The regional model Albachir North-Africa

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1. Introduction

Recently, Maroc-Météo (DMN) was equipped with a new and powerful tool of computing, a super-calculator IBM RS/6000 SP. This acquisition has raised the DMN's computation capacities at the level of its expectations and development prospects. Indeed, a great interest was given to regional forecasting, so a project of changing the present model configuration of Albachir (ALADIN-Maroc) into Albachir North-Africa (Albachir-NA) is in progress.

The new configuration will cover northern Africa to the equatorial belt, with a resolution of 24 km. It will be subsequently used to provide boundary conditions to an embedded model of finer resolution, 9 km, centred on Morocco and covering the current Albachir domain.

2. Albachir-NA running in dynamical adaptation mode

The first stage consists in running the model in dynamical adaptation mode on a wider domain, i.e. : 44° North - 0° South and 36° West - 56° East, with a horizontal resolution of 24 km. The vertical resolution is given by 31 layers. We use a timestep value equal to 900 s. The forecasting range is 72 hours and post-processing is performed every three hours. The coupling files were transformed to 24 km resolution by the ee927 configuration.

We must point out that the upgrade of the computing capacities led to a considerable gain on computing time.

The attached figure is an example of Albachir-NA's product. It shows the 700 hPa relative humidity field for a 24-hour forecast starting on 24/04/2001 at 15 h UTC.

The second stage consists in evaluating the results of this new application, when compared to the existing one. The forecasts produced by this regional model remain very close to those resulting from ARPEGE. Indeed, a comparative study over the Moroccan area showed no significant variations. For the various weather parameters, the graphical charts were mostly close to each other and the differences remain generally weak on the major part of field.

3. Albachir-NA running in data assimilation mode

We were also interested in carrying out the optimal interpolation analysis CANARI on north Africa. The " CANARI's Supplementary Statistics " have presented generally good scores. However, the results concerning the analysis increments have raised a very significant problem: the deficiency in observations on most of the domain, in particular on Sahara Desert.

This encourages us to integrate other types of observations and to reflect more on other techniques of analysis and data assimilation. The integration of TOVS and radar observations and the implementation of a 3d variational analysis in this new application will constitute the best solution. This step will enable us to update the tools for analysis and consequently to improve considerably the quality of the forecasts.

Figure 1 : relative humidity at 700 hPa forecasted for 25/04/2001 at 15 h UTC over Northern Africa