ALADIN - Technical and Scientific Portuguese Activities

à frente do nosso tempo

1. Summary of main activities

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Last year a full upgrade of the Portuguese NWP operational system has taken place by the end of 2008. This upgrade accommodated the following changes: a new computer platform, scripts under SMS/Xcdp, a new cycle version, new geographical domains and resolution, increase of coupling frequency, increase of vertical levels and implementation of new verification procedures. Assessment of the model performance for inland, Azores and Madeira islands is now done separately. New direct output fields are produced with interest to forecast centres such as 10m wind gusts, snowfall, snow depth and altitude of isothermal T=0.

2. Workstation version of ALADIN/Portugal

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2.1 History of the Main Events

Since 24 of April 2000, IM runs a Limited Area Model (LAM) in operational mode. This NWP model is a local installation of the ALADIN model, hereafter called ALADIN/Portugal model.

The following operational changes took place:

- **Apr 2000 → cycle AL09**
- **Jun 2000 → cycle AL11T2 (CYCORA included)**
- **Jul 2001 → cycle AL12_bf02 (CYCORA_bis included)**
- **Apr 2002 → change of the time step (540s to 600s)**
- **Nov 2002 → dissemination of coupling fields to support ocean modelling**
- **Jun 2006 → cycle AL28T3 (new geographical area and climatologies)**
- **Jun 2007 → wind dynamical adaptation for 3 geographical domains**
- **Apr 2008 → CANARI surface analysis fields**
- **Dec 2008 → cycle AL32T3 (new geographical configuration)**
- **Mar 2009 → new verification scheme (for Portugal inland and for Azores and Madeira archipelagos)**

Under test:

- **Arome for Portugal inland and Madeira archipelago**

2.2 Foreseen activities

- **Validation of ALARO and AROME over Portugal inland and the islands of Azores and Madeira**
- **Pre-operational implementation of AROME**
- **Installation of data assimilation procedures**

2.3 Operational version

The operational environment and main characteristics of ALADIN/Portugal are:

Computer characteristics

IBM P5-575 with 10 nodes, each node with 8 Power 5+ dual-core processors running at 1.9 GHz and 32 GB RAM of memory. The operating system is AIX 5.3. The execution of the model is done with 4 nodes, 32 dual-core processors, 64 tasks with Open Multi-Processing and Simultaneous Multi-Threading activated.

Model characteristics

- **Spectral hydrostatic model**
- **Hybrid vertical co-ordinates**
- **DF initialisation**
- **Semi-Implicit Semi-Lagrangian two-time-level advection scheme**
- **ISBA surface parameterisation scheme**
- **Initial and lateral boundary conditions from the latest ARPEGE forecast**
- **3 hour coupling frequency from ARPEGE**
- **Integration domain:**
  - **Size: 439x277 points**
  - **Number of vertical levels: 46**
  - **Horizontal resolution: 9 km**
  - **Time step: 360 s**
- **Integration frequency: twice a day**
- **Forecast range: 48 hours**
- **Output frequency: 1 hour**

Available configurations and applications

001, ee927, 701, PINUTS

Graphical software

The METVIEW/MAGICS graphical software (ECMWF) is used under linux operating system (PAIPIX/IM).

NWP archive

Local database (Temporal Instrumental DataBase - TIDB/IM)

3. New geographical post-processed domains

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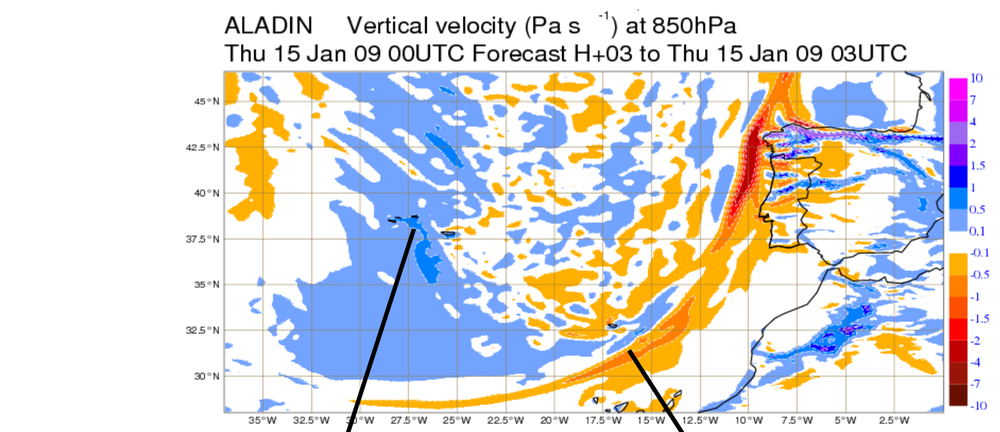
New geographical domains are being plotted for different applications :



Azores archipelago **Madeira archipelago**

4. Model Verification

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A new system of NWP model verification was implemented for the different post-processing domains: Portugal Inland and Atlantic (ATP for ALADIN; ATL_05 for ECMWF). Verification is done using different sets of observations, one for each portuguese domain: Portugal Inland; Azores archipelago; Madeira archipelago.

Basic statistical parameters used for assessment of the forecast quality are: bias, RMSE, forecast accuracy (PRB) and scatter plots for intensive meteorological variables (e.g., T2M, RH2M, MSLP, 10m wind intensity, 10m wind direction); Heidke Skill Score (HSS), Equitable Threat Score (ETS) and bias for extensive meteorological variables (e.g., TP in 3h, TP in 24h). Scores are operationally plotted for daily and monthly verification. Besides, multirun results are plotted with observations.