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Present Status of ALADIN Verification Project

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ALADIN Verification Project

Overview

- ◆ Background
- ◆ Objectives
- ◆ Project schema
- ◆ Where are we?
- ◆ Status of web interface
- ◆ Todo
- ◆ Conclusion
- ◆ References

Background

- ◆ Lack of common strategy for verification at synoptic scale
- ◆ Call for coordinated verification (Lisbon 1999)
- ◆ All attempts had failed (Cassablanca 2001)
- ◆ End of 2003: still in the same situation as in 2001
- ◆ ALADIN 3rd medium-term research plan
- ◆ ECMWF Technical Memoranda on verification

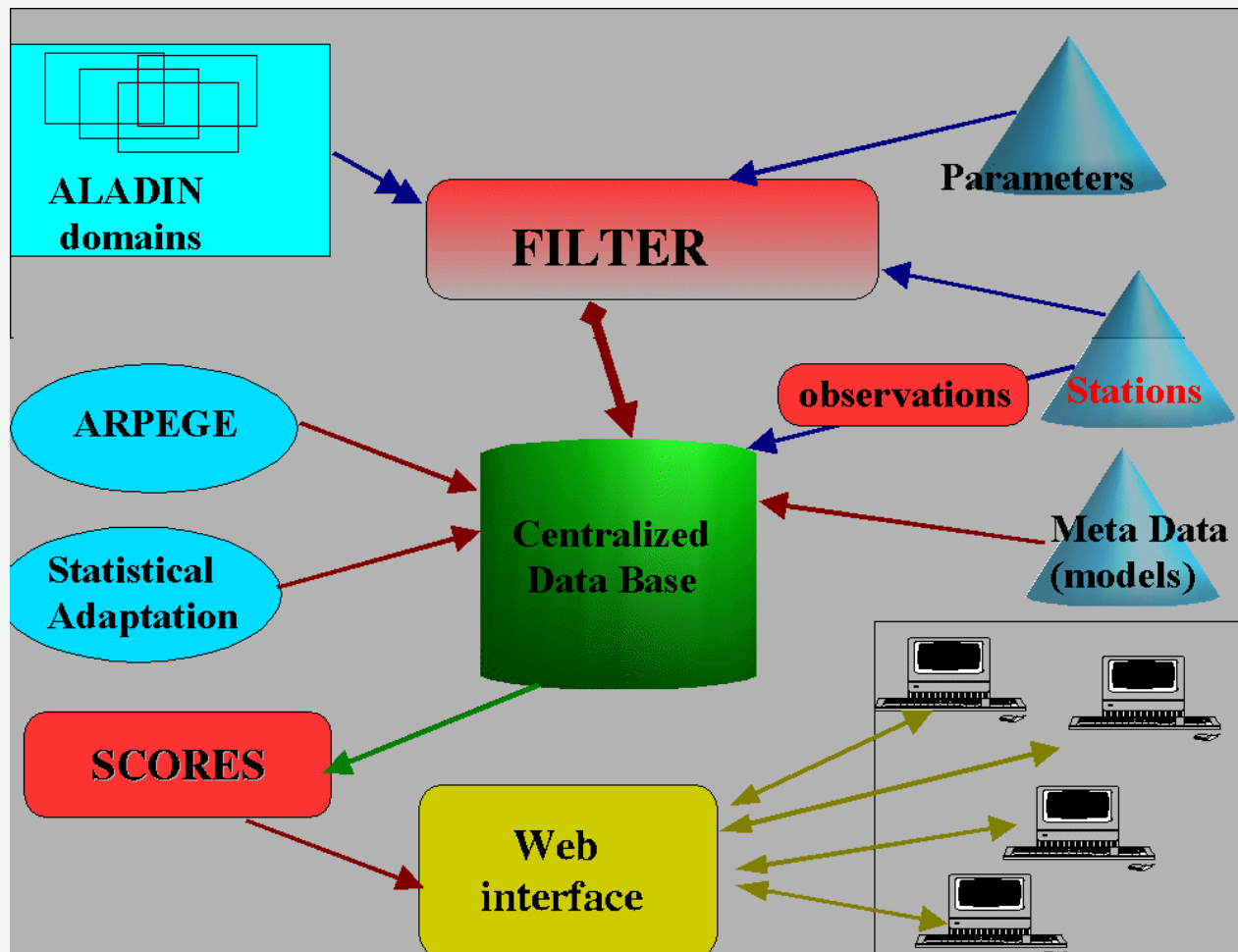
Objectives

- ◆ Objective verification at synoptic scale
- ◆ As simple usage as possible, minimal users interaction
- ◆ Time evolution and comparison of classical scores over different domains and version
- ◆ Towards a verification procedure for high resolution forecasts

Project prototype schema

- ◆ Central database
- ◆ FILTER application (running locally)
- ◆ List of reliable stations
- ◆ List of weather parameters
- ◆ List of verification scores
- ◆ Web interface

Project schema



Advantages of the concept

- ◆ Direct comparison of model data and verification scores
- ◆ Minimum actions required to start at partner state side
- ◆ Minimum interactions from users
- ◆ No additional application for monitor results
- ◆ Simple data exchange (email)
- ◆ Minimal amount of data to be transferred

Disadvantages of the concept

- ◆ Less flexibility with adding:
 - new scores
 - new models
 - new observations
- ◆ Commitment of one partner to maintain the system
- ◆ Observation flags

Where are we?

- ◆ FILTER application (**ready**)
needs minor modifications
- ◆ data parsing and inserting (**ready**)
perl scripts
- ◆ central database (**ready**)
Postgresql database with Postgis extension
- ◆ web interface (**under development**)
PHP, JpGraph, MapServer
- ◆ automatic report generation (**not yet**)
- ◆ documentation / user manual (**not yet**)
- ◆ models meta data (**not yet**)

Web interface status

- ◆ time series of data
- ◆ direct comparison of data from different models
- ◆ scatter plots
- ◆ ME, MAE, RMSE, STDEV vs. time or forecast range
- ◆ contingency tables
- ◆ BIAS, FAR, POD, PC, HSS

Web interface – station list

ALADIN VERIFICATION PROJECT

|| Main menu ||
DATA
station list
model list
view data
SCORES
REPORTS
ABOUT

[chart]

List of verification stations

ID	Name	Country
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]
14258	DARUVAR	CROATIA	161	45.6	17.2333	synop	[detail]	[data]
14472	DUBROVNIK/GORICA	CROATIA	52	42.65	18.0833	synop	[detail]	[data]
14330	GOSPIC	CROATIA	564	44.55	15.3667	synop	[detail]	[data]
14307	PULA AERODROME	CROATIA	63	44.9	13.9167	synop	[detail]	[data]
14445	SPLIT/MARJAN	CROATIA	122	43.5167	16.4333	synop	[detail]	[data]
14431	ZADAR/ZEMUNIK	CROATIA	82	44.1	15.35	synop	[detail]	[data]
14240	ZAGREB/MAKSIMIR	CROATIA	123	45.8167	16.0333	synop,temp	[detail]	[data]
11723	BRNO/TURANY	CZECH REPUBLIC	237	49.15	16.7	synop	[detail]	[data]
11541	CESKE BUDEJOVICE	CZECH REPUBLIC	432	48.95	14.4333	synop	[detail]	[data]
11782	OSTRAVA/MOSNOV	CZECH REPUBLIC	257	49.6833	18.1167	synop	[detail]	[data]
11520	PRAHA-LIBUS	CZECH REPUBLIC	304	50	14.45	synop,temp	[detail]	[data]
11518	PRAHA/RUZYNE	CZECH REPUBLIC	380	50.1	14.25	synop	[detail]	[data]
11659	PRIBYSLAV	CZECH REPUBLIC	533	49.5833	15.7667	synop	[detail]	[data]
10868	MUENCHEN-OBERSCHLEISSHEIM	GERMANY	484	48.25	11.55	synop,temp	[detail]	[data]
10739	STUTTGART/SCHNARRENBERG	GERMANY	314	48.8333	9.2	synop,temp	[detail]	[data]
12960	BAJA	HUNGARY	112	46.1833	19.0167	synop	[detail]	[data]
12843	BUDAPEST/LORINC	HUNGARY	138	47.4333	19.1833	synop,temp	[detail]	[data]
12882	DEBRECEN	HUNGARY	108	47.4833	21.6	synop	[detail]	[data]
12772	MISKOLC	HUNGARY	232	48.0833	20.7667	synop	[detail]	[data]
12925	NAGYKANIZSA	HUNGARY	139	46.45	16.9667	synop	[detail]	[data]
12935	SIOFOK	HUNGARY	108	46.9167	18.05	synop	[detail]	[data]
12982	SZEGED	HUNGARY	82	46.25	20.1	synop	[detail]	[data]
12880	SZOLNOK	HUNGARY	89	47.1167	20.2333	synop	[detail]	[data]

Web interface – station detail

[<<list]

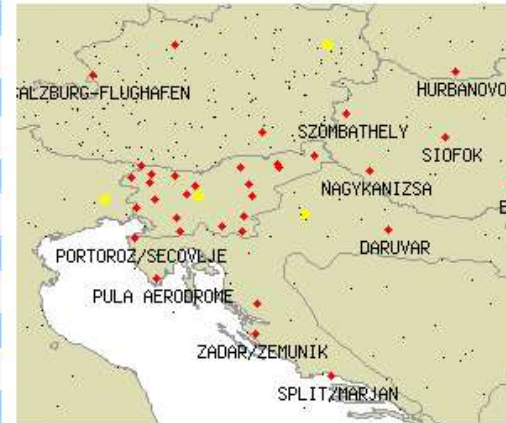
14240 ZAGREB/MAKSIMIR CROATIA

SYNOP DATA

first data	2002-08-28 00:00:00+02
last data	2002-10-21 21:00:00+02
number of records	426
expected number of records	440
all	426/440 [oooooooooooo] 96.8 %
00	50 / 55 [oooooooooooo_] 90.9 %
03	52 / 55 [oooooooooooo_] 94.5 %
06	54 / 55 [ooooooooooooo] 98.2 %
09	54 / 55 [ooooooooooooo] 98.2 %
12	54 / 55 [ooooooooooooo] 98.2 %
15	55 / 55 [ooooooooooooo] 100.0 %
18	54 / 55 [ooooooooooooo] 98.2 %
21	53 / 55 [ooooooooooooo] 96.4 %

TEMP DATA

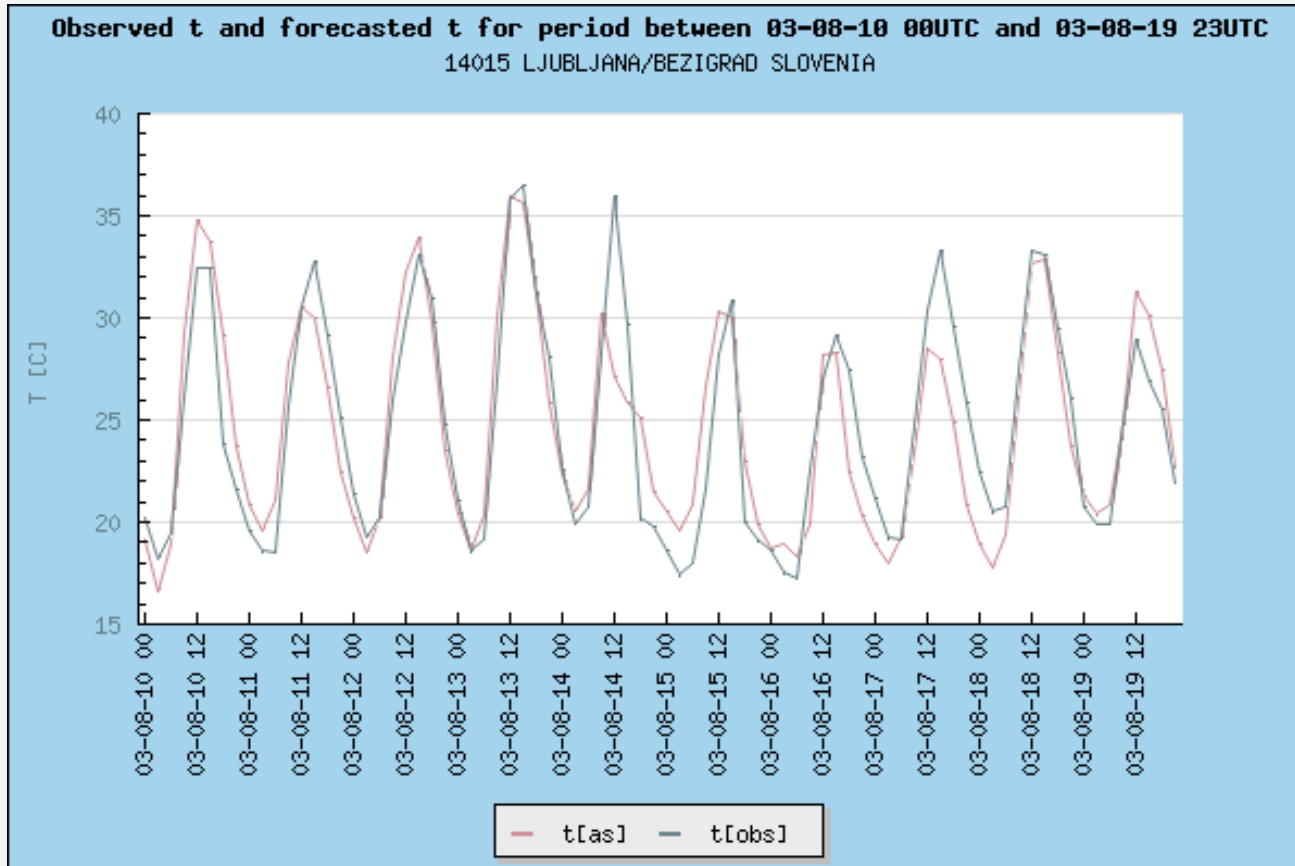
first data	2002-08-28 00:00:00+02
last data	2002-10-21 12:00:00+02
number of records	98
expected number of records	110
all	98 / 110 [oooooooooooo_] 89.1 %
00	49 / 55 [oooooooooooo_] 89.1 %
12	49 / 55 [oooooooooooo_] 89.1 %



Web interface – select data

Select data	
Station:	ZAGREB/MAKSIMIR
Begin date:	28 . 9 . 2002
End date:	21 . 10 . 2002
Time:	all
1.var	<input checked="" type="radio"/> OBS <input type="radio"/> T2m <input type="radio"/> Pmsl <input type="radio"/> T2m min <input type="radio"/> T2m max <input type="radio"/> RH2m <input type="radio"/> CC <input type="radio"/> RR <input type="radio"/> FF10m <input type="radio"/> DD10m
2.var	<input type="radio"/> AS00 <input type="radio"/> T2m <input type="radio"/> Pmsl <input type="radio"/> T2m min <input type="radio"/> T2m max <input type="radio"/> RH2m <input checked="" type="radio"/> none <input type="radio"/> CC <input type="radio"/> RR <input type="radio"/> FF10m <input type="radio"/> DD10m
PLOT!	

Web interface – view data



Web interface – view scores

Verification score

1) select region for verification analysis

Area:

Country:

Borders: longitude West latitude Nord
latitude South longitude East

Station:

2) select time range

from: to:

from: to:

last 10 days last month last 3 months all data range

3) select at least one model

AS00 AS12 AST00 AST12 AL00 AL12 EC12 ETA12

4) select variable for verification

surface variables:

<input type="radio"/> T2m	<input type="radio"/> T2m min	<input type="radio"/> T2m max	
<input type="radio"/> T2m corr.	<input type="radio"/> T2m min corr.	<input type="radio"/> T2m max corr.	<input type="radio"/> 10m-FX
<input type="radio"/> 10m-FF	<input type="radio"/> 10m-DD	<input type="radio"/> 10m-U	<input type="radio"/> 10m-V
<input type="radio"/> Pmsl	<input type="radio"/> RH2m	<input type="radio"/> CC	<input type="radio"/> RR24h

pressure level: 925 850 700 500 250

variable: H T RH FF DD U V

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

Web interface – define scores

Verification score 2/2

Selected region: SLOVENIA
Selected period: period between 2002-9-1 and 2003-11-20
Selected models: as12 ast12
Selected variable: T2m

5) select verification score

ME MAE RMSE SD

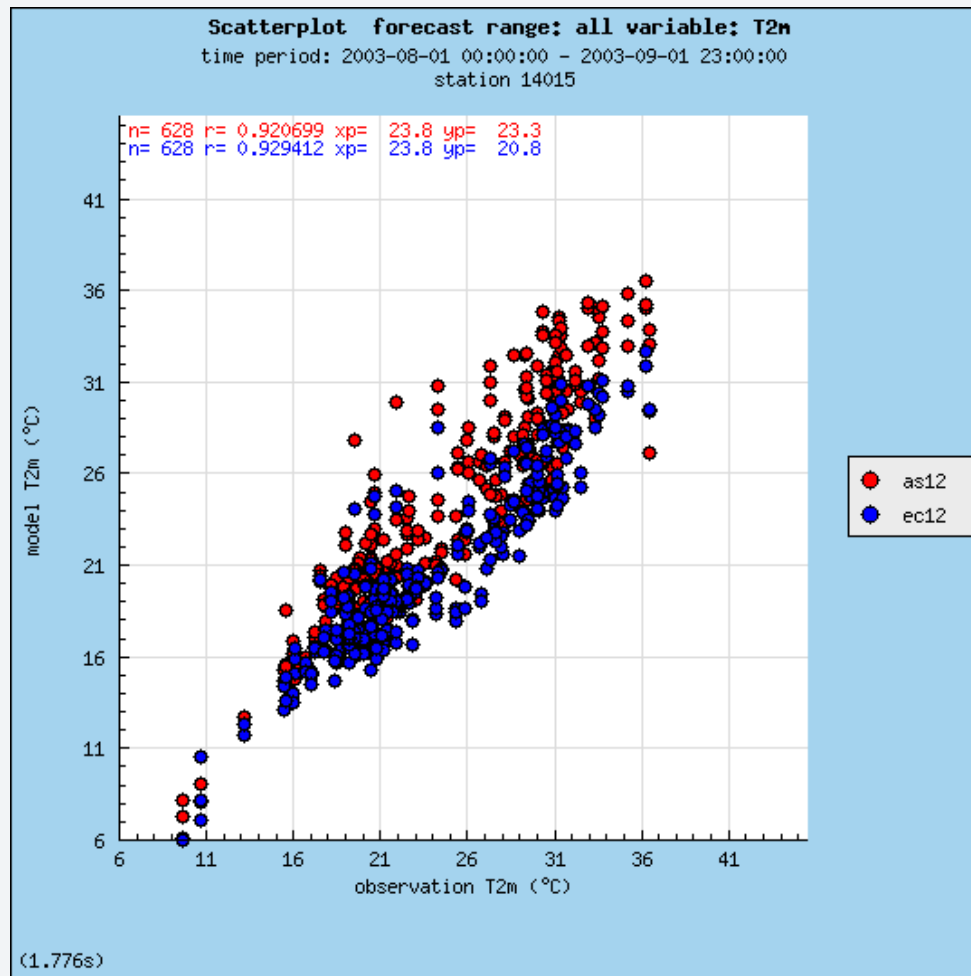
6) select data filtering conditions

include only stations above m and below m
reject data if difference is more than °C

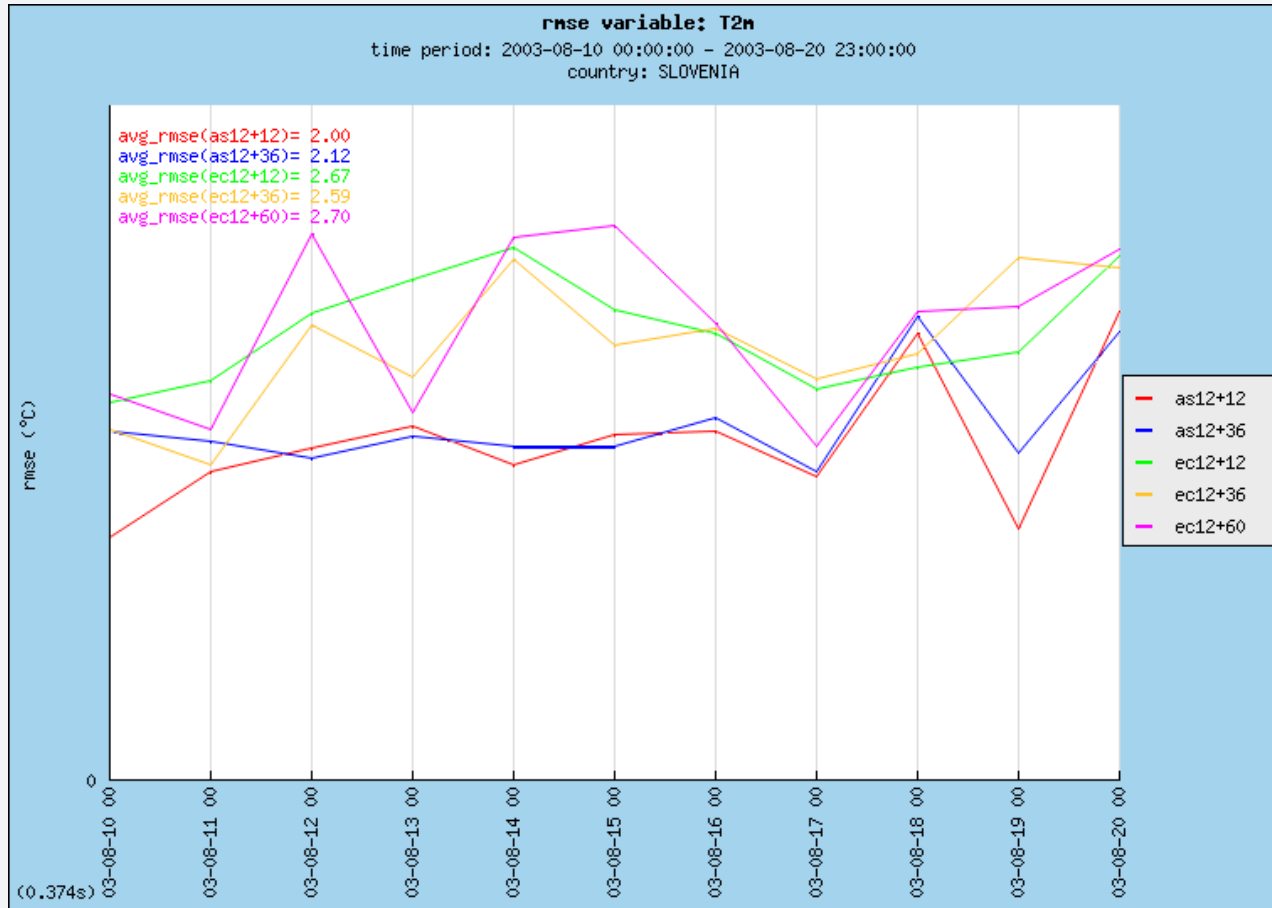
7) and finally, select data view

<input type="radio"/> scatterplot	FC <input type="text" value="all"/>	<input type="radio"/> graph
<input type="radio"/> number/FC		<input type="radio"/> table
<input type="radio"/> score/FC		<input type="radio"/> map FC <input type="text" value="00"/>
<input type="radio"/> score/time	HH <input type="text" value="00"/>	

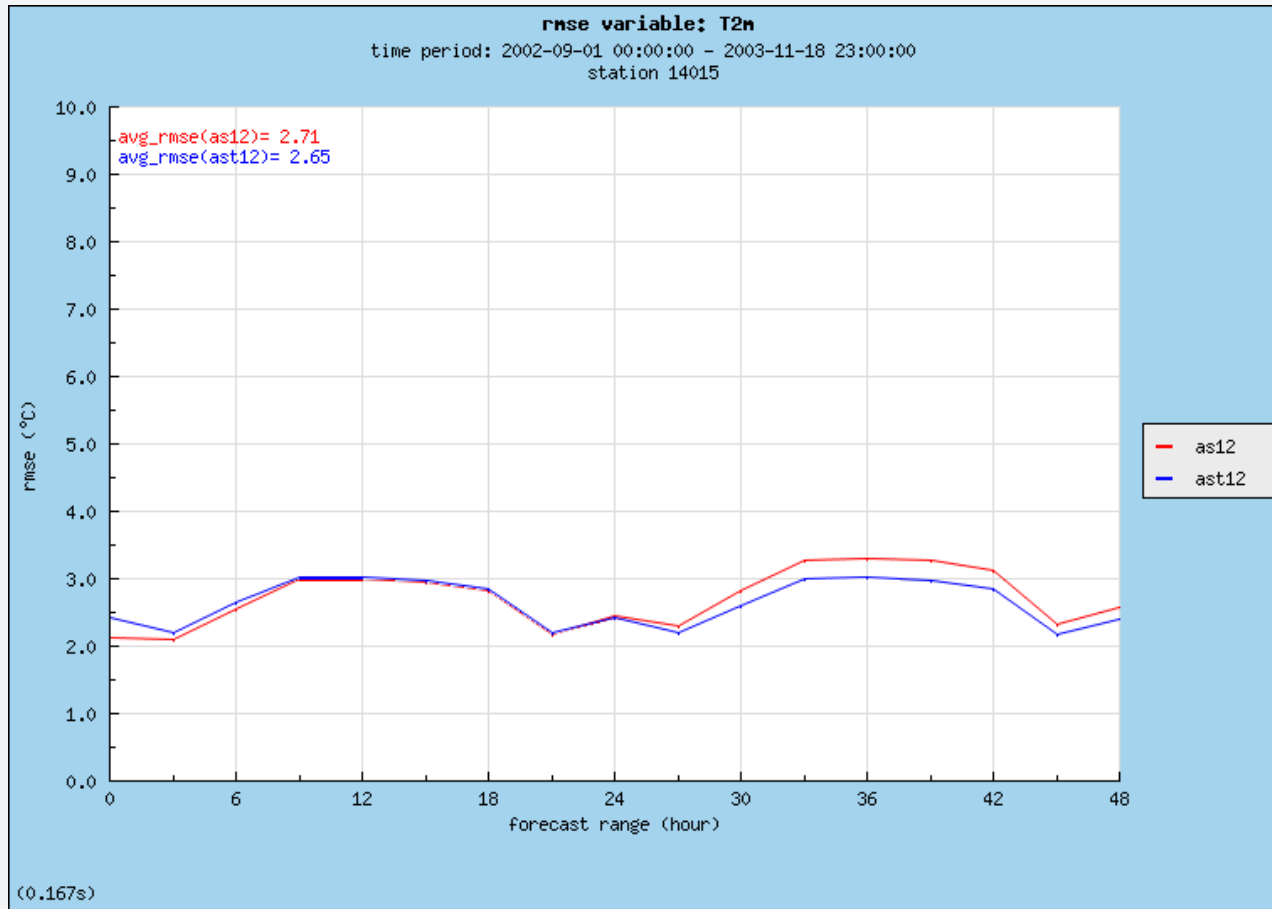
Web interface – scatter plots



Web interface – score vs. time



Web interface – score vs. forecast range



Web interface – contingency table

Contingency table for parameter *rre* on using model(s) *as12*, *ec12* and FC=42

mod\obs	0<=rre<0.1	0.1<=rre<5	5<=rre<20	20<=rre	sum fc
0<=rre<0.1	211 147	31 9	3 1	0 1	245 158
0.1<=rre<5	36 100	39 60	27 21	6 2	108 183
5<=rre<20	0 1	11 12	10 17	11 15	32 45
20<=rre	1 0	2 2	2 3	5 4	10 9
sum obs	248	83	42	22	sum

num_evnts:395

PC(*as12*)= 0.671
HSS(*as12*)= 0.394

PC(*ec12*)= 0.577
HSS(*ec12*)= 0.337

class\score	BIAS	POD	FAR
0<=rre<0.1	0.988 0.637	0.851 0.593	0.139 0.070
0.1<=rre<5	1.301 2.205	0.470 0.723	0.639 0.672
5<=rre<20	0.762 1.071	0.238 0.405	0.688 0.622
20<=rre	0.455 0.409	0.227 0.182	0.500 0.556

Todo

- ◆ Model meta data
- ◆ Automated report production
- ◆ Web interface upgrade
- ◆ User authentication / Profile management
- ◆ Documentation / User guide
- ◆ Local implementations !!

Conclusion

- ◆ Simple user interface
- ◆ Allows direct interactive comparison
- ◆ Close to routine synoptic verification
- ◆ Aladin Verification Project ready for next step
- ◆ Slovenia is willing to provide machine and maintenance of central data base server ...
- ◆ ... volunteers needed for finalization of interface
- ◆ ... for test implementation of FILTER and data exchange

References

- ◆ Aladin Verification Project
www.cnrm.meteo.fr/aladin/concept/verification.html
- ◆ Pertti Nurmi: Recommendations on the verification of local weather forecasts (draft version of ECMWF Technical Memoranda, October 2003)
- ◆ D.S. Wilks: Statistical Methods in the Atmospheric Sciences (Academic Press, 1995)
- ◆ J. Jerman: Prototype for common verification at synoptic scale, presentation at 7th Assembly of the ALADIN partners, Bucharest, 2002