



***Changes in operational version of ARPEGE
July – December 2004***

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1. OCTOBER, 19TH: OBSERVATIONS & PHYSICS & ASSIMILATION CHANGES

The following changes reported in ALADIN Newsletter 26 are recalled below:

- New library CY28 T2
- New satellite observations:
 - AMSU-B from Exeter
 - Surface winds measured by the Seawind instrument of Quikscat
 - ATOVS data from Lannion (Météo-France) (HIRS, AMSU A and B)
- New balance equations for Jb to take into account the ageostrophic motions
- Variational quality control
- New climatology for aerosols and ozone fields used by the radiation scheme
- Tuning of a Rayleigh damping coefficient on temperature in the 2 uppermost levels
- Reduction of 25 % of the thermal inertia for vegetation amplifying the temperature diurnal cycle

These modifications have been tested against the operational ARPEGE version during 73 days and the new version present improved results (see Figure 1) for practically all the meteorological parameters.

The subjective evaluation of both forecasts every day during more than 2 months has revealed that the improvement of this new version is visible for a forecaster after 72 hours with about the double of better forecasts than worse forecast for all the cases where differences existed.

It is hoped that this new version will provide better initial conditions and lateral boundary conditions for all the ALADIN LAM nested in ARPEGE.

2. WINTER NEW VERSION: MODIFICATION OF THE MIXING LENGTHS OF THE TURBULENCE SCHEME

A new formulation of the mixing length has been proposed by E. BAZILE (Météo-France) and has been tested against the GABL data set (the presentation is on the following web site <http://www.cnrm.meteo.fr/ama2004/>) and is being tested during this winter.

3. TOWARDS A NEW ARPEGE SCHEDULE: OBJECTIVE AND INTERMEDIATE STEPS

The current ARPEGE schedule, which drives the LBC provision for all partners including France, has been constant since 1994 for the 00 and 12 UTC runs. At that time the ARPEGE assimilation scheme was Optimal Interpolation, with very limited capacities for ingesting satellite data, and therefore very little impact of waiting for this data before starting the analysis.

The current schedule is not well adapted to the internal needs of Météo-France. As often in meteorology, the most crucial issue is the availability in the early morning. The current scheme is not so bad in wintertime, but since it is constant in UTC time while our users, and therefore our whole production, are based on local time, the summertime period is more problematic.

As presented in the 2003 Assembly of ALADIN Partners in Krakow, we have the "final" objective of having an ARPEGE suite that is constant in local time (or that we keep in UTC but change by 1 hour twice a year to mimic a constancy in local time), covering at least:

- night run : Day D0 and D1 at 3h30
- morning run : until D3 at 7h or 7h30
- noon run : until D1 at 13h30
- evening run : until the current D2 (the future D1) at 19h or 19h30.

The runs are intentionally not referred by a classical UTC stamp, the assimilation schemes allowing for possibilities largely exceeding our current classical 6-hour windows.

For a series of reasons, the final objective cannot be met at one go. A first intermediate step was made last summer, with an additional preliminary ARPEGE run on 00 UTC with a 1 h cut-off,

providing outputs shortly after 3h30 (by 3h45 actually); this run known as "PACOURT" ended when going back to wintertime end October 2004. For the summer 2005 the first goal is to have an optimised PACOURT. Gérald DESROZIERS at GMAP tested various configurations, including extended 4D-Var windows like [15 UTC - 01 UTC]. Finally, because the main issue related to PACOURT is the ability to capture or not a minimum of the 00 UTC radiosondes that arrive late in summer, the most promising candidate for 2005 is not such an extended 4D-Var, but a cheaper 3D-Var FGAT, allowing to wait a little longer for observations. The next steps will come later in the summer, when we'll try to slightly delay the other runs in order to get closer to the final objective : the classical 00 UTC run becomes the morning run, the 06 UTC; then we'll have to consider the possible merge of the current 12 and 18 UTC runs into a single one, leading to a scheme with 4 daily runs again after a transitional period with 5 daily runs.

It's difficult to give a precise timetable for all the steps, because the related potential problems have a huge variety and sometimes complexity. In fact part of our suite and of the tools that use it have been built, year after year, under the unconscious assumption that the ARPEGE schedule was frozen forever. So things are not as easy to move as it could look from outside. Anyway, the new PACOURT will be installed in March (the summertime period starting end of March), but the next steps are by any mean not expected before June. It is even likely that we won't be able to finalise the whole process in 2005. Further news later this year.

For the ALADIN partners, in order to smooth the transition to the new ARPEGE schedule, several actions can be taken. First LBCs can be produced if requested on the current 06 and 18 UTC runs. Some partners already use this facility which makes available, at any moment, a reasonably fresh set of LBCs (while using only the 00 and 12 UTC runs obviously leads to larger gaps). Then it can be considered at some stage this summer to also produce LBCs on the PACOURT run.

Eventually the local ALADIN data assimilation offers to each partner separately a way to adapt his own NWP schedule to his own needs, the large-scale information provided by ARPEGE at least 4 times a day keeping a good quality and the locally analysed fine scale bringing the last moment details.

GÉOPOTENTIEL : PA.r 0/TP-PAD.r 0/TP
 (/1.00m) Chaîne 2004_03, Cycle 28 T2
 73 cas, 30/07/2004_00UTC -> 18/10/2004_12UTC

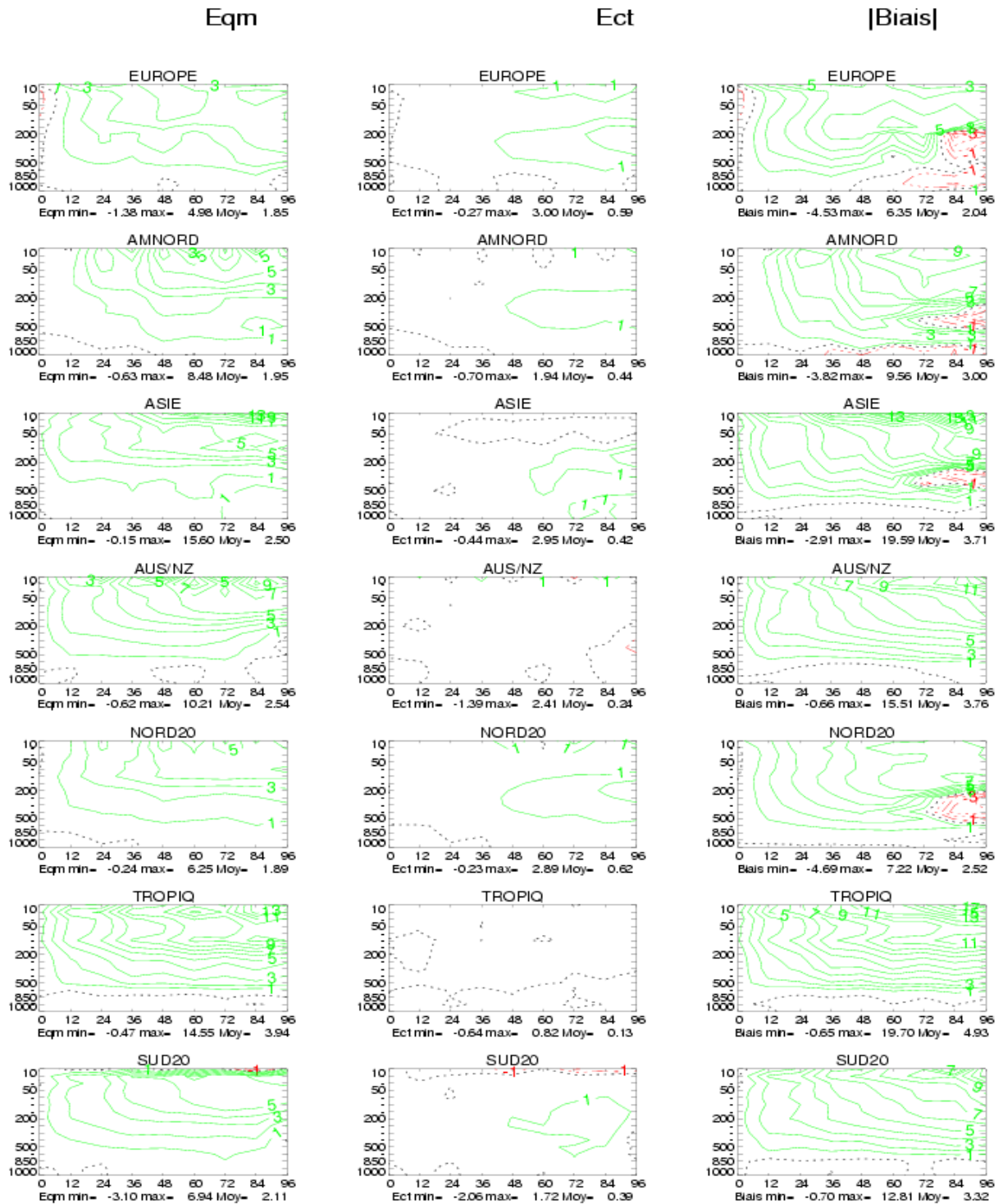


Figure 1: Comparison of the operational forecast and the new version against the TEMP observations. The isolines of the geopotential are plotted every meter. The green isolines correspond to an improvement and red ones to a deterioration.

CONTENTS

1. <u>October, 19th: Observations & Physics & Assimilation changes</u>	2
2. <u>Winter new version: modification of the mixing lengths of the turbulence scheme</u>	2
3. <u>Towards a new ARPEGE schedule: objective and intermediate steps</u>	2