatic

AROME: 270x288x60 gridpoints. 2.5 km at { 18 } + 30 hours
domain over northern Sweden
boundaries Hirlam G05

Computer system

at the **National Supercomputing Centre** at Linköping University www.nsc.liu.se



Operational:
BLIXT

- Linux
- 82 nodes
- dual Intel Xeon
3.2 Ghz, 2 GB memory
- Infiniband interconnect
- Scali MPI connect
- Intel compilers
- Open PBS

Backup
BRIS

- Linux – Home-made
- 16 nodes
- dual Intel Xeon
2.2 Ghz, 1 GB memory
- Scali interconnect
- ScaMPI, MPICH, LAM
- Intel compilers
- Open PBS

Computer plans

Replacement of BRIS

New cluster, **BORE**
143 Intel Harpertown 2.8 GHz nodes
each with 8 cores
InfiniBand interconnect

Estimated peak performance 12.5 TFlops

Operational 20080505