ALADIN operations in Romania

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METEO
ROMANIA

ALADIN Operational Suite

(Doina BANCIU , Simona STEFANESCU, Simona TASCU)

Computing platform:

• **SUN E4500 workstation (8-CPU 400GHz, 8*1 GB RAM) for direct integrations and in line post processing**

• **ALPHA DEC 500 workstation (1CPU, 704 MB RAM) for different processing of model output**

ALADIN ROMANIA

➢ **Model version:** cy28t3

➢ **Characteristics**

- hydrostatic version

- 4 runs / day 00, 06, 12 18 ⇒ 78, 54, 66, 54 hrs forecast range

- boundary conditions from ARPEGE (6 hrs coupling frequency)

- domain: 144 x 144 points, 41 vertical levels (Lambert Projection)

- physical parameterisations

- • ISBA (Interaction Soil Biosphere Atmosphere) scheme
   • radiation: simple parameterisation (Geleyn and Hollingsworth, 1979, Ritter and Geleyn (1992), including more exact computation of the exchange with the surface; maximum overlap for adjacent radiative clouds and climatological profile for ozone
   • turbulent diffusion: level-1 scheme in the atmosphere, similarity scheme (Louis, 1979) at the surface

- • sub-grid convection: mass flux type Bougeault scheme enhanced by Gregory-Kershaw treatment of the convective moment, downdraft parameterisation, vertically variable rates of entrainment and detrainment
   • resolved precipitation: simple microphysics (Kesller type scheme)
   • orographic forcing: an improved gravity-wave drag (Catry et al, 2008) a more consistent definition of wave and form drag components, a lift acting (orthogonal) on the geostrophic wind, use of mean orography instead of envelope orography
   • Xu-Randall cloudiness formulation

Post-processing and visualization

- in line FPOS on a geographical regular grid (0.1 x0.125°), hourly up to 54 forecast range, every 3 hrs afterwards
   grib format ; automatically routed to the visualization systems at NMA headquarters and Regional Centers

- of line FPOS on model grid, every 3 hours

- additional post processing: stability indexes, pseudo-temp, isotherms height

- graphical products on the Aladin intranet web site
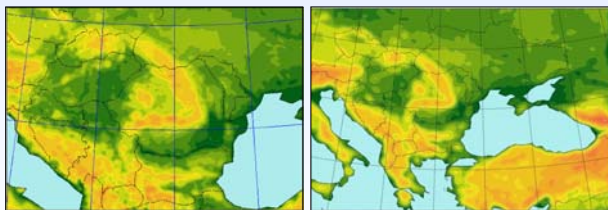
Model orography

ALADIN -SELAM

➢ **Same characteristics like ALADIN Romania over a domain covering entirely the Black Sea** (special for marine forecast)

- domain: 120 x 90 points, 46 vertical levels (Lambert Projection)

- $\Delta x = 24$ km, $\Delta t = 900$ s

ALARO-0 : in research node

⇒ **the next operational model for Romania area**

Downstream Applications

Atmospheric input for :

❖ **Hydrological models**

❖ **Wave models**

❖ **Marine circulation models**
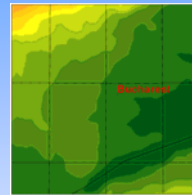
❖ **Pollution transport and dispersion models**

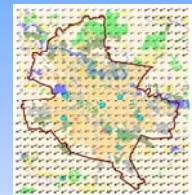## Pre-Operational Suite

(Mihaela CAIAN)

ALADIN BUCHAREST .... it will be replaced in the future by AROME

➢ **Computing platform:** 2CPU SGI ALTIX

➢ **Model version:** cy32t1, non hydrostat

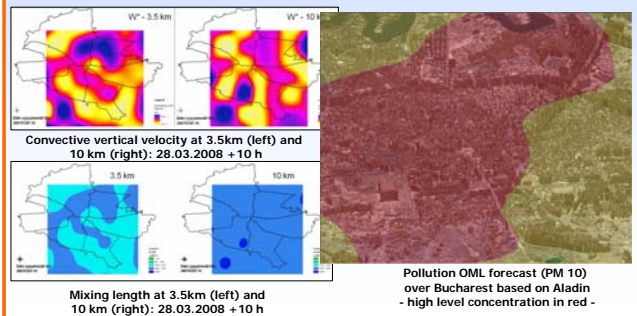- Domain: 50 x 50 points, 41 vertical levels. $\Delta t=60$s

ALADIN BUCHAREST

Model orography

Forecast 10 m wind field :
28.03.2008 +10h

Atmospheric input for:

❖ **Urban-scale (Bucharest) air quality forecast system**

Convective vertical velocity at 3.5km (left) and
10 km (right): 28.03.2008 +10 h

Mixing length at 3.5km (left) and
10 km (right): 28.03.2008 +10 h

Pollution OML forecast (PM 10)
over Bucharest based on Aladin
- high level concentration in red -

ALADIN statistical adaptation and local verification

(Otilia DIACONU, Cristina CRETU)

➢ **The Aladin MOS was recently updated:**
   - parameters: 3 hrs and extreme temperatures, wind, cloudiness and precipitation (3 classes)
   - for 163 Romanian surface observation stations
   - development period January 2006 - December 2007
   - methods: Multiple linear Regression, Discriminant Analysis, Regression with constraints

➢ **The operational verification procedure was reorganized:**
   - It includes: descriptive diagrams (scatter plots, histograms and box plots), confidence intervals for all computed scores.
   - Currently the procedure is applied to the ALADIN and ECMWF products ⇒ it will be used for all operational LAM in Romania
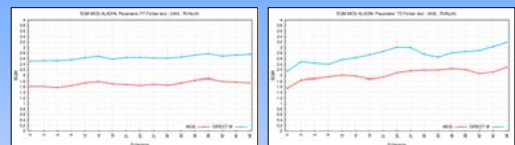

Example of statistical adaptation for the test period (2005): RMS wind direction (left) and
temperature (right), blue – direct model, red - MOS
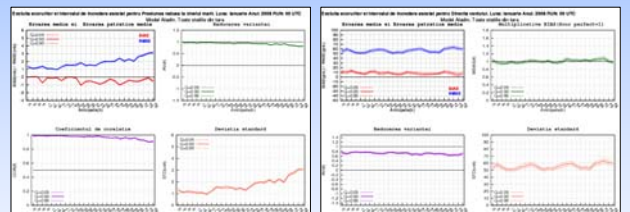
Bias and RMS, variance reduction, correlation coefficient and standard deviation for MSLP (left) and
wind direction (right) for all Romanian observation stations, January 2008
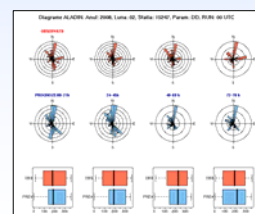
Wind direction: scatter plot, histogram and box plot
for 15247 station (W Romania) , February 2008
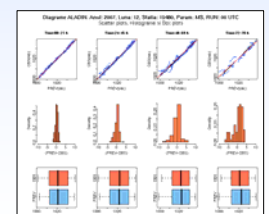
MSLP, scatter plot, histogram and box plot for 15480
station (E Romania, on littoral) , December 2007