16th ALADIN Workshop

Present Status of ALADIN Verification Project

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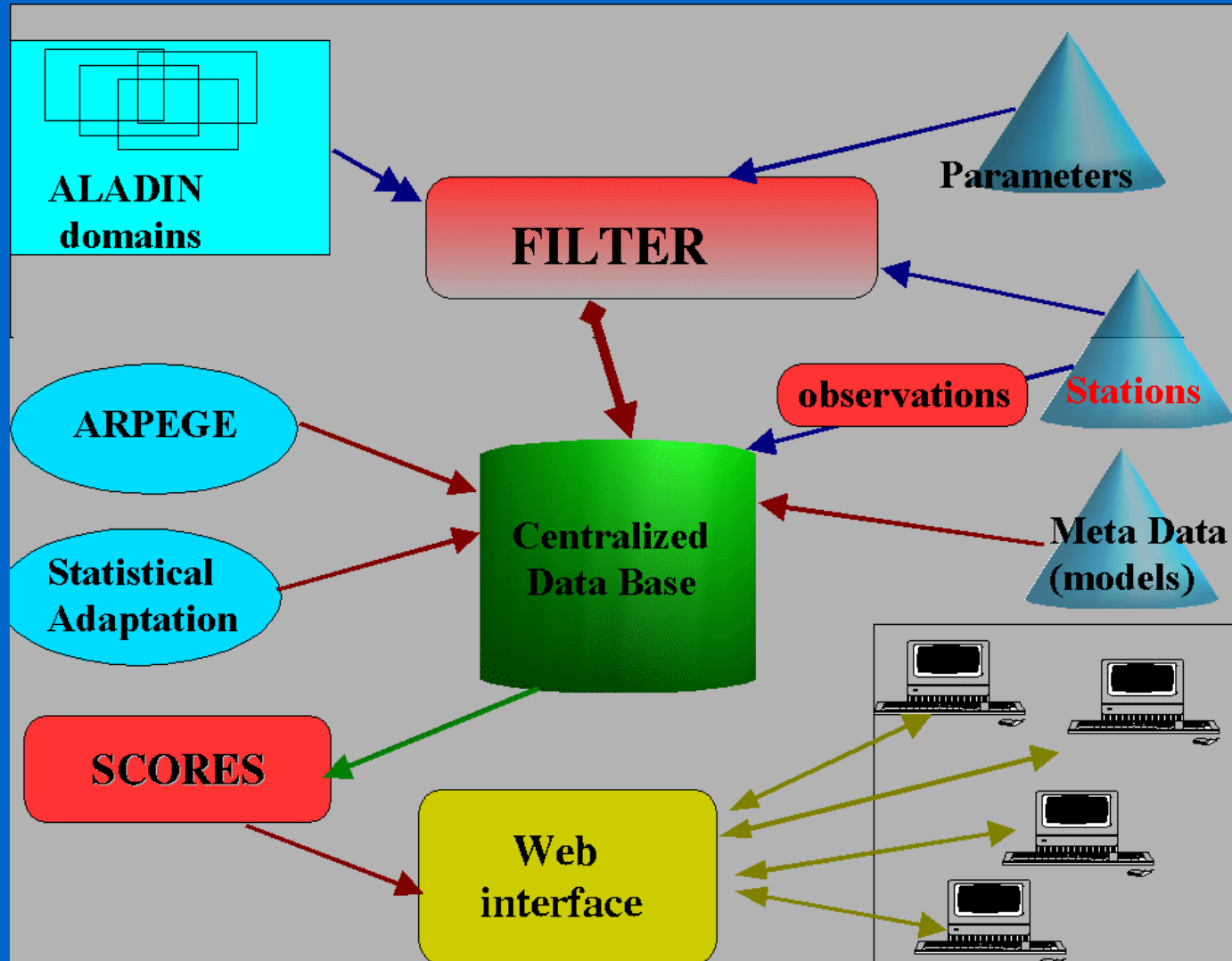
Environmental Agency of the Republic of Slovenia

May 2006

Outline of presentation

➔ **Description of the system (very short)**

➔ **Developments in the last year technical and functional**

➔ **Plans**

➔ **Conclusions**

Scheme

Present status

→ **System is running (pre-operational)**

→ **Limited number of models**

  → **Austria, Croatia, Czech Republic, Hungary, Romania, Slovakia, Slovenia, Tunisia**

  → **from operational and parallel suites**

→ **user interface**

  → **AVP web site access possible www.arso.gov.si/verification/**

→ **17GB of data**

Data transfer

→ **Installation of client software at centers needed**

→ **Data are sent via emails (online or delayed)**

→ **Received data are stored into database (twice per day)**

Server side software

- ➔ **Postgresql with Postgis extension**
  - ➔ **Meta data tables (WMO stations, models, model points)**
  - ➔ **Data (observations, model data)**
- ➔ **Php scripts for calculations**
- ➔ **JPgraph for displaying graphs**

User interface (1)

User interface (2)

User interface (3)

Example of verification scores

24h precipitation

T2m

rmse variable: T2m
time period: 2004-02-19 00:00:00 - 2004-05-25 23:00:00
country: HUNGARY

avg_rmse(ahu00)= 2.29
avg_rmse(ahud00)= 2.20
avg_rmse(ahu300)= 2.25

rmse (°C) vs forecast range (hour)

Legend: ahu00, ahud00, ahu300

(0.277s)
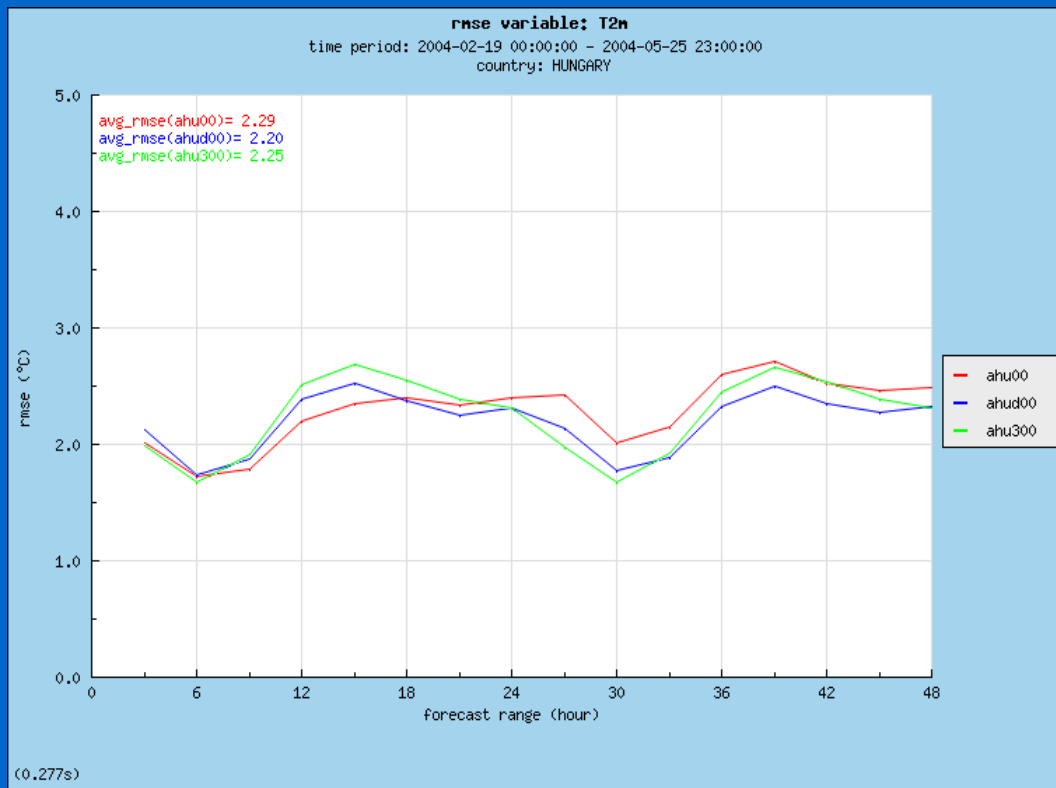
Contingency table for parameter *rrc* on using model(s) ahu00, ahud00, ahu300 and FC=30

mod\obs	0<=rrc<0.1	0.1<=rrc<2	2<=rrc<10	10<=rrc	sum fc
0<=rrc<0.1	292 / 270 / 267	25 / 20 / 15	8 / 3 / 3	0 / 0 / 0	325 / 293 / 285
0.1<=rrc<2	146 / 165 / 168	67 / 75 / 74	57 / 48 / 49	4 / 2 / 3	274 / 290 / 294
2<=rrc<10	9 / 11 / 11	34 / 31 / 37	63 / 81 / 81	18 / 20 / 20	124 / 143 / 149
10<=rrc	0 / 1 / 1	1 / 1 / 1	16 / 12 / 11	24 / 24 / 23	41 / 38 / 36
sum obs	447	127	144	46	sum

num_evnts:764

PC(ahu00)= 0.584
HSS(ahu00)= 0.367

PC(ahud00)= 0.589
HSS(ahud00)= 0.390

PC(ahu300)= 0.582
HSS(ahu300)= 0.384

class\score	BIAS	POD	FAR
0<=rrc<0.1	0.727 / 0.655 / 0.638	0.653 / 0.604 / 0.597	0.102 / 0.078 / 0.063
0.1<=rrc<2	2.157 / 2.283 / 2.315	0.528 / 0.591 / 0.583	0.755 / 0.741 / 0.748
2<=rrc<10	0.861 / 0.993 / 1.035	0.438 / 0.563 / 0.563	0.492 / 0.434 / 0.456
10<=rrc	0.891 / 0.826 / 0.783	0.522 / 0.522 / 0.500	0.415 / 0.368 / 0.361

Basic documentation is available

Table of Contents

1. Introduction

   What is Aladin Verification Project?

2. Overview of Verification Scores

   Introduction to Verification Scores

   Continous Variables

   Categorical Variables

   References

3. User Guide

   Data Browsing

   User Defined Scores

Recent technical developments

➔ **Porting of the application to new dedicated server**

  ➔ **web interface, database, shell scripts**

➔ **Upgrade of Postgresql, Apache, PHP**

➔ **Mapserver for geographical maps**

➔ **Detailed study of database performance**

➔ **Major reorganization of data base with the goal of speed-up**

Recent technical developments (cont.)

→ **Database cleanig**
   → **double data**
   → **missing data**
   → **completeness of data from 1 June 2004**
→ **Improved monitoring of data input**
→ **2 types of users**

Aladin Verification Project

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   model list
   view data (synop)
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   select score
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|| User menu ||

login: user
user level: 1

LogOut

Verification score

1) select region for verification analysis

- ◯ Country: [All ▼]

- ◯ Borders:
  - latitude Nord [_____]
  - longitude West [_____]   [_____] longitude East
  - latitude South [_____]

- ◉ Station: [14015 LJUBLJANA/BEZIGRAD ▼]

2) select time range

- ◯ from: [1▼].[6▼].[2004▼]   to: [12▼].[5▼].[2006▼]

- ◯ from: [Jun▼].[2004▼]   to: [May▼].[2006▼]

- ◉   ◉ last 10 days   ◯ last month   ◯ last 3 months   ◯ [2006▼]

3) select at least one model

[asi_oper_00 ▼] [none ▼] [none ▼]

4) select variable for verification

surface variables:

◉ T2m	◯ T2m min	◯ T2m max	
◯ T2m corr.	◯ T2m min corr.	◯ T2m max corr.	◯ 10m-FX
◯ 10m-FF	◯ 10m-DD	◯ 10m-U	◯ 10m-V
◯ Pmsl	◯ RH2m	◯ CC	◯ RR24h

pressure level: variable:

◯ 925 ◯ 850 ◯ 700 ◯ 500 ◯ 250
◯ H ◯ T ◯ RH ◯ FF ◯ DD ◯ U ◯ V

[Continue>>]

CC-cloud cover, RR-precipitation, RH-relative humidity, FF-wind velocity, DD-wind direction, U-zonal wind component, V-meridional wind component, FX-wind gusts

station list

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\multicolumn List of verification stations								
11240	GRAZ-THALERHOF-FLUGHAFEN	AUSTRIA	340	47	15.433	synop	[detail]	[data]
11120	INNSBRUCK-FLUGHAFEN	AUSTRIA	581	47.2667	11.35	synop	[detail]	[data]
11010	LINZ/HOERSCHING-FLUGHAFEN	AUSTRIA	298	48.2333	14.1833	synop	[detail]	[data]
11150	SALZBURG-FLUGHAFEN	AUSTRIA	430	47.8	13	synop	[detail]	[data]
11035	WIEN/HOHE WARTE	AUSTRIA	200	48.25	16.3667	synop,temp	[detail]	[data]
33008	BREST	BELARUS	146	52.1167	23.6833	synop	[detail]	[data]
33041	GOMEL'	BELARUS	126	52.4	30.95	synop	[detail]	[data]
26850	MINSK	BELARUS	231	53.9333	27.6333	synop	[detail]	[data]
26863	MOGILEV	BELARUS	192	53.95	30.0667	synop	[detail]	[data]
33036	MOZYR'	BELARUS	170	51.95	29.1667	synop	[detail]	[data]
6479	KLEINE BROGEL	BELGIUM	55	51.1667	5.46667	synop	[detail]	[data]
6400	KOKSIJDE	BELGIUM	4	51.0833	2.65	synop	[detail]	[data]
6476	ST-HUBERT	BELGIUM	563	50.0333	5.4	synop	[detail]	[data]
6447	UCCLE	BELGIUM	100	50.8	4.35	synop	[detail]	[data]
15655	BURGAS	BULGARIA	16	42.4833	27.4833	synop	[detail]	[data]
15511	LOM	BULGARIA	32	43.8167	23.25	synop	[detail]	[data]
15614	SOFIA (OBSERV.)	BULGARIA	586	42.65	23.3833	synop,temp	[detail]	[data]
15552	VARNA	BULGARIA	41	43.2	27.9167	synop	[detail]	[data]
14258	DARUVAR	CROATIA	161	45.6	17.2333	synop	[detail]	[data]
14472	DUBROVNIK/GORICA	CROATIA	52	42.65	18.0833	synop	[detail]	[data]

Mapserver - stations

Mapserver – stations - zoom

Monitoring – database checking

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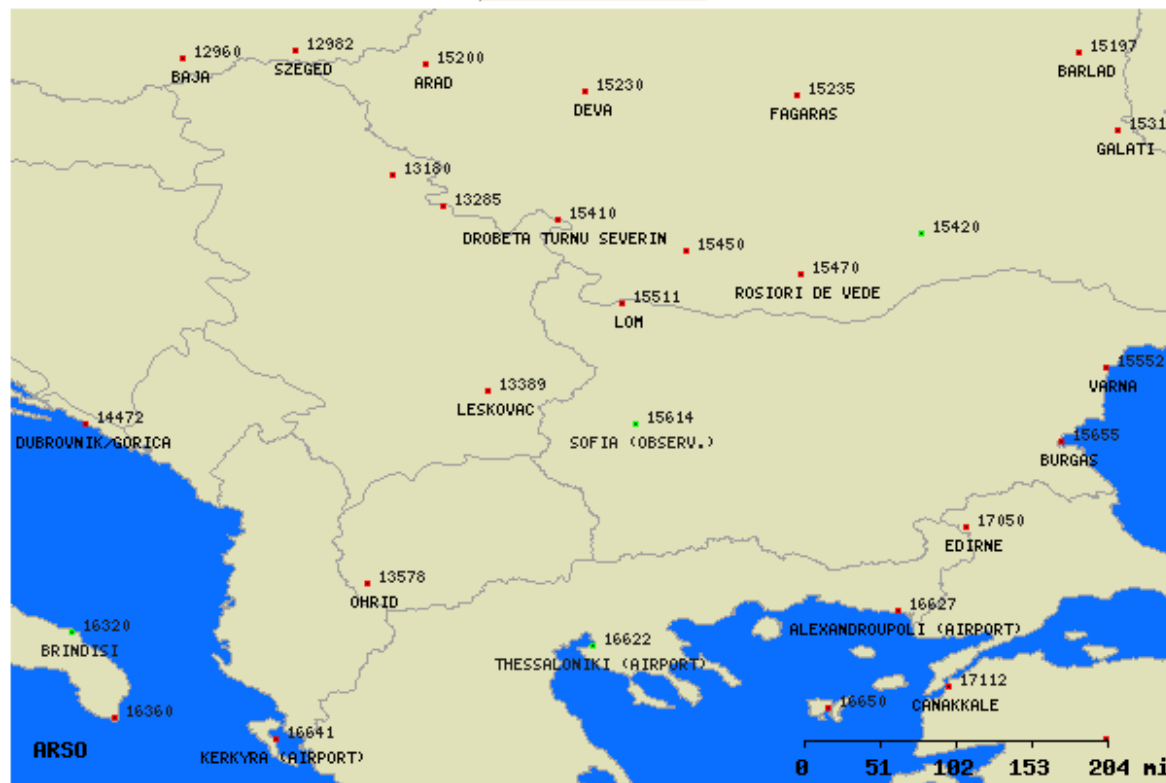
login: user
user level: 1

LogOut

Spremljanje baze podatkov z modelskimi rezultati (mod_synop, mod_temp)

⊙ **11.05.** ○ 10.05. ○ 09.05. ○ 08.05. ○ 07.05. ○ 06.05. ○ 05.05. ○ 04.05. ○ [   ]

	synop00	temp00	xfu00	synop12	temp12	xfu12
aat	258	51	258	258	51	258
acz	257	51	257	257	51	257
ahr	140	30		140	30	
ahud	253	50	253	253	50	253
ahu	253	50	253	253	50	253
aro						
arp		51			51	
asi	253	48	253	253	48	253
asid	253	48	253	253	48	253
ask	258	51	258	258	51	258
atu	38	8	38	38	8	38

Recent functional developments

➜ **Meta-data for models**
- ➜ **definition**
- ➜ **user interface for editing**
- ➜ **history of changes**

Meta-data for models

List of verification models							
model	model abb	model status (begin/end)	last data from	code version	edit	history	chart
Active models							
aat_oper	aat	2004-09-28 /	2006-03-27 14:37:48	cy25t2	[edit]	[history]	[chart]
acz_oper	acz	2005-02-21 /	2006-03-14 14:02:31	cy28t3	[edit]	[history]	[chart]
ahr_oper	ahr	2004-05-25 /	2006-03-14 14:05:32	cy28t3	[edit]	[history]	[chart]
ahu_oper	ahu	2004-07-15 /	2006-03-14 13:45:04	cy28t3	[edit]	[history]	[chart]
ahu_tdynam	ahud	2004-02-20 /	2006-05-11 11:54:54		[edit]	[history]	[chart]
aro_oper	aro	2004-08-01 /	2006-03-14 12:36:24	cy28t3	[edit]	[history]	[chart]
arp_nasu	arp	2004-06-01 /	2006-03-14 14:42:07		[edit]	[history]	[chart]
asi_oper	asi	2003-05-06 /	2006-05-11 11:35:18	cy29t2	[edit]	[history]	[chart]
asi_doub	asid	2005-11-01 /	2006-05-11 11:51:29	al29t2	[edit]	[history]	[chart]
ask_oper	ask	2004-08-01 /	2006-04-26 09:51:58	cy28t3	[edit]	[history]	[chart]
atu_oper	atu	2004-05-29 /	2006-03-14 13:13:49	cy26t1	[edit]	[history]	[chart]
Not active models							
ahr_lace	ahrl	2004-05-25 / 2005-11-30	2006-03-15 13:44:56	cy25t1	[edit]	[history]	[chart]
ahu_t3dvar	ahu3	2004-02-19 / 2005-04-08	2006-03-15 14:18:16		[edit]	[history]	[chart]
asi_incus	asii	2004-05-18 / 2006-01-23	2006-03-15 13:57:50	cy12	[edit]	[history]	[chart]
ask_p001	ask1	2005-02-14 / 2005-03-03	2006-03-15 13:49:33		[edit]	[history]	[chart]
ask_p002	ask2	2005-02-14 / 2005-03-03	2006-03-15 13:51:17		[edit]	[history]	[chart]
ask_preoper	askp	2004-06-01 / 2004-07-31	2006-03-15 13:55:43		[edit]	[history]	[chart]

Meta-data for models - domain
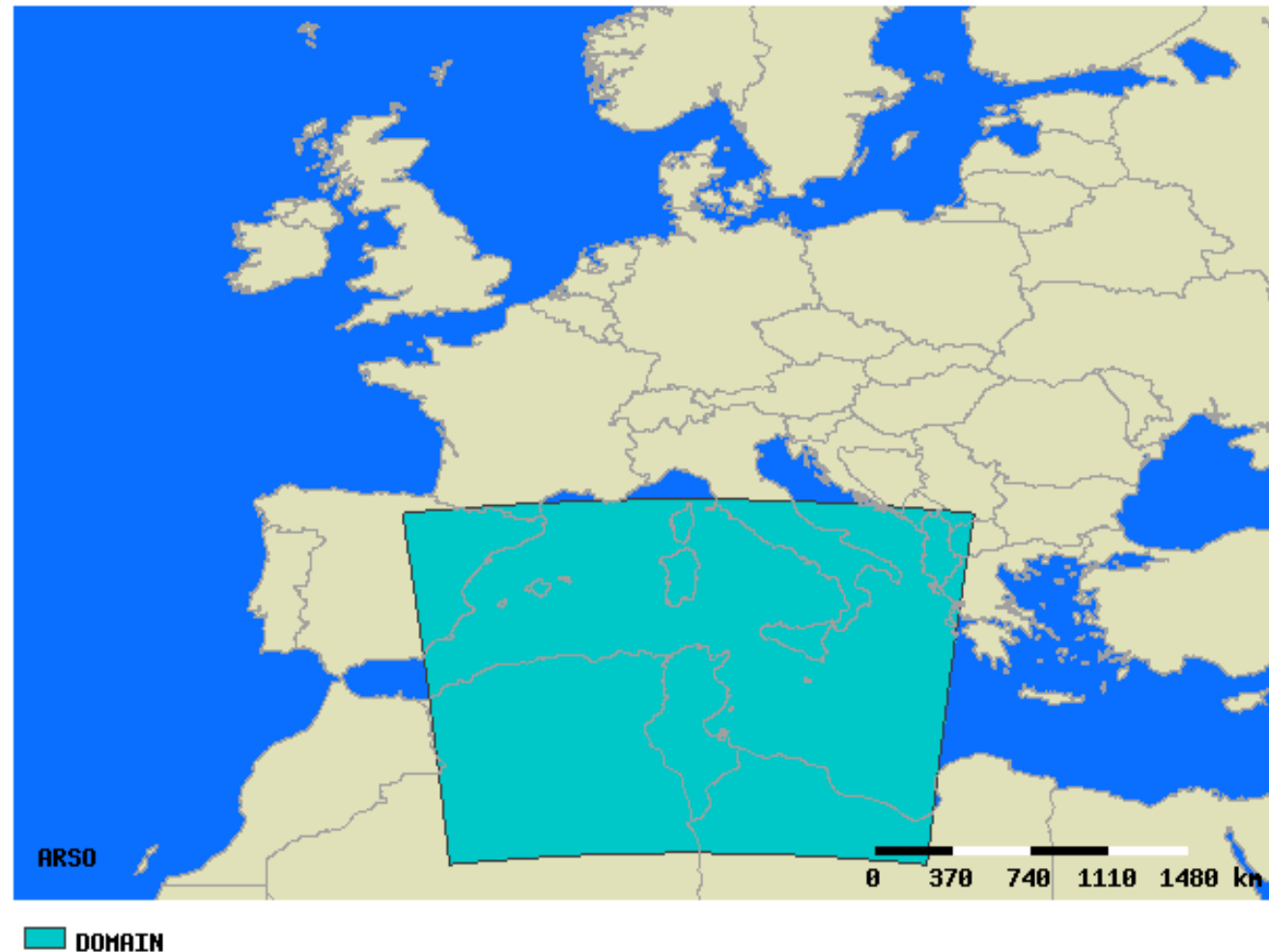
Meta-data for model editor

		Current data	New data
COUN	Country	si	si
DATE	Last modidified on	2006-03-14 15:23:30	2006-05-11 11:35:18
VALID	Modication valid from [date][run]		2006-04-11 00
BEGIN/END	Model started on/ended on	/	2003-05-06
ABB	Abbreviated		
STATUS	Status	oper	
CODE VERSION	Code version	cy29t2	
MFC	Integration	54	72
RUNS	Runs	00,12	
IS ACTIVE	Is Active	t	true ▾
GRID	Grid Type	linear	quadratic ▾
TS	Time step		400
COUP	Coupling model		arpege 3h
NFLEV	Number of levels		37
NLON	Points in x		270
NLAT	Points in y		256
MFPMAX	Truncation in x		89
NFPMAX	Truncation in y		84
NFPLUX	Last index in x		258
NFPGUX	Last index in y		244
LON0	Longitude of the reference point		17.000
LAT0	Latitude of the reference point		46.2447
LONC	Longitude of the central point		17.77417
LATC	Latitude of the central point		44.409786
DELX	Distance between points in x [m]		9501
DELY	Distance between points in y [m]		9501
COMMENT	Add comment		

Meta-data for model

history of changes

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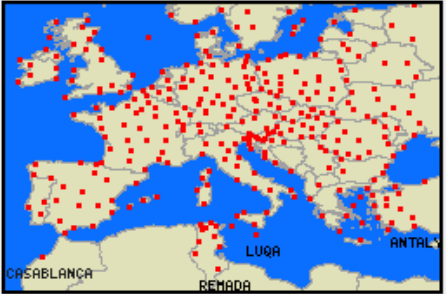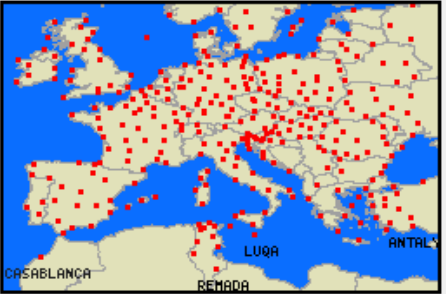## || User menu ||

login: user
user level: 1

LogOut

History

Changes made on 2006-03-14 13:13:49

- is_active = t
- code_version = cy26t1
- nflev = 41
- nlon = 151
- nlat = 117
- nfplux = 162
- nfpgux = 128
- mfpmax = 80
- nfpmax = 63
- lonc = 9.36
- latc = 36.06
- lon0 = 9.36
- lat0 = 36.06
- delx = 12500
- dely = 12500
- ts = 568
- grid = quadratic
- coup_model = arpege 3h
- b_work = 2004-05-29

Changes made on 2004-05-29 12:00:00

- coun = tu
- status = oper
- mfc = 48
- runs = 00,12
- is_active = t

Recent functional developments

➔ **Meta tables for models**
  ➔ **definition**
  ➔ **user interface for editing**
  ➔ **history of changes**
➔ **Predefined product**
  ➔ **definition**
  ➔ **creation once per month**
  ➔ **interface**

Pre-prepared products - definition

- **volume of data**
- **sometimes to slow for interactive work**
- **a lot of degrees of freedom**
  - **parameters, time interval, geographic area, climatological area, ...**
- **a first step: monthly station report**
  - **Lovro Kalin**

Pre-prepared product

➔ **Monthly station report**

  ➔ **automatically produced once per month**

  ➔ **stored in database**

  ➔ **for all stations**

  ➔ **minimum, maximum temperature, temperature, RR24h, wind 10m, pmsl, cloudiness, upper level data**

Monthly report - interface

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|| User menu ||

login: user
user level: 1

LogOut

Monthly station report

Select your data.

Report 1
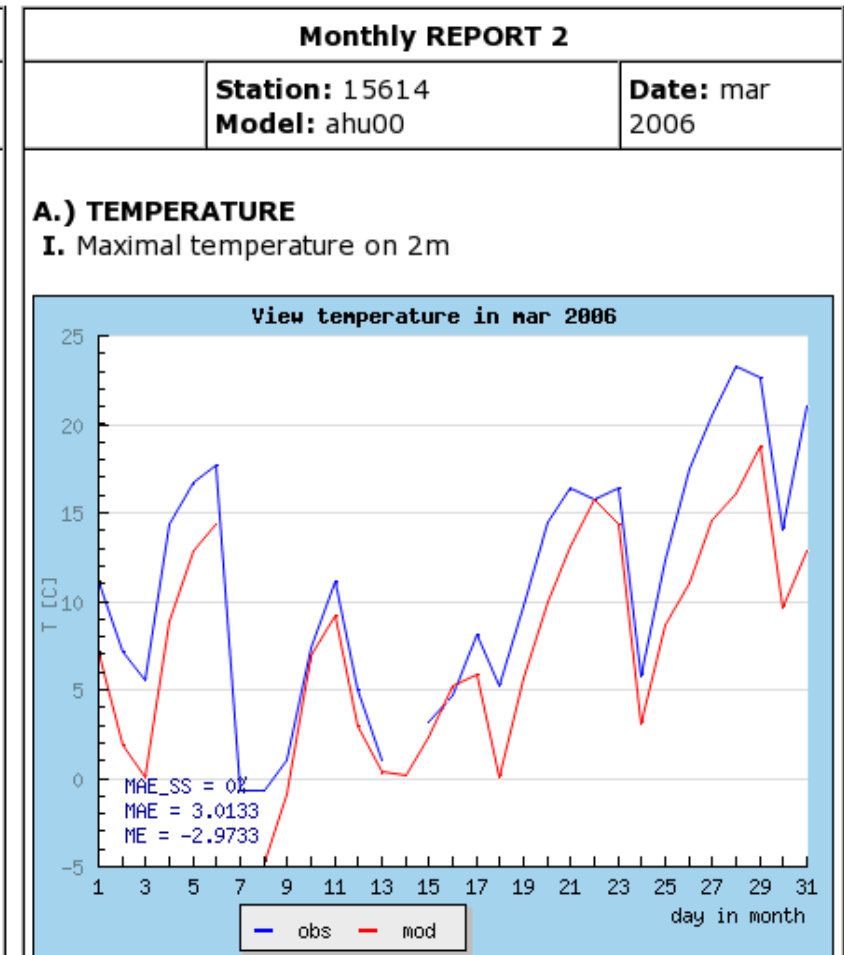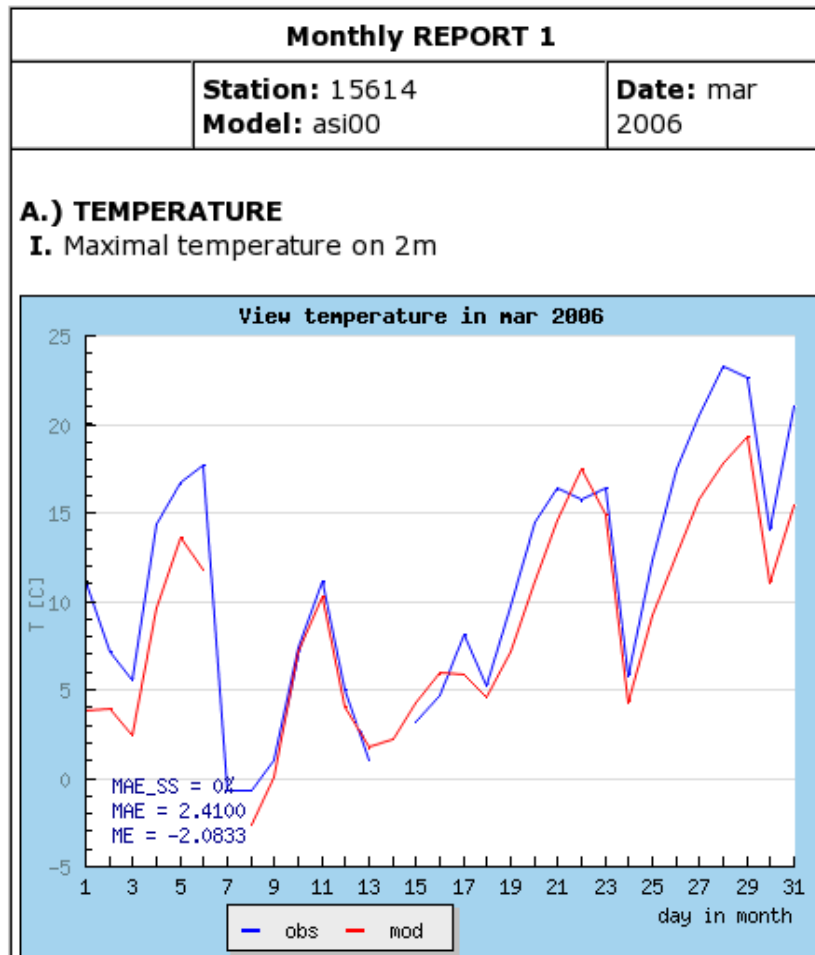
year	2006
month	4
model	aat_oper_00

STATION

LJUBLJANA/BEZIGRAD

Include ☑ and   ADD   ◯
        CLEAR

Report 2

year	2006
month	4
model	aat_oper_00

STATION

LJUBLJANA/BEZIGRAD
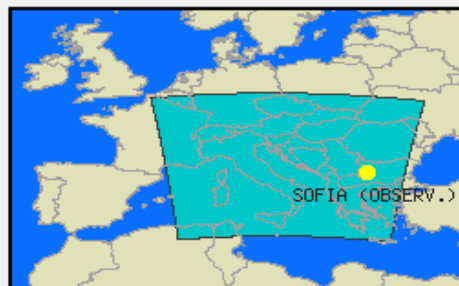
Include ☐ and   ADD   ◯
        CLEAR

Report 3

year	2006
month	4
model	aat_oper_00

STATION

LJUBLJANA/BEZIGRAD

Include ☐ and   ADD   ◯
        CLEAR

Compare up to 3 reports.

Reports in process:

VIEW

ALL IN ONE

Monthly report - selection

Monthly report (1/6)

Monthly report (2/6)

Scatterplot maximal temperature on 2m (18h 42h)
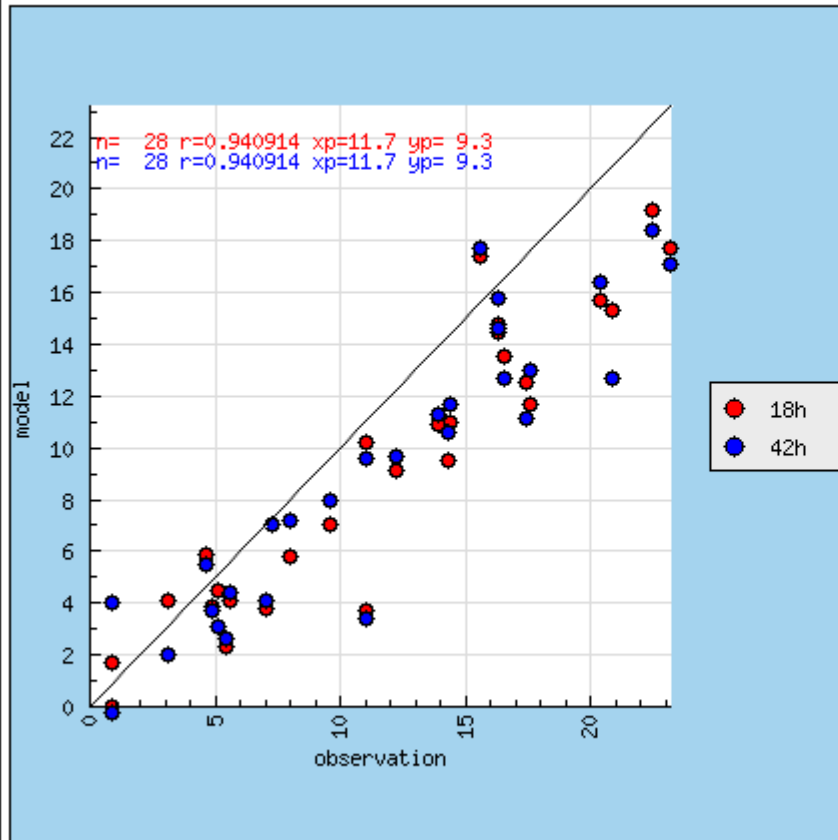
n= 28 r=0.940914 xp=11.7 yp= 9.3
n= 28 r=0.940914 xp=11.7 yp= 9.3

Scatterplot maximal temperature on 2m (18h 42h)

n= 28 r=0.946093 xp=11.7 yp= 8.3
n= 28 r=0.946093 xp=11.7 yp= 8.3
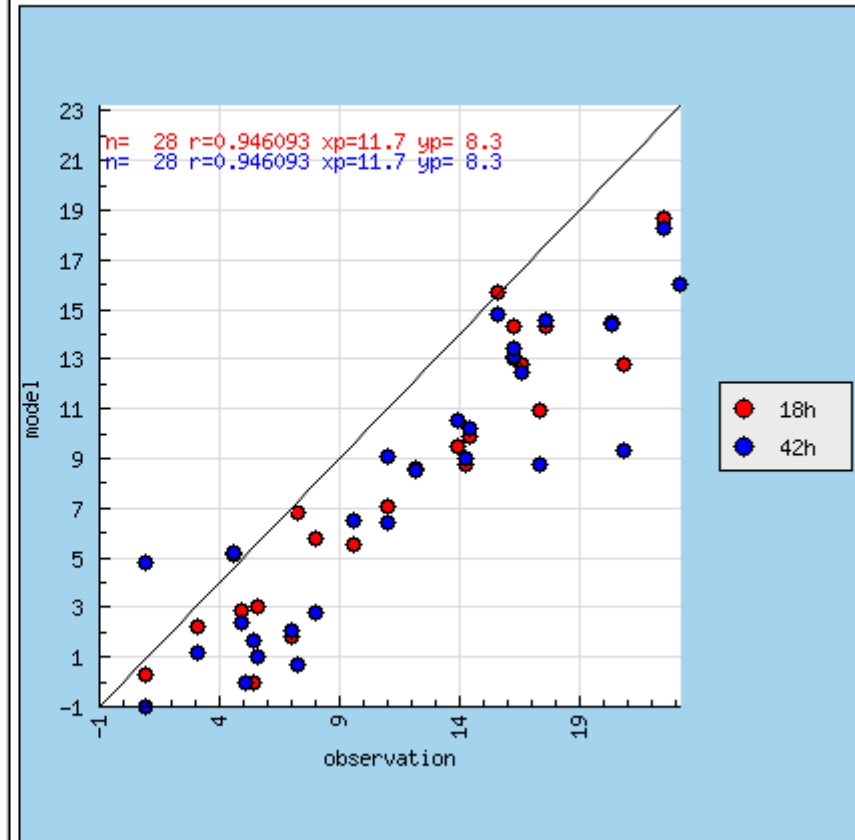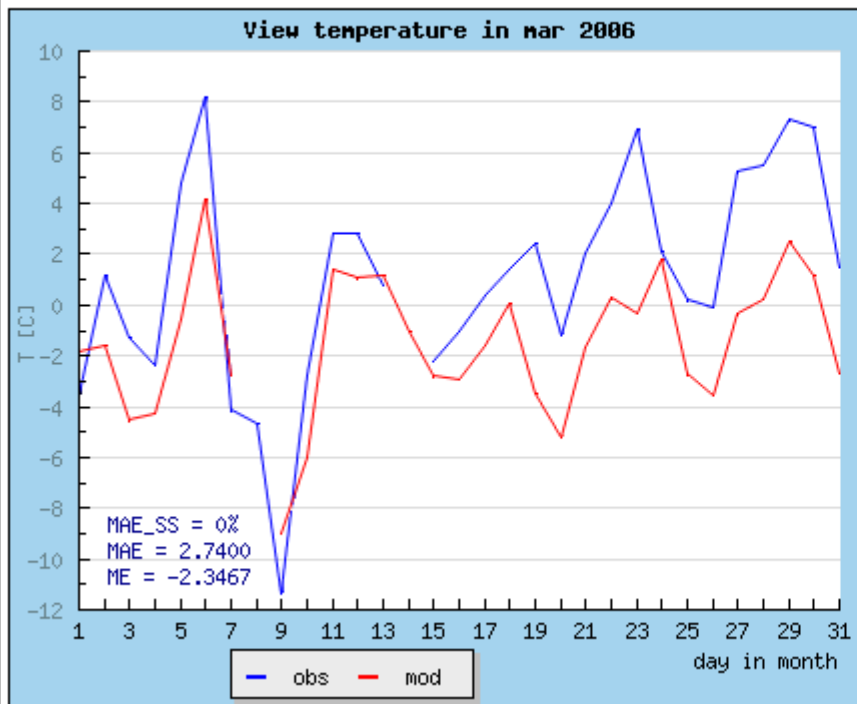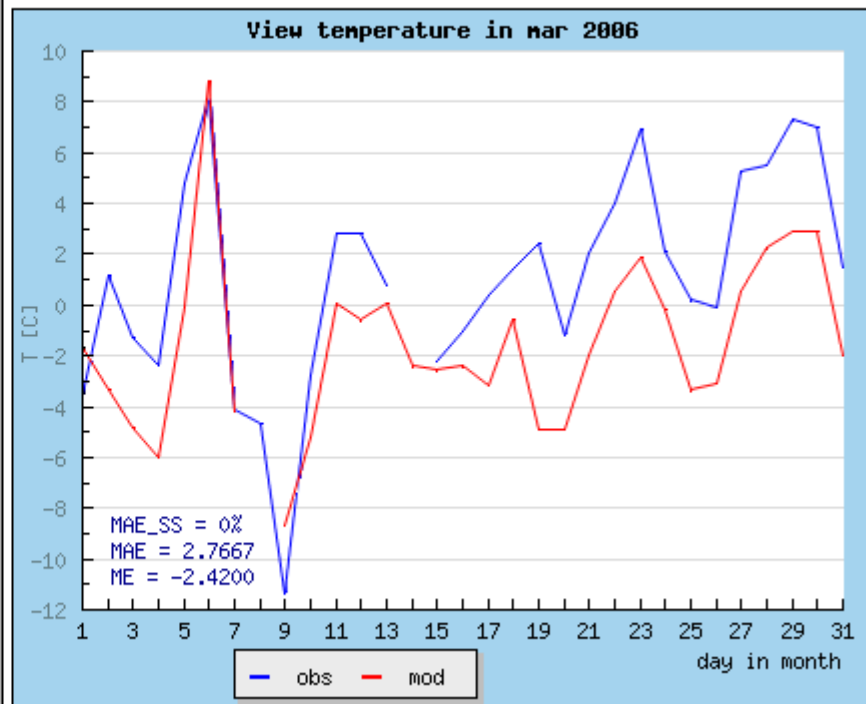
Monthly report (3/6)

Monthly report (4/6)

Scatterplot minimal temperature on 2m (30h)

n= 29 r=0.827643 xp= 1.3 yp=-1.5

30h

Scatterplot minimal temperature on 2m (30h)

n= 29 r=0.855007 xp= 1.3 yp=-1.5
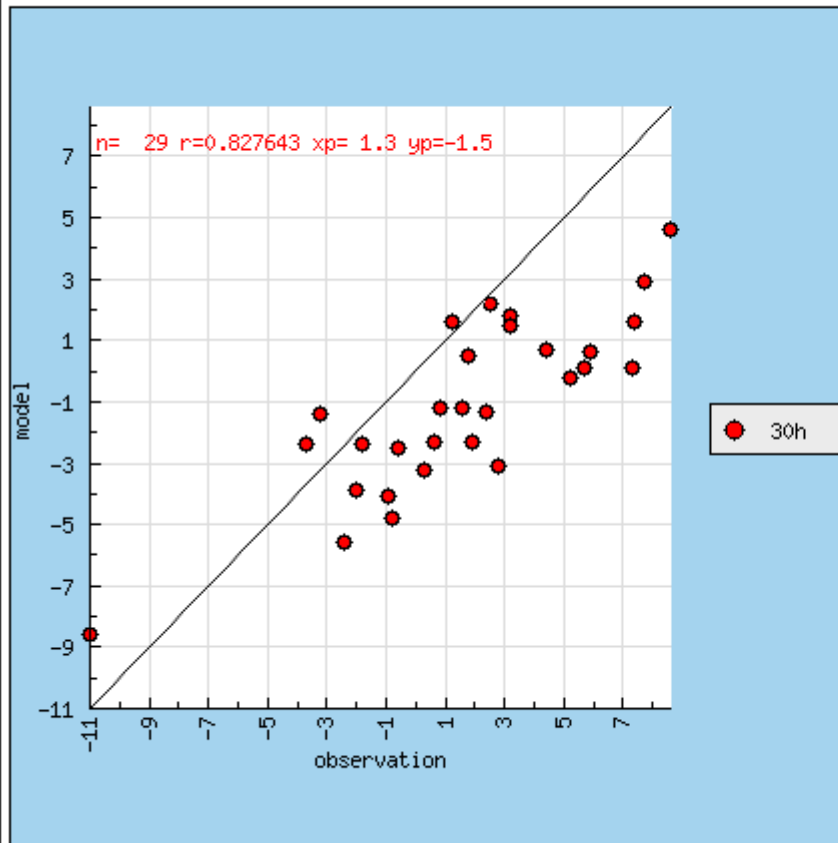
30h
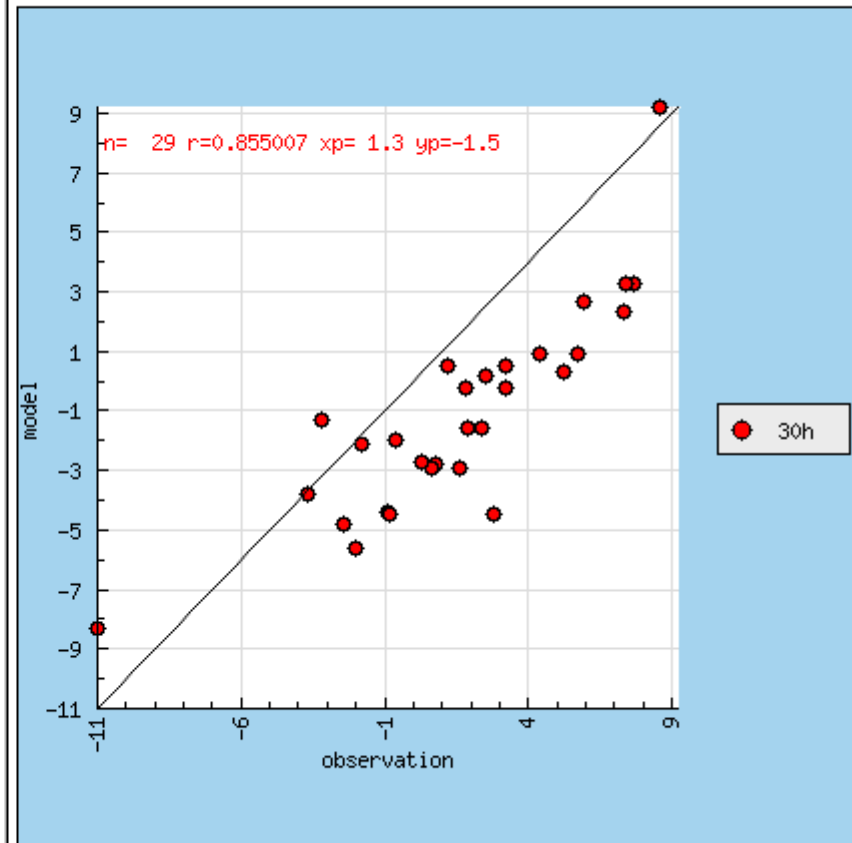
Monthly report (5/6)

III. Score/Forecast

Forecasted temperature for mar 2006

MAE_SS = 0%
MAE = 2.7473
ME = −2.1771

— mae — me

forecast range (hour)

III. Score/Forecast

Forecasted temperature for mar 2006

MAE_SS = 0%
MAE = 2.9640
ME = −2.7463

— mae — me

forecast range (hour)
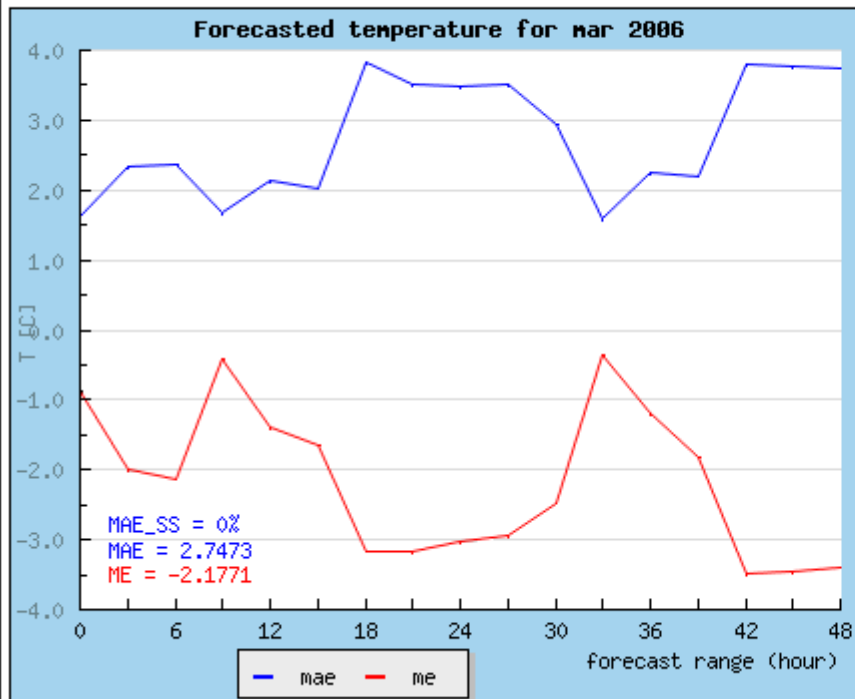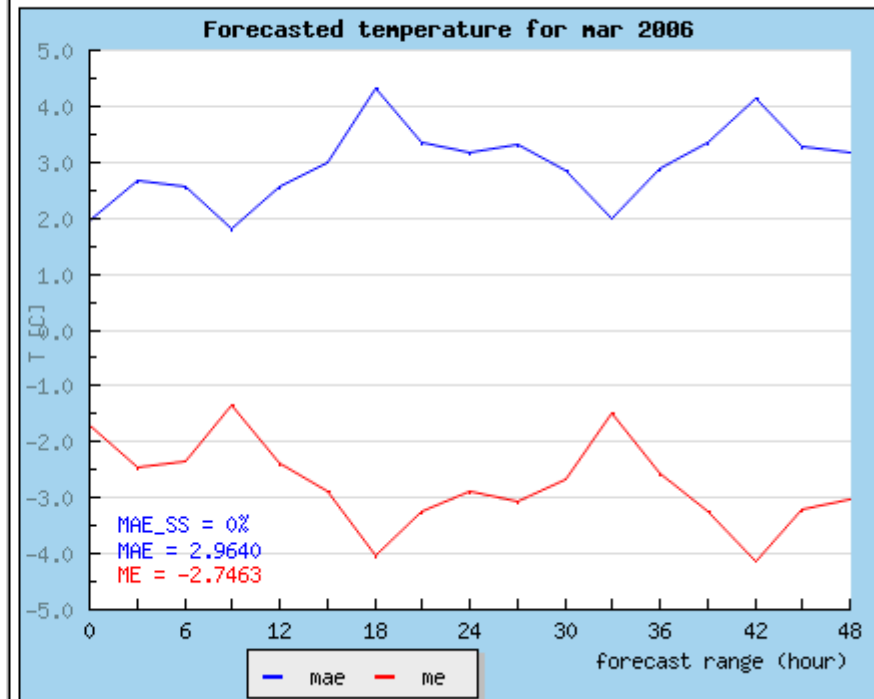
Monthly report (6/6)

B.) PRECIPITATION RR24
I. Contingency table

mod\obs	<=rrc<0.1	<=rrc<2	<=rrc<10	<=rrc	sum fc
0<=rrc<0.1	14	0	0	0	14
0.1<=rrc<2	4	2	2	0	8
2<=rrc<10	0	2	3	3	8
10<=rrc	0	0	0	1	1
sum obs	18	4	5	4	31 \ 31

B.) PRECIPITATION RR24
I. Contingency table

mod\obs	<=rrc<0.1	<=rrc<2	<=rrc<10	<=rrc	sum fc
0<=rrc<0.1	13	1	0	0	14
0.1<=rrc<2	4	1	1	0	6
2<=rrc<10	1	1	4	1	7
10<=rrc	0	1	0	2	3
sum obs	18	4	5	3	30 \ 30

Future goals - short term

➔ new version of extract4verif programme
➔ invitation to other centres to join
➔ monitoring of the system via Nagios
➔ including ECMWF data for comparison
➔ visualisation of all domains in the same plot
➔ testing, reporting problems

Future goals - medium term

➔ collect opinions of users

➔ new pre-prepared products on the base of your suggestions

➔ invite people for working stays

➔ regular analysis of verification (?)

➔ other (not ALADIN) LAM models (?)

➔ use of R statistical packet (?)

Conclusions

→ significant improvements done in the last year

→ infrastructure is ready

→ start to use this tool

→ good base for creation new products

HURRY UP!

www.arso.gov.si/verification/