

High resolution NWP model in operational use in Croatia

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Introduction

In the Meteorological and Hydrological Service of Croatia, a version of the ALADIN model is operationally run twice a day, at 00 and 12 UTC. Coupling files are retrieved from the global model ARPEGE (Meteo-France) with 3 hours frequency. The operational suite has been unchanged since February 2008, though some testing of new versions has been done.

Model results are used for warnings and short range forecasts and are comparable with results from ECMWF and DWD models. Comparison with observations is made for each model runs.

Some model results are visible on www.meteo.hr.

Model Resolutions

- **8 km** horizontal resolution - main integration domain:

- 37 levels in the vertical, 229x205 (240x216) grid points,

- Corners: SW (36.18,3.90), NE (50.68,26.90),

- **AL32T3** – **ALARO-3MT** version with old radiation scheme (Geleyn-Hollingsworth)

- 72 hrs forecast range with 1 or 3 hrs temporal resolution depending on product type.

- Digital Filter Initialisation.

- **2 km** horizontal resolution - high resolution dynamical adaptation domain:

- 10 m mean wind and wind gust forecast,

- 15 levels in the vertical, 439x439 (450x450) grid points.

Dynamical adaptation is run sequentially for each output file, with 3 hour intervals. In the dynamical adaptation, meteorological fields are first interpolated from the input 8-km resolution to the dynamical adaptation 2-km resolution. The same file is used as a initial file and as a coupling file that contains boundary conditions for the model.

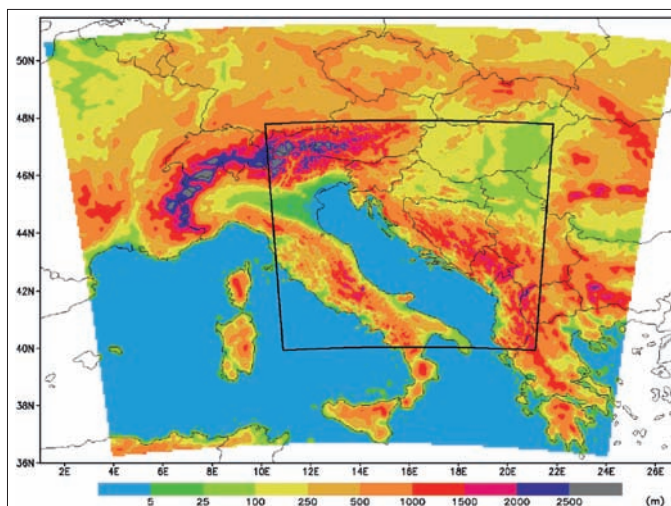
Tests of the New Versions

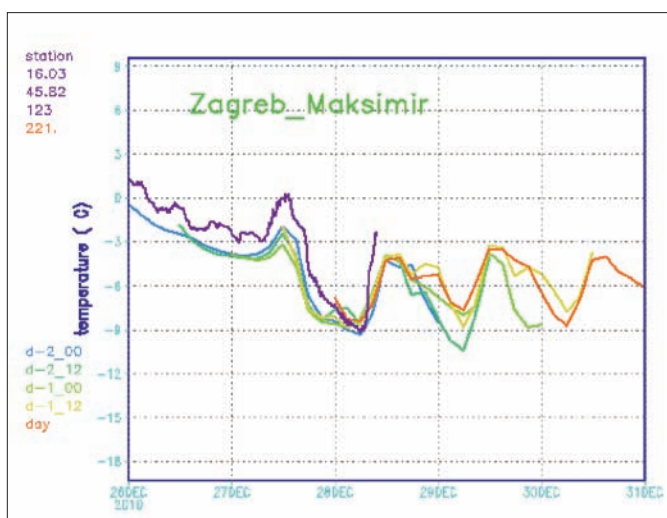
ALADIN 35T1 was ported onto our systems and tested. Unfortunately the verification scores for a 6 month period (June to November 2009) for ALARO+3MT with the old (Geleyn-Hollingsworth) scheme were not satisfactory for a change the operational suite.

ALADIN 36T1 (including bug fixes up to 08) has been ported and now a new test will be done with ALARO+3MT most likely with a new radiation scheme.

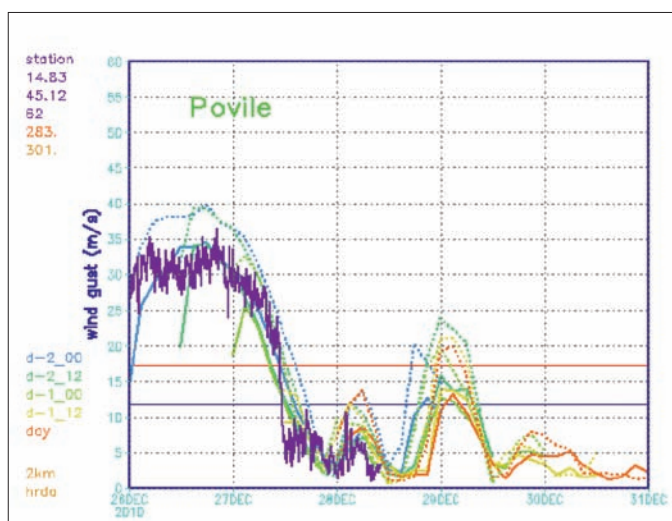
► Figure 1

The domain of the HR NWP model in Croatia and the smaller domain for dynamical adaptation for wind





▲ **Figure 2**
Comparison of temperature (°C) of consecutive model runs of the model grid point nearest to the automatic station at Zagreb Maksimir



▲ **Figure 3**
Comparison of wind gusts (m/s) of consecutive model runs of the model grid point nearest to the automatic station Povile

Tests with 3DVar+CANARI with version 35T1 are promising, though there were still some small problems with T2m and RH2m forecasts in July 2010. It is not clear if this a problem with assimilation or, more likely, with soil parameterisation.

Main Computer, Storage System and Lines

Computer

- SGI Altix LSB-3700 BX2 Server with 48 Intel Itanium2 CPUs 1.6GHz/6Mb

- 96 Gb standard system memory,
- 2x146 Gb/10Krpm SCSI disk drive,
- 1.6 Tb disk array,
- OS SUSE Linux Enterprise Server 9 for IPF with SGI Package,
- Intel Fortran compiler version 9.0.031 & C++ compiler version 9.1.053,
- Queuing system (PBS Pro).

Storage system

- 32Tb disk array - data available immediately for scp or ftp,
- 30TB online on tapes available in reasonable time (usually less than minute),
- and there is no limits for offline storage capacity.

LBC files and lines

- global model ARPEGE, coupling frequency 3 hrs,
- Internet and RMDCN through ecgate as backup from July 2006.

Visualisation

Visualisation of numerous meteorological fields is done via LINUX PC. Comparison of forecasts with SYNOP and automatic station data are done hourly for today's and yesterday's forecasts.

The products are made available on the Intranet & Internet. Internet addresses for some of the ALADIN products are:

- total precipitation and 10 m wind:
http://prognoza.hr/karte_e.php?id=aladin¶m=&it=
- meteograms:
http://prognoza.hr/nauticari_e.php?id=nauticari
- icons of weather and winds with minimum and maximum temperature:
http://prognoza.hr/tri_karta_e.php?id=tri¶m=Zagrebacka&code=Zagreb_Maksimir