La lettre d'informations

Hírlevelek

Revista Periodica

Novice, zanimivosti

Spravodaj

Nieuwsbrieven

Новости

Новини

Newsletter

Number 14

January 1999 - March 1999

This Newsletter presents you the principal events concerning ALADIN during the quarter of year mentioned above. The news about work or events outside Toulouse are related with informations that you sent (for disponibility constraints, the "deported" work deals with the previous quarter).

So, reading this Newsletter, you will know everything about ALADIN activities (more precisely everything I was told about) between January 1999 and March 1999 (except for the work realized outside Toulouse : between October 1998 and December 1998).

Please do bring to my notice anything that you would like to be mentioned in the next Newsletter (number 13) before the 25th of July 1999.

Any contribution concerning announcements, publications, news from the ALADIN versions on workstations or on big computers, verifications results, ... will be welcome. This deadline is particularly important for the report of the deported work each representative should sent every quarter.

If needed, please contact :

Patricia POTTIER
Météo-France/CNRM/GMAP
42, Avenue Coriolis
F-31057 TOULOUSE CEDEX

patricia.pottier
@
meteo.fr

(33) 5 61 07 84 74
(from France, replace 33 by 0)

http://www.cnrm.meteo.fr/aladin/

Contents

2. Doina BANCIU : "Specific small scale diabatic forcing in ALADIN at the limit of the hydrostatic assumption"
3. Ilian GOSPODINOV : "Conservation Properties of 2 Time Level semi-Lagrangian"
4. Filip VANA : "The dynamical and physical control of kinetic energy spectra in a NWP spectral semi-Lagrangian model"
5. Mark ZAGAR : "Prediction of small-scale events through second level dynamic adaptation of the planetary boundary layer"

Bogussing in La Réunion island

Tropical cyclones simulations with ALADIN

ALADIN on a cluster of Linux/Digital Unix workstations

Regional nested and variable mesh models: a comparative theorical study

Scores on ALADIN-FRANCE during the fourth quarter of 1998

Experiences on the subjective evaluation of ALADIN/LACE model 00 UTC

Participations in the ALADIN project : some statistics

Deported developments during the forth quarter of 1998

1. In Austria
2. In Belgium
3. In Bulgaria
4. In Croatia
5. In Czech Republic
6. In Hungary
7. In Moldavia
8. In Morocco
9. In Poland
10. Portugal
11. In Romania
12. In Slovakia1
13. In Slovenia
14. Deported work by Météo-France people

ALADIN developments in Prague during the first quarter of 1999

ALADIN developments in Toulouse during the first quarter of 1999

1. Main events in Toulouse this quarter
2. Other visitors research or development studies that ended during this quarter
3. Other research or development studies by the Toulouse permanent staff

Main events

1. **Second medium-term (1999-2001) research plan for ALADIN (a new document) and 1999 working plan**

   The Second Medium-term (1999-2001) research plan for ALADIN has been reformulated by the 3-headed team (R. Bubnova, D. Giard & A. Mokssit) created during the 3rd Assembly of ALADIN Partners to initiate and coordinate the exchanges, collect proposals and prepare the discussions for the next Assembly. A working plan for 1999 has been prepared accordingly.

   These documents are available both on our public ftp (newplan2001.ps : Second medium-term (1999-2001) research plan for ALADIN; plan1999.ps : the 1999 working plan in English; plan1999_fr.ps : the 1999 working plan in French) or (here) on this ALADIN server.

   Please consult the complete documents for details.

---

2. **Some proposals to enhance coordination in the ALADIN project and make source code management less puzzling, from coordination meetings held in March 1999**

   The 3 headed team (R. Bubnova, D. Giard & A. Mokssit) met in Toulouse in February 22nd-26th. They reformulated the second medium-term research plan (see 1.) and made the following proposals to enhance coordination in the ALADIN project.

   1. Improving the diffusion of information on source code evolution

   A Utilisation of the web site for ALADIN

   including an access to :

   - all the mails sent by the Toulouse "Gourous" (alias GCO team, or Eric Sevault and Stéphane Martinez) concerning source code modifications, namelists changes, reported problems, ...

   - sets of namelists for the successive "export" versions (not yet done)

   B Enhance used of the "alabobo++at++meteo.fr" mailing list

   Every problem noticed in source code MUST be reported through alabobo, including obvious bugs, non-standard coding, compilation problems, ...

   C Consistency between operational and research libraries

   Differences must be reduced to the strict minimum, to make checkings easier and avoid the multiplication of namelists sets. This was experimented in the last export version, AL09.07.

   D New management of export versions

   The access to the corresponding code is now two-fdd :

   - the usual expanded source code package, to be transfered by ftp. Both the whole source code and a

reduced set corresponding the the modified elements will be available.

- a view on clearcase, which allows to point easily at individual subroutines. Extraction scripts to recover modifications between successive versions will be designed. Such an access to AL09.07 is already available through the command "cc_getview -r AL09 -u export".

For more details contact : Eric.Sevault++at++meteofr.

2. Preparing new cycles

A Update of the auxiliary library

The Gourous promised to update it more regularly and thoroughly. Moreover accounts on J90 (Cray computer) and a SUN workstation will be available for Sami Saarinen so that he can improve the portability of ODB, the new management tool for observations under development at ECMWF.

B Preliminary tests

A set of simple tests is to be designed. These experiments are to be run on various platforms before any significant change in the auxiliary library or in coding norms (as the change from CY20/AL10 to CY21/AL11), to point out any portability problem. The GCO team is in charge of tests on SUN workstations and Cray platforms (J90). This should be ready for the export version of AL11.

C. New strategy for phasing

The next phasing operations will be scheduled in two successive steps, focusing first on "basic" configurations (ARPEGE, then ALADIN), second on data assimilation aspects (ARPEGE, then ALADIN). This was in fact the case for the last cycles, and must be taken into account in the management of stays. Moreover it has been decided to perform a more thorough validation of the code before the delivery of an export version for any new cycle : on VPP of course, but also on workstations (in Météo-France for basic configurations, in Romania for CANARI, any other volunteers ?) and on Cray (once in Belgium, once in Morocco).

3. Verification

A simpler procedure will be designed for the diffusion of objective scores, by observation point rather than by domain. The main goal for 1999 is to concentrate informations from all ALADIN partners in Toulouse. Methods for computing the deviation from observations may differ, since tools or strategies may change. However the output format must be the same, so that data can be easily handled and merged together. A common database will be implemented next year in Toulouse.

---

3. Status of ALADIN source versions : Claude Fischer's soul-searching

The last 6 months were probably not a good example of code and phasing management in the strict sense. Supposed to be available beginning of november, Arpege pre-cycle 20 arrived in Toulouse in december. Unfortunately, the Aladin phasers were present at GMAP only until christmas. The somewhat uncontrolled sliding of the deadlines gave the opportunity for some nice discussions at GMAP on how to do best, short, and after a few days nobody really remembered who was first to shift the dates. For Aladin, a race against the clock started, with a completed source phasing but absolutely no chance to have any binary for validation end of 1998. The "lost" time was filled with some developments, so that many of the phasers would probably not appreciate too much if the general feeling of my paper would be that they had holidays.

They had not. Luc Gerard coded the new formulation for the convection scheme, in link with Doina

Banciu and Jean-Marcel Piriou. This rather heavy coding entered AL10, and it is now the start for new calibrations for the future operational settings (work of Vladimir Pastircak in Toulouse and Martin Bellus in Prague). Meriem Zitouni dived into distributed memory and message passing issues and developped the DM version of the diagnoctic "ECHKEVO" routine. Though this type of applications does not for the time being concern many centers outside Toulouse, the DM features will have to be more and more emphasized in the coming phasings, for example via code cleaning. Ilian Gospodinov worked for AL10 on the semi-lagrangian code both for the inclusion of some of his PhD developments and for phasing. David Dvorak and Martin Charron secured the non-hydrostatic code for the new cycle (conf 001). Maria Siroka (3d-var), Cornel Soci (Canari), Plamen Neytchev (setup), Dominique Giard and Patrick LeMoigne (923, 927) and myself (message passing, sensitivity) prepared the many other facilities for AL10.

However, as I already mentioned, nothing was really ready end of 1998. For the real validation, an extra effort was done in february-march 1999, with the help of a restricted commando of validators: Plamen Neytchev ran about 100 jobs to validate thoroughly configuration 1 in many different settings. Wafaa Sadiki ran Canari on AL09, and worked also on DM-aspects. Francoise Taillefer has now included Wafaa's developments for AL10/Canari. Meriem Zitouni performed a somewhat unusual task: she validated the non-hydrostatic model. Some additional work was also necessary to introduce the modifications required by the new parametrization of soil freezing and make 927 provide a clean extension zone, whatever the clim file. Thus, AL10 is probably the first cycle where this non-operational version is ready before any "stagiere" starts to sweat on it. In the same spirit, the variational types of configurations also are ready (test of TL, test of AD, gradient test, 3d-Var gradient test).

Was this the end for this semester ? Of course not ! You forget about the bad intentions and ill-minded inspirations of our gourous, who decided there should be a major cleaning of the code, soon after CY20/AL10. So we wait for the delivery of AL11, the free-format, implicit none, generic-type constant version of the Aladin model. Of course, those who will do "cc_diff" between the former and the cleaned code will have difficulties to recognize anything but a common line between the two versions (see Eric Sevault's comments in the previous Newsletter).

So the present text is typed on friday, april 30th, 15 UTC, by a sunny, mild and slightly windy Toulouse afternoon. The end of the overall phasing, that was supposed to lead to CY21/AL11 beginning of february 1999 is still expected to happen some day in may.

Oh, I forgot to mention some more scientific work implemented in AL10 as well:

- Martin Charron's TL and AD of the non-hydrostatic version entered partially
- Lateral Boundary treatment in TL and AD
- some more work on RUBC

Also, for information, we have presently a proper version of AL10 under clearcase view "AL10_cleaning", in phase with the Arpege branch "CY20_al10". In future, the cleaned branch "CY21_al11" will be merged with another CY21 branch prepared by the data assimilation team. By the end of may, we should then have our AL11(T1) phased with a CY21T1.

Maybe I was slightly pessimistic in my presentation of the AL10 phasing. Please contradict me and be a lot to accept our next invitation for phasing, for november-december 1999 !

Another lesson of the recent phasing efforts is that the data assimilation facilities are validated after the other configurations. Therefore, from year 2000 onwards, it has been decided to phase in two steps : hte data assimilation parts lagging behind the model items.

NDLR (who didn't participate to this huge work): AL10 is one of the only ALADIN cycles for which

absolutely ALL configurations - be they operational or in development - have been validated. We had to wait more than expected to obtain this result - granted, but wasn't it worth ?

---

4. Attention : new soil freezing parametrization

All correspondants for operational problems should have received the following message on mid-April.

As you all know, the problem of soil temperatures exasperately keeping too close to 0&#29;DG in transition phases has been casting a shadow on the otherwise good performances of ISBA, and this for the whole of last winter. The causes of the main deficiencies in soil freezing parameterization (since part of the forecast failures were due to the snow cover description) have been identified and a well tested correction set is now ready.

In fact it has been available for some weeks but tests in ARPEGE with data assimilation have shown that, when the soil is partially frozen, there is a quite long "spin-up" time (some weeks) before finding a new equilibrium and that the situation might sometimes be worse in-between, even if results are clearly positive in the end. Since ALADIN partners are entirely dependent on ARPEGE for this issue, it was decided (after an unsuccessful attempt to "catch-up" a research mode suite) to wait for the season when basically all soil-ice would have disappeared from the ALADIN-territories and to then "piggy-back" this "(temporarily) transparent" modification on another ARPEGE parallel suite.

The occasion seems now to be ripe with an ARPEGE parallel suite testing a change of statistics for the Jb term of 3D-Var (hence a completely independent issue) that started on 8/4/99. Assuming that:

(1) the results of this parallel suite will look promising by 21/4,

(2) everything will be ready on both ARPEGE and ALADIN sides at that time,

we intend to incorporate on 22/4 in this parallel suite the freezing/melting CODE AND FILE modifications (with some corrections in soil water analysis and in Full-Pos too) with the aim of an operational switch on 3/5 (*NDLR: delayed to 24/5*).

As previously mentioned, the necessity to incorporate a new soil prognostic variable (superficial ice content) imposes a COORDINATED CHANGE to all ALADIN users : either moving to the new package (compulsory for ALADIN-France and ALADIN-LACE) or using a file conversion procedure (for those not yet ready), like it was already the case on 16/3/98 for the switch to ISBA. The corresponding procedure is ready and available on dino. Anyway no major damage is to be expected in case of a missed conversion.

Concerning the file-testing procedures, ALADIN-France and ALADIN-LACE will be in full parallel suite mode. One set of testing files from the parallel suites in Toulouse will be prepared for Al-Bachir, Belgique, Poland, Portugal and SELAM on a date to be negociated. The LACE Prague Team will prepare a similar set for Austria, Hungary, Slovakia and Slovenia.

In principle, owing to the above-mentioned choice of a warm season for the switch, the results should be quasi-identical, except above and around high mountains. However, since the "test of the pudding" will come at a yet unknown time in the autumn, it would be wise, once you master the new situation technically speaking, to make a scientific test on a more realistic season before that event. Coupling files for the freezing/melting episode (over France at least) of 18 to 27 of November 1998 will be made available on request in researchmode to those of you interested in such a test.

We hope that these explanations will help you to prepare for the foreseen change (that can of course

be postponed in case of well justified necessity (*). Since we probably forgot to cover some more detailed aspects of the problem, please do not hesitate to ask for more information. An explanation of the scientific modifications will be put soon on the ALADIN www server and a detailed description of the corresponding export version follows. In the end we are sure that everything will go as well as one year ago and that next winter will show the benefits of the action we are going to do now together.

(*) On the one hand there is no urgency before next fall but on the other hand we might not find again the opportunity of such a thematically independent ARPEGE parallel suite as the current one.

A brief scientific description can be found on our usual ftp (files : extabs.ps, pp1.ps, pp2.ps).

Conferences / Workshops / Announcements

1. Sixth ALADIN Workshop held in Bucarest on February 15-17th, 1999

This Sixth ALADIN Workshop took place at the National Institute of Meteorology and Hydrology in Bucarest and was entitled "Scientific development and new applications of the numerical weather prediction model ALADIN".

Model features, significant changes during the last period and model verification in Toulouse were first presented.

Presentations of different applications of ALADIN in Romania were given then : urban modelisation, .transport of pollutants (with MEDIA model), marine meteorology with the comparison of two waves models (WAM from Max-Planck-Institut of Hambourg and VAGROM from Météo-France), ...

Some results of subjective and objective verifications were shown.

During a round-table discussions on scientific plan, recommendations for coordinators were proposed (see "Main events 1.").

The last day round-table discussions dealed with :

- the design of the common data sets for case studies and tuning the model;
- data assimilation
- AWOC (see "The (pre-)operational ALADIN model" 1.AWOC)

---

2. Next EWGLAM/SRNWP joined meetings

The 22nd EWGLAM & 7th SRNWP meetings will take place in Bratislava on October 11-15, 1999. The official invitations will be sent soon.

For information, please contact: siroka++at++synoptik.shmu.sk *) or write to the general e-mail address for whole group of meetings' responsible people:* EWGLAM++at++mail.shmu.sk

---

3. Seventh ALADIN Workshop to be held in Ljubljana on November 17-19th, 1999

It has become a tradition that the community of the users of the numerical weather prediction model ALADIN meets regularly and presents the last progress of the model use and exploitation.

It was proved that exchange of experiences and presentations on the various implementations of ALADIN products in operational environments are of great use for planning and organisation of related activities in national services.

The above list of potential topics should be considered as a proposal.

- Proposed Subjects:

- MAP and ALADIN

ALADIN was choosen as one of the LAM models for the support of MAP (Mesoscale Alpine Experiment) field phase, so called SOP (Special Observing Period), from Sep. till mid-Nov. 1999. Visualized products of ALADIN/LACE will be available at MAP servers in order to be used by involved forecasters, scientists and measuring mission planners.

- short term perspectives: use of ALADIN within the field experiment; planned MAP IOPs case studies; etc.

- long term perspectives: how to use MAP experience to improve the model; etc.

- CANARI

Potential use of package (diag.pack under development) for the analysis, diagnostics and nowcasting purposes:

- Analysis and diagnosics expectations from bench forecasters

- Experiences with use of derived quantities

- Use in nowcasting process

- etc.

- Presentations

- Applications of ALADIN on:

Weather Forecasting

Aviation Meteorology

Mountain Meteorology

Hydrology

etc.

- Model verification, methods and results

Abstracts should be received till end of June 1999. Instructions to Authors are available on the Web page of the meeting.

For additional information please contact: aladin.workshop99++at++rzs-hm.si *or* http://www.rzs-hm.si/OpTiM/lace/workshop99.html

---

4. Assembly of ALADIN Partners

The next Assembly of the ALADIN Partners will take place in Lisbonn on Monday 22nd of November 1999. An invitation has been sent to the directors of all NMSs involved in the ALADIN project : the proposed date was 15th of November. This date had to be changed because of the 7th ALADIN Workshop. A second letter will be send to the directors with this new date.

For additional information please contact: mario.almeida++at++meteo.pt

---

5. "Atelier de Modélisation de l'Atmosphère" (A.M.A.) to be held in Toulouse beginning of December 1999

This year, the main topics of the A.M.A. will be "Modèles". A "call for contributions" will be sent very soon within the French speakers community (communications andposters will be in French)

More details on request by writing to : ama99++at++meteo.fr *.*

---

6. SNRWP Workshop on Non-Hydrostatic

The third International SRNWP Workshop on Non-Hydrostatic modelling in Offenbach (25-27th of October, 1999) will focus on "Data assimilation for fine mesh models".

Please contact j steppeler++at++dwd.d400.de *or* claude.fischer++at++meteo.fr *who will attend the workshop.*

---

7. ALADIN workshops in 2000

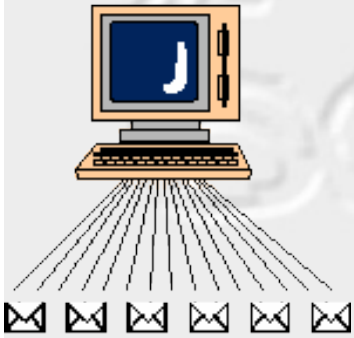
Next forecaster workshop will take place in Ljubljana on 17th-19th of November 1999 (see 3.).

During last ALADIN workshop in Bucarest, next modeller meeting was proposed to be held in Poland by M. Jerczynski (February-April 2000). Belgium also has candidated and could organize then the next forecaster meeting (presumably in fall 2000).

Contacts & Informations

These informations (and others,please see the list of the documents in annex) areavailable on a public ftp : cnrm-ftp.meteo.fr , under the directory ***/pub-aladin***.

Some mailing lists also exist to make our correspondence smoother; for example :



- the general list : aladin++at++meteo.fr ,
- the RC LACE list : lace_talk++at++chmi.cz ,
- the AWOC list : awoc++at++meteo.fr ,
- the list for questions and/or problems encounteredwith ALADIN : alabobo++at++meteo.fr
- ...

Many of you have a remote access to Météo-France machines. Eric Escalière (eric.escaliere++at++meteo.fr) is now your only point of contact for these access.

There was no answer to the previous calls to update the list of the contact points for operations !

PLEASE HELP US IMPROVING THE COMMUNICATION INSIDE THE PROJECT

ALADIN on the WEB : yes !

Well, if you are reading this, you know about it !...

An ALADIN WEB site is available at : ***http://www.cnrm.meteo.fr/aladin/.***

It is mostly in English but the first page is available in different langages used within the ALADIN community (excepted Arabic, Croatian and Czech for the time being). Please find here two examples of this first page.

It is only a first version, trying to be both a showcase of the ALADIN project and a tool for all "ALADINers" with, amongother things :

- some informations about the ALADIN system, the scientific contents,
- the research plans, the use of configurations, some technical data,
- the cycles, ...
- the (pre-)operational versions with links to Partners servers,
- the history of our project with genuine antique documents,

- the organisation of our project : MoU, statistics of participation,...,
- the publications, the newsletters, the meetings,
- full addresses of ALADINers"at home" and on visit (Toulouse, Prague) with e-mail, telephone and fax numbers, some mailing lists (with archives),
- ...

Please have a look at it and don't hesitate to tell me anything you want me to modify, to add (or to remove) in order to improve this server.

Money Funding asked for some cooperations based on the ALADIN project

1. **French "Ministère des Affaires Etrangères" support (MAE)**

   Demands for Embassy support for 1999 have been expressed to the Ministery last October. Rules are the same as 1998 ones with a probable reduction of the total amount of the support. We are waiting for informations from the Ministery. As soon as we receive informations, your representatives will be contacted and we will plan the stays benefiting from this support.

   More details can be asked to Arlette Rigaud (Météo-France/DGS/IE arlette.rigaud++at++meteo.fr).

2. **Bilateral supporting grants**

   Balaton, Barrande, Proteus, Portugal are famous names of ... bilateral programs who can support short visits in both sides. All submitted demands have been successful even though we have not obtained all what has been requested. The countries involved in these programs can easily be guessed considering the programs names.

   The French fundings are used to pay the per-diem (in France) of the visitors and to pay the travel of French people to your NMS, and vice-versa.

3. **Météo-France support for maintenance**

   Part of Météo-France for funding to support maintenance actions in the ALADIN project has been used for AL10 phasing in January and February. We still have to find volunteers for the next one in November-December ...

The (pre-) operational ALADIN models

1. **AWOC at the Bucarest workshop and later on**

An AWOC meeting took place during the ALADIN workshop in Bucarest. This is the report from Claude Fischer.

The extended activities of the AWOC group have been recalled during the discussions at the Aladin workshop in Bucarest (devoted to fixing installation or operation problems, code, compiler or related bugs).

In this frame, it was noticed that the auxiliary library had missing routines (xrd19). Also, non-standard non-ANSI code was detected (to be in general reported to the gourous). Duplicated declarations of variables cause some compilers to fail. Also, the order of the declarations should be carefully checked. Some shortcomings have been reported recently (march) by Luc Gerard and the gourous have sworn some of them will be fixed over xrd21.

Some news on CY20 were given (see the detailed report in this newsletter). Also, the cleaning for CY21 was mentioned: IMPLICIT NONE, free source format, fortran 90 generic types used for the definition of real expression accuracies (see Eric Sevault's description in the previous newsletter). It was recalled that the surface reservoir for frozen water in the soil parametrization will not become operational before april 99. The preparations for the switch have started and the date of the change should be May, 17th.

The status of the documentation was mentioned. For the reports, the Aladintheque is regularly updated with the latest "stagiere's`` reports. Nothing was started to translate the documentation of the physics into english. The existence of a rather complete IFS documentation was mentioned. This documentation can be installed on the Prague webserver for the LACE countries but does not concern the Arpege physics. For non-LACE countries, only a delivery via mail, on their specific demand, is possible.

2. Workstation version at Austrian Meteorological Service

(more details thomas.haiden++at++zamg.ac.at)

3. The operational implementation of ALADIN-Belgium

(more details olivier.latinne++at++oma.be)

4. Workstation version at Bulgarian Meteorological Service

(more details valery.spiridonov++at++meteo.bg)

5. Operational ALADIN-FRANCE in Météo-France

(more details francis.pouponneau++at++meteo.fr)

6. Workstation version at French Meteorological Service

(more details jean-marc.audoin++at++meteo.fr)

Nothing new this quarter.

7. Workstation version at Hungarian Meteorological Service

(more details horanyi++at++met.hu)

The main events of the first quarter of 1999 are :

- Quasi-operational implementation of CANARI

Since the end of January the CANARI optimal interpolation scheme is executed quasi-operationally providing inputs for the nowcasting applications at the Hungarian Meteorological Service. At the

moment CANARI is running every 6 hours using local SYNOP and TEMP observations (the observations are read from the local data base then it is converted into ASCII format for Mandalay and then Mandalay creates the direct CMAFOCinput for CANARI).

The quality of the CANARI analysis is planned to be monitored and improved continously. In the near future it is planned to have analysis every 3 hours, later on we might continue with hourly analysis.

It is emphasised that at this stage CANARI is only running for nowcasting purposes, however later on we plan to perform some data assimilation experiments as well.

- Migration to SGI ORIGIN2000

In the beginning of 1999 a new SGI ORIGIN 2000 machine with 6 processors was delivered to our Service (now there are two more additional processors available). The speed of the processors is 0.4 Gflop each.

In the beginning of February we started the adaptation of the ALADIN model to the SGI platform using the distributed memory version of the code. After the successful adaptation some tests were carried out for showing the scalability of the machine for the ALADIN/HU operational domain. The speed-up of the machine with 8 processors is 6.7 (see the speed-up curves enclosed).

In the near future we will port the operational ALADIN/HU application to the SGI platform and after the stabilization of the operational suite a domain and resolution increase is planned.

- Verification

Finally the necessary softwares were completed for the relative comparison of NWP models applied in an operational manner at the Hungarian Meteorological Service. The software is able to calculate simple statistical scores of the models with respect to SYNOP and TEMP observations. At the moment the ECMWF model, the ALADIN/LACE and the ALADIN/HU models are compared using the observations available on the ALADIN/HU domain. The visualisation of the results are carried out using the same software as it is in Toulouse (using gnuplot).

8. Operational ALADIN-LACE in CHMI

(more details can be asked to Project Leader or Prague Team Leader)

News from the Council:

The 9th RC LACE Council held in Prague on 25th February 1999 approved the new shape and candidates of the Management Group as follows:

- Project Leader: Radmila Bubnová, CZ
- Deputy Project Leader: Dijana Klaric, HR
- Prague Team Leader: Martin Janousek, CZ
- Deputy Prague Team Leader: Mária Siroká, SK
- Project Scientific Officer: Thomas Haiden: AU
- ALADIN/LACE System Co-ordinator: Gábor Radnóti, HU

This Management Group will start its work on 1st May 1999 and has been nominated for 1 year.

Evolution of the ALADIN/LACE application.

In the beginning of the year the Prague Team concentrated on the validation of the cycle AL09/CY19T1/XR19, which repatriation started still before Christmas. The validation in a parallel suite revealed a bug affecting the use of the 8th lateral boundary conditions file. The bug was immediately reported to all ALADIN sites.

The cycle AL09/CY19T1 has been put into the operations on 10/02/1999 for 12 UTC network time (cycle AL09/CY19T1/XR19) with neutral results with respect to the previous cycle AL08T3/CY18T3/XR04, containing the switch LSETTLS.

Research & Development, Parallel Suites

The Prague Team has developed the necessary tool of automated parallel suite environment and agreed with COMPAS and TTI at Météo-France on the possibility to launch ALADIN/LACE parallel suites coupled with ARPEGE parallel suites and thus to see an impact of the change in ARPEGE on ALADIN/LACE. The mechanics was first tested on the "radiances & screening" ARPEGE parallel suite in the beginning of March. Thus it was ready to test the foreseen "LFGELS" suite.

The Prague Team completed the "verif.pack" procedure in the following terms: generality (use for the operational & parallel suite & research experiments, enabling more general combination of experiment dates and choice of the samplings; graphical presentation of scores, based on NCAR. The first version of this package is being documented and will be available for any ALADIN site (the portability requires: configuration 701, NCAR).

The Prague Team launched the parallel tests to assess the impact of all the modifications before they entered the operational application:

- Test of the cycle AL09/CY19T1.
- Research suite testing the orographic lift and gravity wave drag schemes.
- Test of the pre-cycle AL10/CY20 for R & D purposes only, revealing neutral scores.
- Research "USURIC" test, which goal is to tune the vertical exchangecoefficients of turbulence. This suite has been one of an helpful element in the study of last December storm.

Other R & D developments:

3D VAR: work on Jb and Jo; CANARI: validation for the cycle AL09/CY19T1 & start of the work on diag.pack; physics: tuning of the new convection scheme.

Other technical developments:

Port of the linking script SLD, GRIB tool for getting extreme values of fields over a defined period, test of MPI version, different tests of MANDALAY functionalities (proved to be quite a painful exercise), preparation of the local LACE-domainSYNOP database.

9. Operational ALADIN-MAROC in MAROC-Météo

(more details mehdi.elabed++at++meteo.ma)

10.Workstation version at Polish Meteorological Service

(more details zijerczy++at++cyf-kr.edu.pl)

Since 25th of February '99 high-speed telecommunication link beetwen IMWM and Cracow

Supercomputer Center works in operational service. Link is based on Ericsson Mini-link radioline capable of 2x2Mb/s transfer rate. At present only one channel is being used. In near future our NWP operational system will be able to switch automatically from radioline to ISDN in case of any problems with radio-link.

11.Workstation version at the Portuguese Meteorological Service

(more details mario.almeida++at++meteo.pt *)*

12.Workstation version at the Romanian Meteorological Service)

(more details cordoneanu++at++meteo.inmh.ro)

13.Workstation version at Slovak Meteorological Service

(more details olda.spaniel++at++mail.shmu.sk)

The ALADIN/Slovakia model is running once per day (LBC from 00:00 UTC ALADIN/LACE run) in operational suite with horizontal resolution 7,18 km.

Graphic outputs (NCAR) are included into same graphical menu at meteorological workstation as products from ALADIN/LACE. Outputs products from ALADIN/Slovakia are following : Clouds (total, low-level, middle, high), 2m temperature, 10 m wind, precipitation (stratiform, convective, liquid, solid).

Also verification surface fields (ALADIN/LACE =96 ALADIN/Slovakia =96 observations) are running and results are available on Intranet environment.Some successful results was done in field of visualisation pseudoTEMPs.

14.Workstation version at Slovenian Meteorological Service

(more details neva.pristov++at++rzs-hm.si or jure.jerman++at++rzs-hm.si)

Information about pre-operational ALADIN/SI model:

Two workstations are used: ee927 and visualisation on "calvus" (DEC AlpaStation 600 5/333, 192 MB RAM, 333 Mhz 21 164 CPU, 4MB secondary cache, DigitalUnix 3.2).

The model integration on "castelanus" (BIT Alpha 500, 256 MB RAM, 500 Mhz 21164 CPU, 1 MB secondary cache, DigitalUnix 4.0d).

- space resolution :11.16 km (LELAM), 31 levels.
- integration domain: numberof grid points x*y (72x72 for C+I, 8 points in E zone), latitude of reference (46.0), longitude of reference (13.5), longitude and latitude of the 4 corners (SW corner : 8.6864, 42.3278; NW corner: 8.0257, 49.4358; SE corner : 18.3136, 42.3278; NE corner : 18.9743, 49.4358)
- coupling files from ALADIN/LACE, 6 hours coupling frequency
- range of forecast: two runs daily: 00 UTC and 12 UTC +48 hours
- duration of integration until the maximum forecast range : optimally 110 minutes (14s for one time step of integration 2TL-SL (400s))

The address of the Slovenian WWW server containing:

- *information about Slovenian version of ALADIN : /www.rzs-hm.si/napoved/aladin_opis.html (in the Slovene language)*
- *operational ALADIN forecast : /www.rzs-hm.si/napoved/aladin.html*
- *high resolution wind forecast : /www.rzs-hm.si/napoved/DADA.html*

Applications on ALADIN/SI forecast:

- meteograms for 19 stations (model points)
- amount of precipitation for 19 stations (model points) and 6 selected areas (catchment) used mainly for hydrology forecast
- creation of pseudotemps for 3 stations (model points)
- creation of file with model data for Vis5d interactive visualisation
- sequence of the pseudosatelite pictures
- dynamical adaptation of surface wind for 3 selected areas and 5 forecasted ranges
- vertical cross-sections for 3 pre-selected slices (in testing)

ALADIN/SI model availability in 1998

The overlook of the availability of ALADIN/SI products has been prepared for last year. The starting and the ending time of the integration was analysed from 11th November 1997 (when also afternoon run was introduced) until the end of the year 1998 (see figure).

Run	**morning run**		**afternoon run**	
Completed	373	90%	331	80%
without intervention	348	84%	324	78%
rerun	25	6%	7	2%
operational not finished	68	16%	92	22%
no results	43	10%	85	20%

Table1: Availability of ALADIN/SI model results from 11/11/1997 to 31/12/1998 (416 days)

It can be seen from the table that one out of ten morning model runs is missing and app. one is very late; in the afternoon, two out of ten are missing.

The managing of the operational suite is still in our group responsibility. If something goes wrong in the afternoon run, there's usually nobody available to fix the problem and to rerun the model. The situation is slightly better for the morning run, when model has been rerun quite often. Longer "blank" time periods appeared when there was nobody there to fix the suite (due to holidays, absence, etc.).

The most often objective reason for integration failure is incomplete transfer of coupling files. In the first part of the year the files have been transferred via InterNet from Toulouse. After the introduction of the transfer of coupling files via IBM-GN from Vienna this problem disappeared.

Often integration stopped because a coupling file was not ready in time and the model was not waiting for it. This has repeatedly appeared for time periods after the new libraries had been introduced (end of March-begin of April, end of July- begin of August).

With availability like the one presented here, we can not claim that our model is really an operational one. But on the other hand, from September 1998 conditions improved and number of failures was significantly reduced.

"Réseau Formation Recherche" : PhD Studies

- ***Visit of Prof. Rakovec***

Prof. Joze RAKOVEC (University of Ljubljana) was the external co-ordinator for the RESEAU FORMATION RECHERCHE which started in February 1996 with a duration of 3 years. He visited Toulouse in the period 6-13 February and presented a final report on the progress of the research at CNRM/GMAP in the scope of the RFR for five PhD students from countries from Central and Eastern Europe.

His report is available here . It contains a "short report and results of the research of the five candidates" with also "detailed reports on the research of the four researchers" (one of the five candidates, Marta Janiskova, has successfully defended her thesis last November in Bratislava).

His "general remarks and conclusion" are favourable :

The action in scope of the Reseau formation-recherche is a quite successful one: one PhD has already been completed and four are on the horizon for this or next year (or two). The main reason for such successful progress are the personal qualities of the students, and the fruitful collaboration with their supervisors.

As in my previous report I must also stress the importance of the pleasant research environment being enabled at Météo-France in Toulouse. Not only the logistics and the efficient equipment: each candidate has his own X-terminal with all communicational capabilities, access to all libraries of the model and to the initial and boundary conditions, access to the Météo-France's library with main journals and textbooks. Also the friendly atmosphere is one of the important supporting factors for a fruitful research work. What is for some of the students a constraining factor is the sometimes limited possibility to run the model quickly, at each desirable time immediately. Namely bigger jobs which demand great computing power are normally waiting in a queue to be executed (which is a rather common situation in every shared and busy computing environment).

Next important factor, contributing to the efficient work of the candidates is certainly the fact that model ALADIN (or the system Arpège/ALADIN), with which most of the research is connected, was developed by the international team in which most of the students also participated. The model has become operational for most of the students' countries and so they feel the model to be ``their'' model. Such personal involvement is certainly a very positive and supporting factor for the success.

The side effect of the research work in Toulouse, not being connected with the students' research, is also the improving ability of using foreign languages. The researchers and their supervisors communicate in English and in French. And outside offices the language is of course French. This does not mean that the candidates will learn the ``high'' French with all grammatical finesses - but already now are all of them more or less capable to communicate with their environment in Toulouse.

- Doina BANCIU **: "Specific small scale diabatic forcing in ALADIN at the limit of the hydrostatic assumption"**

The last experiments have revealed an insufficient vertical development of the convective clouds in ARPEGE/ALADIN model over tropical region (as shown by Jean Marcel Piriou by comparison with the ECMWF and Meso-NH models). In the case of such deep clouds, it seems to be an important buoyancy loss in the lower part of the atmosphere, that could be related to a too strong entrainment rate. On the other hand,

the simulations of a strong squall line over middle latitude region (CLEOPATRA case: 1992, July 21) have been improved by increasing the entrainment rate at the cloud basis.

As a result, a new formulation for convective entrainment, suggested by Jean-Francois Geleyn, has been developed. The entrainment rate is supposed to be dependent not only on the altitude but also on the cloud depth.

The new formulation was firstly tested in 1D ARPEGE/ALADIN model version for the 22 February 1993 TOGA COARE squall line (thanks to the efforts of Jean Marcel Piriou and Jozef Vivoda for updating the model version and preparing the model forcing data). The results showed the new formulation could be a possible solution to obtain deeper clouds. The comparison with the results of a 3D cloud resolving model (Redelsperger and Sommeria), for the 22 February 1993 TOGA COARE squall line, proved a better agreement for the convective mass flux. The results of CLEOPATRA case 3D simulations were less encouraging. Therefore for computing the entrainment rate instead of the cloud depth, the integral of cloud excess in moist enthalpy was used. This lead to an improvement of the simulations, but further experiments and free parameters tuning are needed.

- Ilian GOSPODINOV **: "Conservation Properties of 2 Time Level semi-Lagrangian"**

There are two separate problems within any two-time-level semi-implicit semi-Lagrangian (2TLSISL) scheme : the determination of the semi-Lagrangian trajectories and the treatment of the non-linear residuals. By using our simplified testing tool which is a 1D "Shallow Water" model, we have shown that the accuracy of the trajectory scheme is essential for the accuracy and the stability of any 2TLSISL scheme. By expanding in Taylor series and applying the advection aperator to both sides of a 2TLSISL discretization of the one dimensional forced advection aquation we have proven 2 theorems. The first of them introduces a class of second order accurate in time 2TLSISL schemes under the condition that we know the exact trajectories. The second one determines the accuracy of any 2TLSISL scheme under the conditions of our first theorem. Thus it has been shown that the treatment of the non-linear residual is more adaptable than the trajectory scheme.

Another part of our work other the last 6 months was the implementation of the second order accurate in time trajectory scheme in the hydrostatic version of the ARPEGE/ALADIN NWP model. Equivalently to what has been developed with our 1D model the new trajectory scheme on the horisontal is a second order accurate in time approximation of the horisontal advection equation where the acceleration appears exactly as it can be found at the right-hand-side of the 2D momentum equation including all forces - the Coriolis force, the pressure force and the diabatic forcing (physical tendencies). In other words uniformly accelerating motion along the trajectory is assumed on the horisontal. In any hydrostatic atmospheric model the vertical motion governing equation is diagnostic or, in other words, there is no forcing and it has an exact solution representing uniform motion. Thus in our new trajectory scheme we assume uniform motion on the vertical.

We have examined our new scheme together with the Classical 2TLSL trajectory scheme employing linear extrapolation in time and the SETTLS scheme, developed last year in the ECMWF, employing extrapolation of the acceleration from the previous time step along the same trajectory. The famous "Baltic Jet" case from February 25, 1997 has been chosen as a testing case. What is specific for this case is that a numerical instability patern in the core of a mid troposphere jet over a flat region has been related to the extrapolation in time in the classical 2TLSL trajectory scheme which was operational at that time. By performing 2 groups of experiments - with and without diffusion - with the three examined schemes and comparing the results we arrived to the conclusion that only our new scheme cures entirely the instability.

The research will continue with more detailed study of the non-linear residual treatment regarding the stability, accuracy and conservation ability of the 2TLSISL scheme.

- Filip VANA : **"The dynamical and physical control of kinetic energy spectra in a NWP spectral semi-Lagrangian model"**

Impact of different semi-Lagrangian interpolators used was studied on adiabatic frontogenesis process. For the typical semi-Lagrangian time step (around CFL criterium) the effect of different interpolators used was negligible for this case so the timestep was extended to the limit of of semi-Lagrangian stability to allow the scheme to be more sensitive to used interpolators. Then some conditions were defined and tested, to be able to choose the best interpolator for any given point keeping as much accuracy and stability (in necessary situation applying more diffusive interpolator) as possible. This solution allows either increase of accuracy of the scheme keeping the same timestep or increase of timestep keeping the same accuracy.

- Mark ZAGAR : **"Prediction of small-scale events through second level dynamic adaptation of the planetary boundary layer"**

To conclude his least stay (before his PhD defense in Ljubljana), on Monday 26th of April, Mark presented the main results of his work during a CNRM seminar in Toulouse. English and French summaries of his presentation follow :

Prediction of Small-Scale Events Using Dynamic Adaptation

Even though the progress in numerical modelling of the atmosphere is continuous and considerable, only the increase of the model's spatial resolution can bring more details to the meteorological prediction in the regions with complex orography. In order to be able to obtain a useful forecast of small-scale events, such as local wind features or local, orographically induced rainfall extremes, the described dynamic adaptation approach can be used. This way the computing time is reduced significantly comparing to the full model integration.

The principle is the following: first, the fields from a large scale model output (which presents the large-scale prediction for a chosen range) are interpolated onto a dense grid of the adaptation model. This is followed by a short, typically 30 minutes integration of the high resolution, adaptation model. Physical parametrization in this model are deprived of all thermodynamics and the vertical resolution is also reduced except in the low levels. Resulting surface wind is in a great majority of cases very close to the one, obtained by a full model's, full range integration. Theoretical considerations and the application of ALADIN model for the above-mentioned purpose wll be discussed.

The field of vertical velocity is a dynamic consequence of horizontal wind modification due to more detailed orography in the hydrostatic adaptation model. As the rainfall intensity is in undoubting relation to the vertical motion, better vertical velocity field can hopefully improve the rainfall intensity and distribution prediction. One statistic and one deterministic method will be presented.

Prévision des phénomènes en petite-échelle par adaptation dynamique

Malgré le progrès important et permanent dans la domaine de la modélisation numérique d'atmosphère, la prévision détaillée et précise des phénomènes, dûs au relief montagneux, peut toujours profiter d'augmentation de résolution spatiale du modèle. Les phénomènes, tels que les petits traits distinctifs du vent ou les extrêmes locaux de la pluie, peuvent être obtenus par la méthode présentée. Le temps de calcul est sérieusement diminué par rapport à celui d'une intégration complète du modèle en haute-résolution.

Le principe en est le suivant: d'abord il faut faire une interpolation des valeurs des champs atmosphériques du modèle grande-échelle (prévus par celui-ci pour une échéance choisie) sur la grille fine du modèle adaptant. Ensuite ce dernier tourne pendant une période de 30 minutes. Les paramétrisations physiques dans le modèle adaptant ne contiennent que la partie sèche, et les niveaux verticaux sont moins denses en haut altitude, ce qui fait le modèle encore moins cher. Le vent en surface ainsi obtenu est assez proche de celui du modèle dit "plein", ayant tourné pendant toute l'échéance. Les considération théoriques et l'application

du modèle ALADIN pour les objectifs décrits seront présentées pendant le discours.

On suppose que le champ de vitesse verticale est une conséquence dynamique directe de changement du vent par orographie dans un modèle adaptant hydrostatique. Le lien entre le mouvement vertical et l'intensité de pluie est bien évident. Par conséquent une meilleure connaissance du champ de vitesse verticale donne une base pour une prévision plus précise de distribution et quantité de pluie. Deux façons d'y pourvenir vont être montrées: une méthode statistique et une approche déterministe.

Bogussing in La Réunion island

(more details isabelle.soulan++at++meteo.fr *)*

The Cyclone Research Cell of Météo-France in La Réunion island is working on a kind of bogussing on an idea of Jean-Francois Geleyn in order to improve the tropical cyclone track prediction with ARPEGE/ALADIN.

Usually, the ARPEGE/ALADIN models can see a tropical cyclone when there is one, but it is not often at the right place. That is why we intend to modify the fields of ALADIN in order to improve the description of the cyclone, then correct ARPEGE using the new ALADIN files.

We hope that when ARPEGE starts a prediction with a good location of the center of the tropical cyclone, it can give a good track prediction. The first point is under study in La Réunion, the second one under development in Toulouse.

References :

- Agricole Wills et BenAmadi Yahaya : Evaluation d'une nouvelle méthode d'assimilation de cyclones tropicaux faisant appel au couple Arpege étiré-Aladin. Rapport de stage de recherche Mastère de l'ENM, année : 1996/1997
- Goolaup Premchand et Félix Randrianavalona : Assimlation de cyclones tropicaux à l'aide des modèles Arpege étiré-Aladin. Rapport de stage de recherche Mastère de l'ENM, année : 1995/1996

Tropical cyclones simulations with ALADIN

(more details yves.bouteloup++at++meteo.fr *)*

In this short presentation some tropical cyclone simulations made with ALADIN are presented jointly with a quick bibliographical study. The main result is the ability of ALADIN to make realistic simulations of tropical cyclones. The problem of the improvement of the analysis in order to make better track forecasts is not resolved.

It is well-known that numerical models are not able to do skilful forecasts of tropical cyclones track. An important factor that contribute to this result is the lack of observations over the ocean, another one is the inadequate models resolution. As shown by Serrano (1997) ECMWF Re-analysis has skilful performance in tracking tropical cyclones. Indeed more than 80% of them are captured by the analysis, but the positional mean error is 140 km in the Northen Hemisphere and 176 km in the Southern Hemisphere. The forecasts

suffer from this inadequate analysis position. An operational use of ECMWF model (IFS) at the DIRNC (Météo-France Regional Division in Nouvelle Calédonie) reinforce these conclusions.

With satellite imagery and Dvorak method it is possible to have a very good estimation of cyclone position and intensity. Most operational track prediction models include `synthetic' or `bogus' observations near the storm to help overcome the problem of the initial position (Mathur 1991). The aim of this kind of method is to produce an initial vortex that was well adapted to the forecast model and was much more realistic in size and intensity than the analysis storm structure. In the method proposed by Kurihara et al (1993) a crudely resolved tropical cyclone in the large-scale analysis is replaced by a vortex that is properly specified for use in a high resolution prediction model. This method is used by Bender et al (1993) on four real-data cases. They concluded that the average 48-h forecast error is reduced by more than 50% when compared to the integrations run with the analyzed vortex. Serrano and Unden (1994) with a less sophisticated method, found a very unfavorable impact of predicted cyclone tracks for the cases investigated. They concluded that a bogus method must give an asymetric component of the flow consistent with recent tropical cyclone motion. As shown by Fiorino and Elsberry (1989) the asymetric flow determines the initial motion of the storm. DeMaria et al (1990) have even shown that in barotropic model forecasts, an error in the estimate of the initial motion vector of a storm has a greater impact on a track forecast than an initial position error. To overcome this problem DeMaria and Jones (1993) used a 4DVAR assimilation of synthetic data in a barotropic hurricane track model. They found that the average track errors are smaller than the errors in the control simulations out to 72 h. Nevertheless, as shown by Flatau et al (1994) baroclinic processes contribute to tropical cyclone propagation.

Some simulations of cyclones and tropical storms has been made at the DIRNC with a 20 km mesh version of ALADIN. Boundary conditions came from IFS forecasts for these first experiments. In a first set of experiments initial conditions were not pertubated. A realistic structure of the cyclone was rapidly reconstructed by the model. After a 24-hour-simulation wind force and mean sea level pressure were closed to the values estimated by the Dvorak method (Fig. 1). In case of tropical storm YALI, the IFS forecast trajectory was very accurate despite a 6-hour chronological error. ALADIN made a dynamical adaptation of the fields to the orography, with a very good strengthening of the wind in the havana canal at the south of the main island (Fig. 2). However, when the global track forecasts were not good, ALADIN did not improve them. A 20 km mesh limited area hydrostatic model is a very good tool to study the dynamical structure of tropical cyclones, but not to make track predictions. An improvement of initial conditions is really necessary.

In a second set of experiments a simple bogussing method was applied to the initial conditions. As in Serrano and Unden (1994) we found that rapidly track forecasts were not accurate. No surprise, our bogussing method did not improve the surrounding circulation. One way to reconstruct the asymetricflow is to use a 4DVAR assimilation of synthetic data, like DeMaria and Jones (1993) but with a baroclinic model.

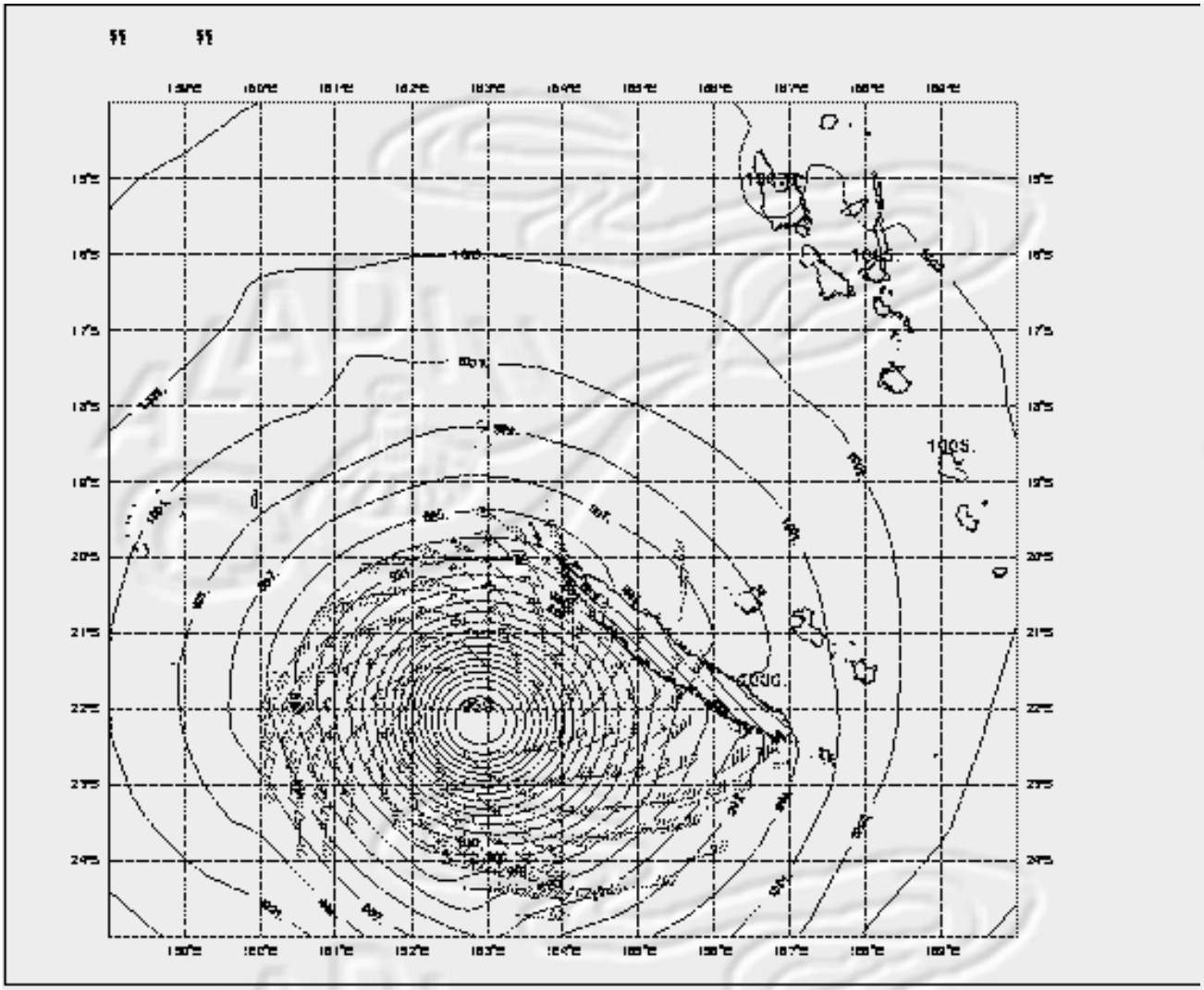


Figure 1 : Mean sea level pressure and 10 meters wind from ALADIN simulation of tropical cyclone DRENA. Only wind larger than 40 knots (20ms-1) are plotted. Intensity of wind and mean sea level pressure are closed to their estimated values. The positional error is approximately 100 km west of the island.

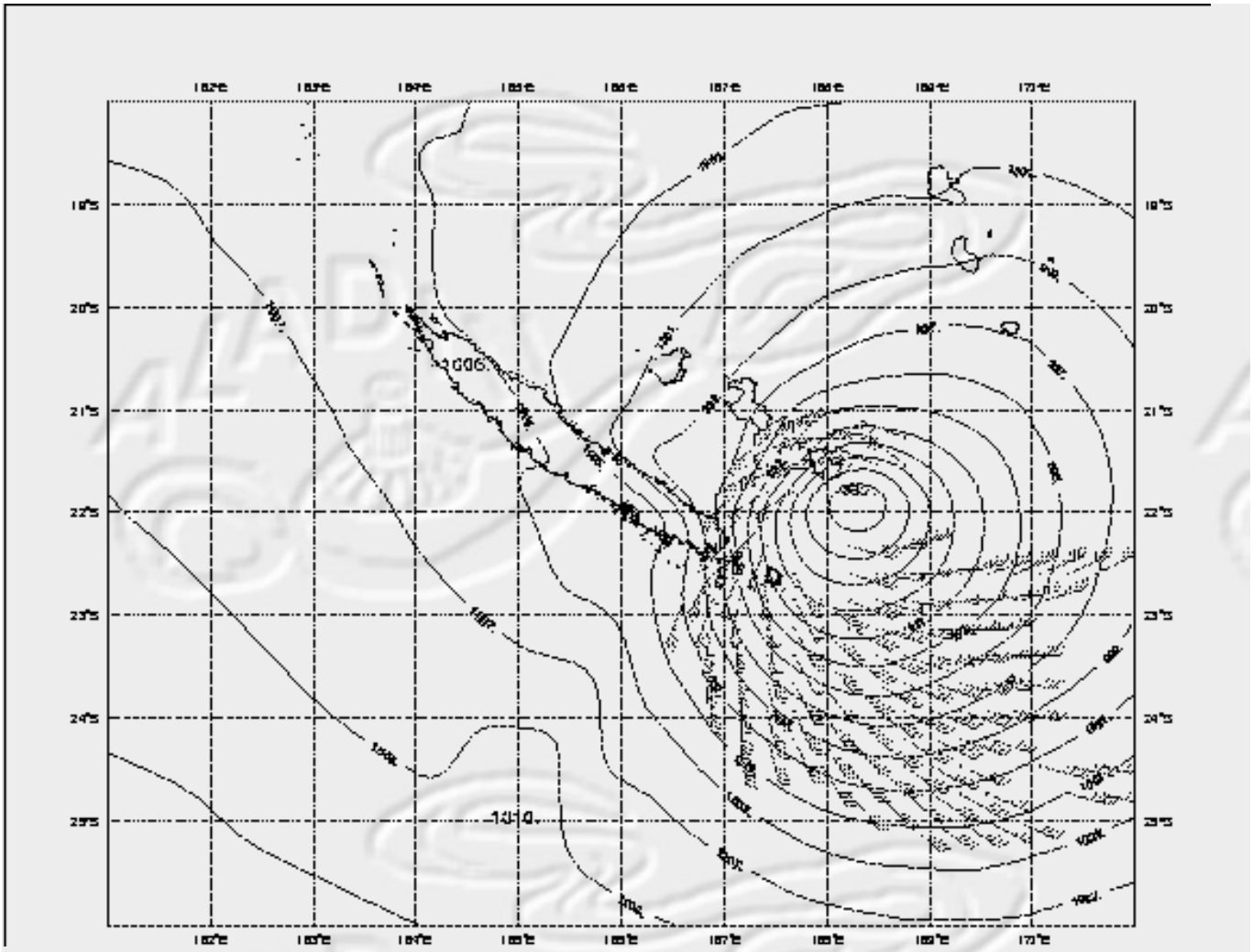


Figure 2 : Same as figure 1 but for tropical storm YALI. Forecast track is very good, despite a 6-hour chronological error. One can remark the strengthning of the wind in the havana canal between the main island and the isle of pine. Observations by automatic weather stations confirm this forecast.

References

- Bender, M. A., R. J. Ross, R. E. Tuleya, and Y. Kurihara., 1993 : Improvements in Tropical Cyclone Track and Intensity Forecasts Using the GFDL Initialization System. Mon. Wea. Rev.,121, 2046-2061.
- DeMaria, M., B. Lawrence, and J. T. Kroll, 1990 : An erroranalysis of Atlantic tropical cyclone track guidance models. Wea. Forecasting, 5, 47-61.
- DeMaria, M., and R. W. Jones, 1993 : Optimization of a Hurricane Track Forecast Model with the Adjoint Model Equations. Mon.Wea. Rev., 121,1730-1745.
- Fiorino, M.,and R. L. Elsberry, 1989 : Some aspects of vortex structure related to tropical cyclone motion. J. Atmos. Sci., 46, 975-990.
- Flatau, M., W. H. Schubert, and D. E. Stevens, 1994 : The Role of Baroclinic Processes in Tropical Cyclone Motion : The Influence of Vertical Tilt. J. Atmos. Sci., 51, 2589-2601.
- Kurihara, Y., M. A. Bender, and R. J. Ross, 1993 : An Initialization Scheme of Hurricane Models by Vortex Specification. Mon. Wea. Rev.,121, 2030-2045.
- Mathur, M. B., 1991 : The National Meteorological Center's quasi-Lagrangian model for hurricane prediction. Mon. Wea. Rev.,119, 1419-1447.
- Serrano, E., and P. Undén, 1994 : Evaluation of a Tropical Cyclone Bogusing Method in Data Assimilation and Forecasting. Mon. Wea. Rev.,122, 1523-1547.
- Serrano, E., 1997 : Tropical Cyclones.ECMWF Re-Analysis Project Report Series, 5.

ALADIN on a cluster of Linux/Digital Unix workstations

(more details jure.jerman++at++rzs-hm.si *)*

Introduction

Model ALADIN/SI has been operational in HMIS since two years. ALADIN/SI is still running on the old Digital Unix Alpha 600 5/333 workstation and on a no name machine with 500 Mhz Alpha processor. It is true that computers have become faster in last two years and much cheaper, but single processor workstations are still not fast enough to allow major step in increasing of ALADIN resolution. But situation has changed with appearance of distributed memory version of ALADIN code. Now we can build powerful cluster of workstations from cheap "off the shelf" components.

A test cluster of 20 workstations was built based on Alpha processor and Linux operating system. ALADIN was successfully ported to this environment. The final result was a machine, able to run ALADIN with excellent price/performance ratio. The model ALADIN has been tested in distributed memory mode on a cluster of workstations. Cycle AL09_CY19T1 with the newest bugfix has been used. The only configuration tested has been configuration 001 with 2 TL semilagrangian, LFPOS=TRUE, no DFI. The major goal of the tests was to obtain some estimation on performance of the code in DM mode in workstation environment.

Test have been performed on homogenous "Beowulf" type cluster of workstations based on Alpha CPU and Linux RedHat OS. Tests were done with MPI as inter-processor communication protocol.

Porting of ALADIN on a cluster

Besides hardware (few workstations connected together with FastEthernet), proper communication software must be used. There is support for both MPI and PVM inside ALADIN code, but we focussed our attention on MPI.

There are two mainly used public domain MPI implementations: LAM and MPICH. They provide MPI environment for majority of Unix systems. Tests have been done with both of them and they performed quite the same. LAM is maybe a bit more users friendly and it comes with basic MPI Users Guide. LAM has also a fancy XMPI job launcher with a lot of colourful effects.. It also offers more tools for verifying the communications . MPICH offers more freedom in a way how to start the job.

For further information refer to http://www.mcs.anl.gov/mpi/mpich/ (MPICH) and http://www.mpi.nd.edu/lam/ for LAM.

Changes in the Aladin code

For detailed instructions on Implementation of AL09 on DEC workstations please refer to mail of Gabor Radnoti submitted to alabobo mailing list. Only two additional routines were changed in order to be able to run Aladin in DM mode;

It is very important to substitute file in xrd19/mpe/include/mpif.h with the one coming with MPI (LAM/MPICH) distribution before compilation of xrd19/mpe. The mpif.h file is tailored to specific MPI implementation and contains definitions used in mpe routines.

- mpe_recv.F

The size of the messages received, type of the message and message tag, are coming from an argument of mpe_recv.F, which is an array. The size of the array (irecv_status) has to be declared explicitly as

INTEGER*4

Instead of:

```
call MPI_get_count(irecv_status,MPI_BYTE,ilen,kerror)

     krcount = ilen/ibytes

     krfrom  = irecv_status(MPI_SOURCE) + 1 ! MPI_SOURCE = 1

     krtag   = irecv_status(MPI_TAG)        ! MPI_TAG    = 2
```

the code was changed to:

```
krcount = irecv_status(1)/ibytes

     krfrom  = irecv_status(MPI_SOURCE) + 1

     krtag   = irecv_status(MPI_TAG)

     kerror  = irecv_status(MPI_ERROR)
```

- suarg.F

MPI protocol does not guarantee distribution of command line options to all processes. (there are no problems with LAM, but if MPICH is used, command line options have to be sent from master processor to all others explicitly). In order to achieve portability between different MPI implementations, suarg was modified. mpe_broadcast function is used to broadcast commandline options to all non-master processes.

Hardware

A test cluster consisted of 21 Alpha workstations. It was built just for test purposes and it will be disassembled in some time. All nodes have the same architecture except master node which has additional network card and additional memory.

Typical node configuration :

CPU	533 Mhz 21164PC Alpha
Memory	128 MB, master node 192
Network	1 x Full Duplex 100 BaseT , master node 2 x
Hard disk	4 GB

Boxes are connected trough 100BaseT FastEthenet network and FORE switch. It turned out to be crucial to have the switch instead of the hub because network throughput is much higher with switch. The estimated cost of a cluster like this is 2.500$/node.

Performance could be improved with better network (Myrinet or Gigabit Ethernet), but this would add additional 1000$ per node for 2-4 times better network performance.In addition, new type of machines with new Alpha (21264) processor are already on the market. They are 2 times faster than machines with 21164 processor, but price/performance ratio is roughly the same for both.

Software

Besides Linux RedHat 5.2. as operating system MPICH, LAM as a MPI implementations were used. There are additionally cluster tools (bWatch, Smile) installed for easier maintenance of the cluster. Queuing system is DQS and it is used to increase efficiency of the cluster.

Results

Theoretical power of Ali Baba cluster is 20 GFLOPS, but in practice is approximately 2-3 GFLOPS what is comparable with 8 processors on CRAY J-916

Speed up for increasing number of processors for ALADIN integration can be estimated from figure 2. Speed up is excellent for small number of processors, but there is an effect of saturation for bigger number of them. The effect of saturation is less intensive for bigger domains. The reasons for saturation are overhead of computations because of domain splitting and increased communication between processors for bigger number of them.

Domain	NDGL	NDLON	NLEV	Min Time /TSTEP	NPROC
SI	80	80	31	2.3	12
HUN	108	120	31	6.0	12
Envelope	108	144	31	6.5	12
LACE_OLD	192	216	27	12.0	16
Benchmark	256	240	27	17.5	18

Table 1. Performance of cluster for different integration domains. Min time/TSTEEP is the minimum integration time for 1 time steep which is different for different domains.

Future work

We are now at the stage when we can declare a cluster solution working for computation of ALADIN, but it still needs some tuning and further efforts. We still have to work on stability and fault tolerance of the cluster. The work consists of installation of additional software tools, like the Cluster monitoring system. To achieve better usage of the cluster resources, a queuing system will be installed. The queuing system will be DQS (similar to generic NQS) or its commercial version CODINE.

Aladin and Linux

As already mentioned before, ALADIN is running on Alpha boxes with Linux. Machines with Linux OS are much cheaper because Linux is free, there is only one problem namely that there is no good f90 compiler for Alpha/Linux. There are some compilers available, but performance would be substantially degraded.

There are some rumours, that Compaq will release a f90 compiler (formerly DEC f90) also for Linux. In this case Linux would become very reasonable choice. In our institute the Linux boxes do not cause more problems than other brandname Unix machines.

With the appearance of new Linux kernel (2.2) situation has improved a lot. ALADIN is running up to 15 %

faster, so the scores listed before are already obsolete. In some cases the same binary compiled on DU is running even faster on Linux 2.2 than on Digital Unix.

Conclusions

Beowulf type of cluster of workstations is a cheap, powerful and scalable solution. Linux OS in combination with code compiled on Digital Unix performs extremely well. Such cluster is very convenient for larger problems while there is a problem of saturation for smaller problems - the scalability is also determined with nature of the problem.

The almost instant success of porting Aladin to such an "exotic" environment is a great proof of the efficiency of the Aladin code and of the whole project.

Figures

Fig 1. Photo of "Ali Baba" cluster

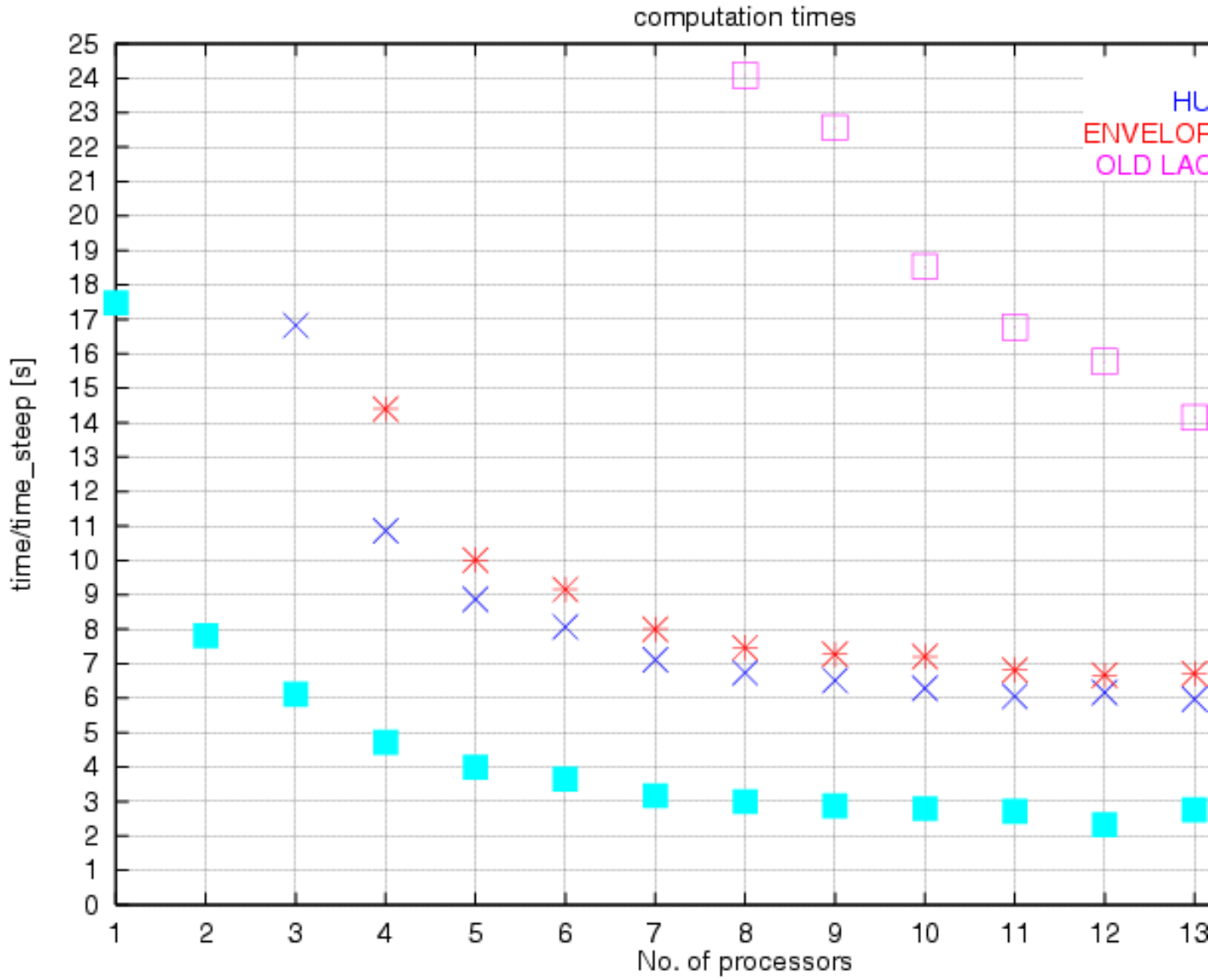


Fig 2. Computation times for different domains and different number of processors for 1 time steep for normal integration.

Regional nested and variable mesh models: a comparative theorical study

(more details frederic.chome++at++oma.be *)*

The complete version of this paper with figures is downloadable from:
ftp://ftpserver.oma.be/pub/meteo/fchome/alanl0599.doc

NDLR:

There is currently a new burden of interest for the much debated challenge : strong stretching versus LAM, and the associated problem of the optimal coupling strategy. Frederic Chome, a PhD student at the Belgium Met'Office, focuses on predictability properties with very simplified models (no physics, no orography). His first results are summarized hereafter, a more complete paper is available on his ftp. In the

meantime, in Toulouse, Eric Bazile reran the "Vaison-la-Romaine" case, a reference situation with very strong convective precipitations. He compared the operational ARPEGE/ALADIN-France couple and ARPEGE with a stronger stretching factor (6.3 instead of 3.5). This choice ensured a similar computational cost for both configurations. In this case, forecasts were better with ALADIN, which was not what Eric expected. A summary of these experiments (presented at the recent HIRLAM workshop on high resolution modelling in Norrkopping) will be put on the ALADIN web site very soon.

Introduction

In the vast majority of regional forecasting models, the high-resolution part of interest is nested within a low-resolution global forecasting model. The latter is integrated over time independently of the nested part, and the outcome of this integration provides a boundary forcing constantly acting on the limited area under investigation.

The objective of the present work is to relax this constraint by viewing the evolution laws in the entire space under consideration as a single dynamical system rather than as two dynamical systems one of which is embedded in the other. This will be achieved by building an autonomous continuous variable-mesh model (VMM) and by examining its dynamical and predictability properties versus those of the nested limited area one (NLAM).

The particular context in which this comparative study will be carried out is the loss of stability of plane-wave solutions toward inhomogeneous long wavelength fluctuations known to occur in thermal convection, one of the processes at the basis of mesoscale atmospheric variability. It can be shown that near the instability threshold this type of dynamics can be cast in a universal form known as the complex Landau-Ginzburg equation. It generates spatio-temporal chaos and therefore exhibits sensitivity to initial conditions which, as well known, is one of the main factors limiting predictability.

The intrinsic simplicity of our model, capable of generating complex behavior sharing, in addition, key features of atmospheric variability while being amenable to a detailed numerical and statistical analysis, will enable us to delineate the role of various factors in the observed behavior. In particular it will allow for a comprehensive analysis of the probabilistic properties since integrations over a large number of samples starting from different initial conditions can here be carried out at a reasonably low computational cost. This will in turn be a necessary prerequisite for a detailed predictability analysis of the fields of interest generated by the models.

Statistical results

We are interested in the quality of representation of the relevant variables in a statistical sense by the VMM and the NLAM as compared to the values provided by an "exact" solution in which the entire space is filled by the fine grid (the reference model). We shall focus on the statistical properties of the field at a particular gridpoint chosen here to be the centre of the limited-area grid that is by construction the centre of the global model.

The probability density displays a symmetry around the mean, where the densities for both the NLAM and VMM are nearly indistinguishable from the reference model. However in the NLAM case sizeable deviations are apparent as one moves to the extremes values of P as well as around the most probable events. In contrast, the P(x) obtained from the VMM is closer to the reference system, the improvement reaching a factor 10 as compared to the NLAM for the most probable events.

Interestingly, these properties depend on the length LN of the nested domain of interest for the NLAM. The mean deviations of each model from the reference one clearly indicates zones where the mean error for the NLAM is considerably reduced, showing two optimal lengths for the nested fine-scale domain for which the performance is higher than the globally coarse model, the errors being practically negligible (less than 3%). It appears therefore that a judicious choice of the size of the nested model may provide statistics of enhanced quality. The dependence of the probability distribution as obtained from the VMM on LN is practically negligible, its mean being of very high quality (lower than 1%).

In the spatial power spectra, we observe that for the short scales the agreement is in general satisfactory for both regional models, but for large scales the spectrum of the NLAM deviates form the reference model in that it presents a number of equally spaced spurious peaks. Varying the length of the nested model reveals again the existence of an optimal length (LN=200 LU) for which the large-scale oscillation disappears in the NLAM spectrum. The VMM results in a perfect agreement at all scales for every LN, the disappearance of the spurious large scale oscillations being presumably due to the natural continuity of the fields from the global grid toward the fine scale one, resulting in a unique self-consistent dynamics. On the other hand, the spurious oscillation over the low wavenumbers in NLAM spectrum is presumably due to the nesting procedure, which forces the fine-scale limited-area dynamics to readjust artificially at regular timesteps to the behavior of the large scale fields provided by the global coarser model.

Predictability properties

The main interest in analysing the growth of initially small errors between each regional model and the reference one will be to assess whether the replacement of the boundary forcing of the NLAM by the purely dynamical description adopted in the VMM brings about noticeable improvement and, if so, whether this improvement can be optimised by appropriate choices ofthe parameters.

In order to identify errors associated to the modelling of the nesting procedure, we first considered the ideal case of exact initial conditions in the regional domain. It turned out that the continuous variable-mesh model was by far more efficient than the nested limited-area one, since the errors reach the saturation level after 100 time units for the VMM, which is to be compared with 15 T.U. and 20 T.U. for the NLAM and the globally coarse model, respectively.

This tendency holds when adding small initial errors arising from the uncertainty to the initial state of the system. The mean error decreases for short times and subsequently grows with similar rates for the global and the nested limited-area model, whereas a smaller rate of increase is apparent for the VMM. It is worth mentioning however that although the NLAM turns out to be of lower predictive quality than the VMM, it still performs better than a globally coarse large-scale model, at least for short-term forecasts.

Once again, the forecasting ability of the VMM is evident as compared to the NLAM. Note however that the VMM presents a stronger sensitivity arising from the uncertainty to the initial conditions, suggesting that in this case only the use of appropriate data assimilation techniques could improve substantially the predictive skill of those continuous regional models.

Our study highlights the complexity of the dynamics of limited-area models. In particular, the influence of model errors in the degradation of the quality of forecasts reflects the importance and intricacy of the coupling procedure of fine-grid and the surrounding coarse parts for the nested model, suggesting strongly the intensive use of VMM to describe and forecasts small scale fields over zones of limited extension.

Scores on ALADIN-FRANCE during the first quarter of 1999 : Comments on Contingency Tables

(more details francis.pouponneau++at++meteo.fr *)*

Change of the computation zone for ALADIN-FRANCE score

We have calculated the scoreof ALADIN-FRANCEmodel over FRANX01 grid since 1st march 1999.

An error in TEMPERATURE score of ALADIN-FRANCE

We calculate the score of different models against SYNOP over FRANCE. We use the nearest grid point over land interpolation. We noticed in previous communication that the bias of ALADIN-FRANCE model (monthly averaged) is more important (0.5 °K) than bias of ARPEGE model.

Actually, there was a bug in the nearest grid point over land interpolation. For five stations, the nearest grid point is on sea and was involuntarily selected for the control.

We then removed this five stations and obtained new scores : the gap between ARPEGE and ALADIN-FRANCE doesn't exist.

COMMENTS ON CONTINGENCY TABLES ON FIRST 1999 QUARTER

Next tables are cloud cover and precipitation contingency tables for the 36H forecast range of ALADIN-FRANCE model (0 hours initial data set). Classes are used in the verification of NWP models in EUROPE (EWGLAM). Contingency tables are here computed over France.

Three skill scores have been calculated over the whole table :

- CORRECT : percentage of good forecasts
- HEIDKE : score against hazardous forecasts
- ROUSSEAU : the most severe, score against hazardous forecasts with respect to the climatology of the phenomenon.

Contingency tables for 6 hours precipitation periods are computed with classes :

- P < 0.1 mm (no rain)
- 0.1 £ P < 0.2 (light)
- 2.0 £ P < 10 mm (moderate)
- P ³ 10 mm (heavy rain).

In contingency tables, blue color means an underestimation, red one represents an overestimation.

NEBULOSITY: **9901-9902 (59 days), MODEL: ALADIN, AREA: FRANP01-France, Range: 36 H**

Obs/Forecast	0 - 2	3 - 6	7 - 8	SUM
0 - 2	**9.6%**	7.6%	0.3%	17.5%
3 - 6	6.9%	**18.1%**	5.7%	30.7%
7 - 8	3.7%	24.7%	**23.4%**	51.8%
SUM	20.2%	50.3%	29.4%	7686
Correct: 51.1%	**Rousseau: 0.23**		**Heidke: 0.26**	

The percentage of correct is 51.1%. The high nebulosity class (7-8) is more often observed than forecasted : 51.8% against 29.4% . The medium nebulosity class is more often forecasted than observed (observed in 30% of cases but forecasted in 50% ofcases). Heidke and Rousseau indexes arelow (0.23 et 0.26).

PRECIPITATIONS: **9901-9902 (59 days), MODEL: ALADIN, AREA: FRANP01-France, Range: 36 H**

Obs/Forecast	NO rain	LIGHT	MODERATE	HEAVY	SUM
NO rain	**58.6%**	10.0%	1.9%	0.2%	70.7%
LIGHT	7.7%	**8.0%**	3.2%	0.1%	19.0%
MODERATE	1.5%	3.6%	**3.9%**	0.4%	9.4%
HEAVY	0.2%	0.1%	0.4%	**0.2%**	0.9%
SUM	68.0%	21.7%	9.4%	0.9%	8883
Correct: 70.7%		**Rousseau: 0.38**		**Heidke: 0.38**	

The percentage of correct is more than 70.7%. "Light precipitation" class has been more often forecasted (21.7%) than observed (19%) whereas "NO rain" class has been more often observed (70.7%) than forecasted (68.0%).

Experiences on the subjective evaluation of ALADIN/LACE model 00 UTC

Márta Sallai Buránszki *and* Szilvia Jenki *(HMS)*

Historical overview:

- The idea to perform subjective evaluation of the ALADIN model was originally coming from Ales Poredos (HMIS). It was recommended to start the operational evaluation in February, 1997. At the ALADIN workshop in Budapest (16-18 June, 1997) the first experiences were presented and rediscussed. The first evaluation period was 10 February 1997 - 10 May 1997. (Sallai, Wantuch: First experiences with the subjective evaluation system of ALADIN at HMS, Proceedings of the third RC LACE/ALADIN workshop Budapest).
- After the workshop the evaluation was continued without changing the method. The results of the evaluation for the period 1 June 1997 - 31 December 1997 was presented in the ALADIN Newsletter (number 10).
- 1 February, 1998 : modifications regarding the type of the weather situations and ranking of the different parameters (+/- sign).
- The first results of the new scheme was presented at the 5th ALADIN workshop in Prague (June, 1999).

Motivation:

- Subjective evaluation should aim towards better understanding of operational performance of

ALADIN model.

- The goal of the subjective evaluation: to give some additional information about the performance of the models on top of the already existing objective verification scores. The results should serve as input for forecasters as well as for the model developers.

The application of the method in Hungary:

- The evaluated forecast ranges: 06-18 UTCand 18-30 UTC
- Regions : Western and Eastern Hungary (only the plane regions are studied)
- Weather types :
  - C-cyclone
  - A-anticyclone
  - Ce-Eastern part of cyclone
  - Cw-Western part of cyclone
  - Ae-Eastern part of anticyclone
  - Aw-Western part of anticyclone
  - Wp-weak pressure gradient
  - Z-zonal flow
- Extreme events:
  - N-nothing special
  - W-strong wind episode
  - HP-heavy precipitation
  - CU-strong convection event
  - CP-cold air pad
- The evaluated parameters:
  - 10 m wind
  - cloudiness
  - maximum temperature
  - minimum temperature
  - precipitation distribution
  - precipitation quantity

Guidance for the evaluation:

(As it was proposed after the round table discussion of the ALADIN workshop in Budapest)

- Total cloud cover:
  - distribution:
    3 = cores of observed and forecastedmax. cloud zone <50 km apart
    2= 50 km < cores < 100 km
    1= cores of observed and forecasted max. cloud zone >100km apart
  - quantity :

obs. \ for.	0	1-2	3-6	7-8
0	3	+2	+1	+1
1-2	-2	3	+2	+1
3-6	-1	-2	3	+2
7-8	-1	-1	-2	3

- Wind:
  3= direction +/- 30 degrees, speed +/- 2 m/s
  2= direction +/- 30-50 degrees, speed +/- 3 m/s
  1= worse
  (if for. > obs. then sign of mark should be +, otherwise -)
- Temperature:
  3= the difference +/- 2 degrees
  2= the difference +/- 2-4 degrees
  1= worse
  (if for. > obs. then sign of mark should be +, otherwise -)
- Precipitation:
  - distribution:
  3= cores of observed and forecasted precip. zone <50 km apart
  2= 50 km < cores < 100 km
  1= cores of observed and forecasted precip. zone>100 km apart
  - quantity:

obs. \ for.	**0**	**<2 mm**	**2-10 mm**	**>10 mm**
0	**3**	**+2**	**+1**	**+1**
<2 mm	**-2**	**3**	**+2**	**+1**
2-10 mm	**-1**	**-2**	**3**	**+2**
>10 mm	**-1**	**-1**	**-2**	**3**

The results of the evaluation

- The evaluation period: 1 February 1998 - 31 December 1998
- The number of the correctly evaluated cases: 1271
- In the evaluated period the type Ce(Eastern part of cyclone) occured in the most cases (279 occasions), and the second most commonsituation was the anticyclonic (260 cases). The rarest case was the zonal flow.
- Extreme situations occured in 32 % of examined cases. Among these cases the strong wind episodes and the strong convection events were the most frequent.

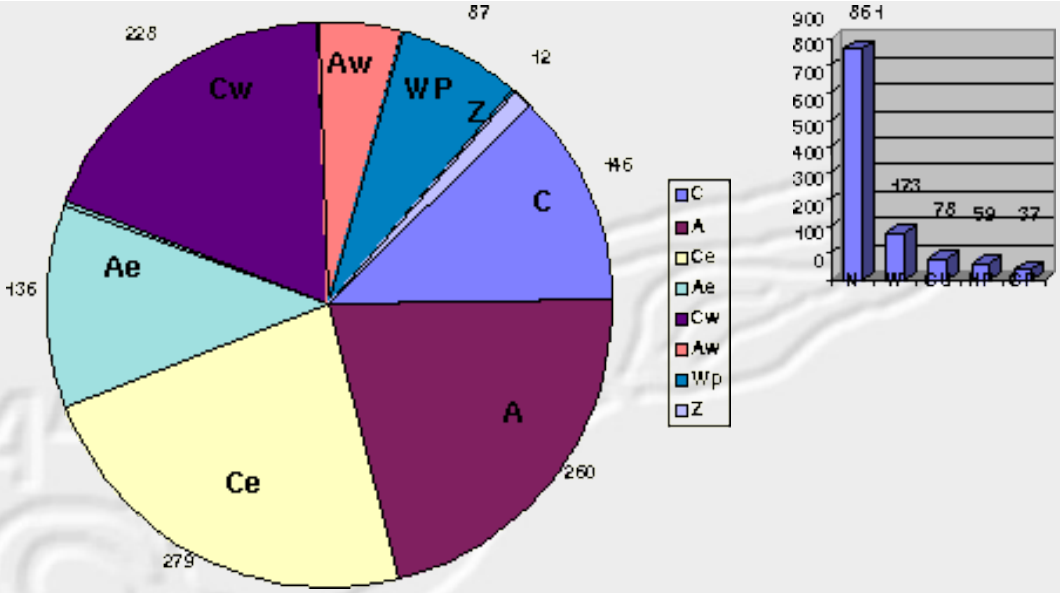


Figure 1. The frequency of the occurrence of the different synoptic and extreme situations

- The results without separating the weather types and the extreme situations

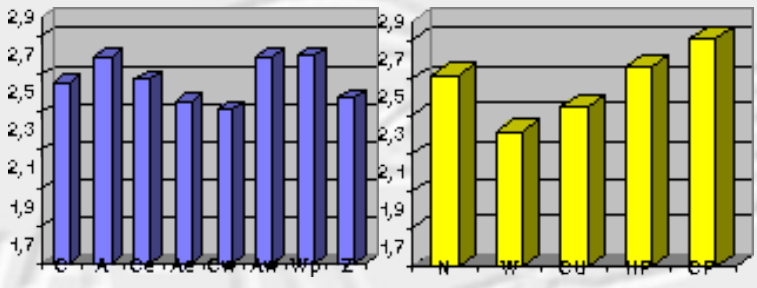
The precipitation distribution is the best ranked parameter in this evaluation period. The forecast of the temperature, chiefly the maximum temperature is the less successful.

Parameters	**wind**	**cloud**	**max. temp.**	**min. temp.**	**precip. distr.**	**Precip. Quan.**
Evaluation	**2.67**	**2.66**	**2.50**	**2.55**	**2.72**	**2.60**

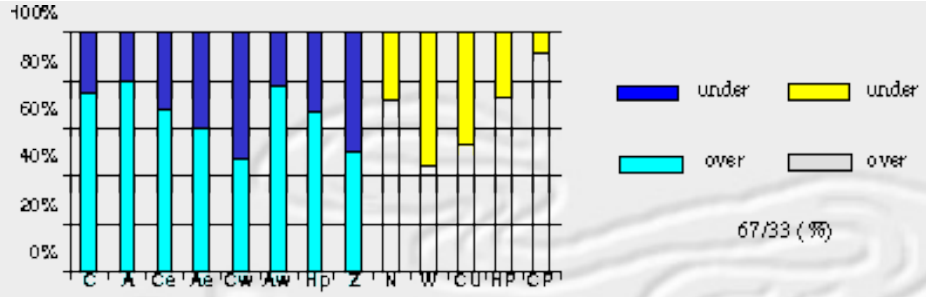
Table 1. The rate of successful forecast of the different parameters

- When the weather situations and extreme situations are separately studied the results are as follows:

Wind : The ranks are the best in the case of anticyclonic and weak pressure gradient weather situations, or when it was cold air pad in the Carpathian Basin. The prediction is the worst in strong wind periods, it is significantly underestimated, like in the last year. The rate of the overestimations is far bigger than the rate of the underestimations.



The rate of the successful forecasts

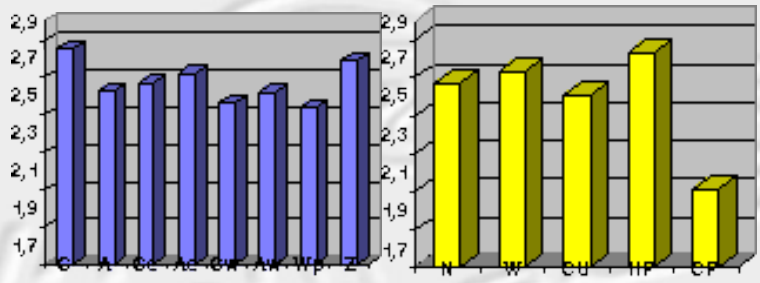


The rate of the overestimated/underestimated cases (%):
over 67 % / under 33%

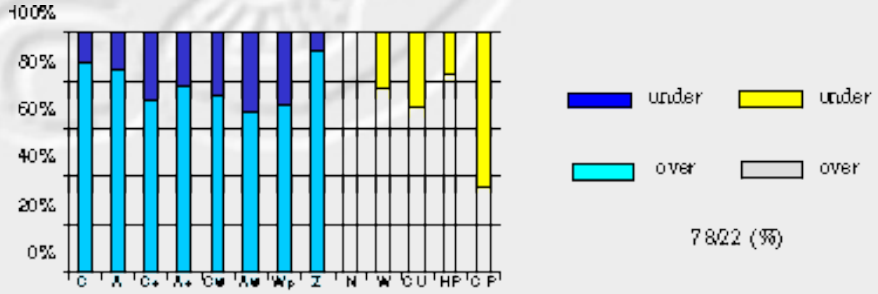
Figure 2. Subjective verification of wind forecasts in the case of the different synoptic and extreme situations

- Cloudiness

When the cloud coverage is the predicted parameter, the rate of successful forecasts is the best in cyclonic and in zonal flow situations. Studying the extreme situations it can be seen, that the rank is the best in strong wind episode, and chiefly in heavy precipitation situation. It is the worst significantly in cold air pad weather situation. The model overestimates the cloudiness in many cases.



The rate of the successful forecasts

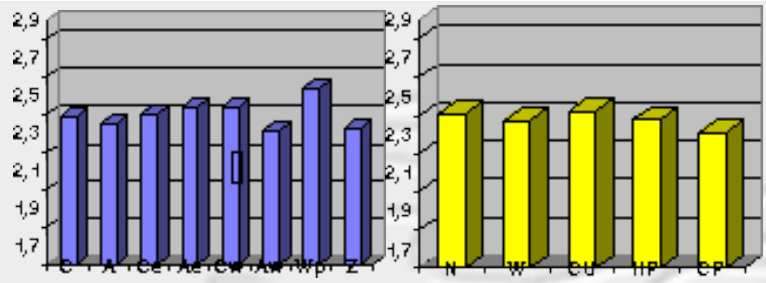


The rate of the overestimated/underestimated cases (%)

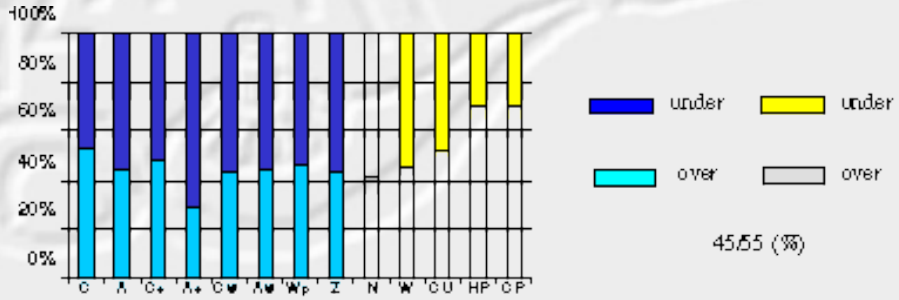
Figure 3. Subjective verification of cloudiness forecasts in the case of the different synoptic and extreme situations

- Maximum temperature

The forecast of the maximum temperature is the worst in zonal flow situation (when there is a rapid temperature change at high levels). The forecast is not always successful in the case of anticyclone or Western part of anticyclone. In autumn and in winter in anticyclonic weather situation cold air pad very often occurs, it may cause the wrong prediction. Last year the ALADIN model predicted much more low degrees in the most cases. In this evaluation period, in 1998 the difference is not so big between the rate of the overestimation and underestimation.



The rate of the successful forecasts

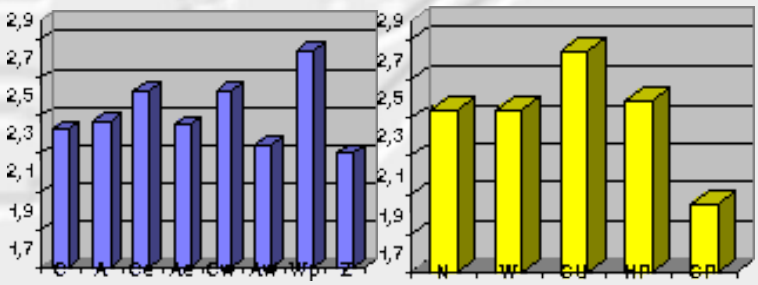


The rate of the overestimated/underestimated cases (%)

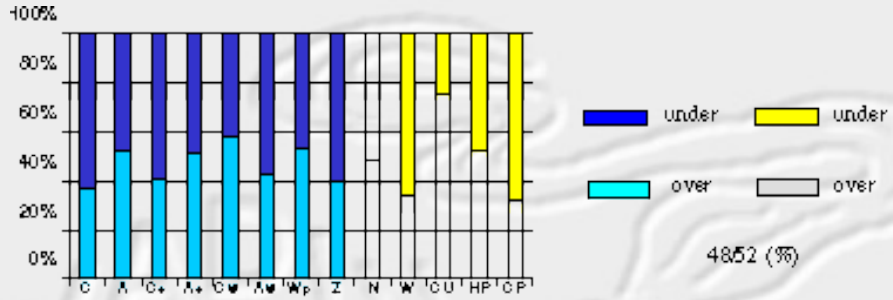
Figure 4. Subjective verification of maximum temperature forecast in the case of the different synoptic and extreme situations

- Minimum temperature

Studying the minimum temperature forecast we can draw similar conclusion like in the case of maximum temperature. The worst ranks were given in zonal flow situation and when it was cold air pad. In 1998 the rate of underestimation also was bigger than the rate of overestimation, but not so much like in 1997.



The rate of the successful forecast

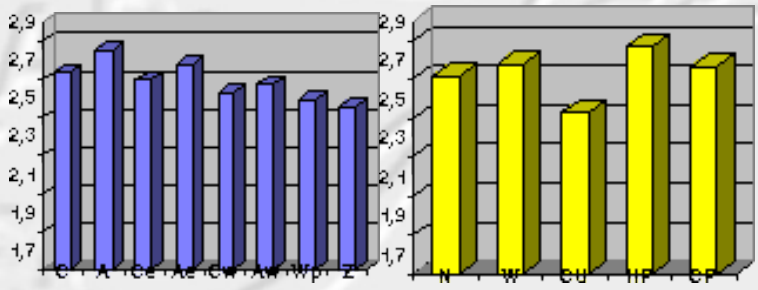


The rate of the overestimated/underestimated cases (%)

Figure 5. Subjective verification of minimum temperature forecast in the case of the different synoptic and extreme situations

- Precipitation distribution

Apart from the anticyclonic situation the most successful forecasts are in Ae (Eastern part of anticyclone) and in cyclonic situation. The rate of successful forecasts is the worst in zonal flow or in weak pressure gradient situation. As the strong convection event connects with the weak pressure gradient weather situation in many times, studying the extreme situations it can be seen, that the ranks are the worst in Cu (strong convection event) weather situation.

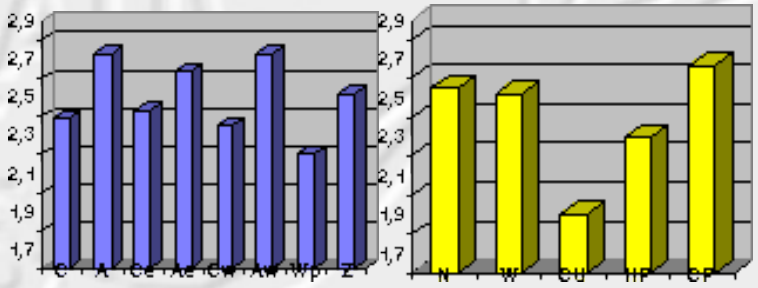


The rate of the successful forecasts

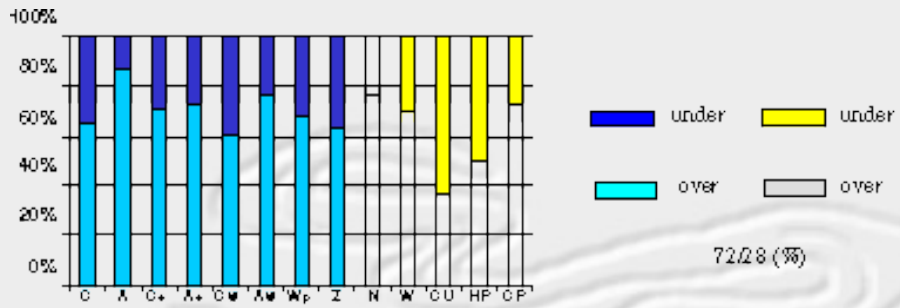
Figure 6. Subjective verification of precipitation distribution forecast in the case of the different synoptic and extreme situations

- Precipitation quantity

The predicted amounts of precipitation are not good neither in cyclonic, nor in weak pressure gradient situation. When there is strong convection event, the forecast of the model is not successful, at all. The rate of the overestimation/underestimation shows, that the precipitation forecast is overestimated in many cases.



The rate of the successful forecasts



The rate of the overestimated/underestimated cases (%)

Figure 7. Subjective verification of precipitation quantity forecasts in the case of the different synoptic and extreme situations

Studying the regions separately it can be seen, that the forecast of almost every element is better for the Western part of Hungary, but the difference is not big.

region	wind	Cloud	max.temp	Min. temp	precip. dist	precip. q.
East	2.71	2.67	2.50	2.53	2.71	2.59
West	2.62	2.67	2.51	2.56	2.73	2.61

Table 2. The results studying separately the different regions and forecast ranges

Summary

- The prediction of the temperature, mostly of the maximum temperature is the weak point of the ALADIN model. The model often underestimates, but in cold air pad situation usually overestimates the values.
- The precipitation distribution is the best ranked parameter in this evaluated period, too.
- The precipitation quantity is regularly overestimated. Due to the convective processes chiefly in summer period the forecast of the amounts of precipitation is not successful, especially in the case of weak pressure gradient situation.
- The ALADIN overestimates the cloudiness in the most cases, like is the last year.
- The wind prediction is the worst in strong wind periods. In this case the wind is significantly underestimated.

Participations in the ALADIN project

The statistics about the participations in the ALADIN project and the ensuing compilation of the ALADIN developments are drawn up from the contributions sent by the representative of each country.

Prague (RC-LACE) and Toulouse actions are registered immediately (i.e. at the end of March 1999 for the current statistics) while a tree months' lag is applied to the deported contributions (i.e. at the end of December 1998 for the current statistics).

In the next three parts ("Deported developments during the last quarter of 1998", "ALADIN developments in Prague/LACE during the first quarter of 1999" and "ALADIN developments in Toulouse during the first quarter of 1999"), you will find the list of the ALADIN developments (in Prague, in Toulouse and outside) except those detailed in the previous pages : PhD studies, developments for workstation versions or operational suites, ... during the quarters concerned by this Newsletter. The following informations concerning the deported developments are obtained from informations you sent.

Deported developments during the forth quarter of 1998

During this quarter, 55 persons have worked on ALADIN "at home" (i.e. in their NMS : not in Toulouse) and their global effort represents about 70 people.month during this period. It is the first time for months that Météo-France people contribute to Deported work.

1. In Austria

- ALADIN/VIENNA : completing the operational environment, post-processing of fields, generating NETCDF-files, ... (Y. Wang),
- ALADIN-LACE verification of areal precipitation :verification of archived data with regard to precipitation amount, flow direction, season, region, etc; operational production of areal precipitation forecasts including error margins; preparation ofverification reports (T. Haiden, K. Stadbacher).

2. In Belgium

- Validation of ALADIN-Belgium : statistical verification of forecasts depending on synoptic situation, area and range (B. Schenk),
- Verification of precipitation forecasts on September 1998 floods in Belgium (J. Neméghaire, J. Vanderborght),
- CANARI assimilation (O. Latinne),
- Study of the bad scores of surface temperature forecasts in Novemberand December : tuning of GCGEL parameter in ISBA (O. Latinne),
- Operational work (L. Gérard) : installation of AL09_CY19T1 operational on November 2,1998, completion of the work initited during a Toulouse stay on optimisation of convection routines for cycle 20,
- Study on Non-Hydrostatic physic parametrisations with presentation at EWGLAM meeting (L. Gerard),
- Analysis of the performance of simple limited area models : statistics and previsibility with an article in press in Int. Journal of Bif. and Chaos, Chomé F. and Nicolis C. "Regional limited-area models viewed as dynamical systems,
- Informatic aspects (J. Vanderborght),

3. In Bulgaria

- implementation of ALADIN on SUN workstation : pre-operational runs of AL09 and creation for scientific tasks of three integration domains (A. Bogatchev, V. Spiridonov).

4. In Croatia

- no significant quantifiable activity this quarter in Zagreb.

5. In Czech Republic

- Maintenance of the development environment for CHMI and RC LACE ALADIN teams (F. Vana),
- Training for the upcoming Toulouse work (D. Dufkova),
- Development of postprocessing tool for ALADIN (D. Dvorak),
- Evaluation of ALADIN performancein the event of floods (M. Salek).

6. In Hungary

- Preparations for ALADIN/HU domain andresolutions changes; non-hydrostatic test runs; preparations of Mandalay and Canari; data assimilation project plans for LACE; relaunching of some past cases for case studies (A. Horanyi),

- preparation of AL09; tests with the distributed memory version of ALADIN; tests with Mandalay and Canari (G. Radnoti),
- Preparation of ASCII input files for Mandalay (T. Szabo).

7. In Moldavia

- nothing reported this quarter.

8. In Morocco

- Verification of ALADIN-MAROC forecasts (W. Sadiki),
- Compilation and test of AL09 (S. Issara),
- Chagal improvements (R. Ajjaji),
- Modification of ALADIN domain, utilisation of a 12 hour assimilation cycle for the backup suite (R. Ajjaji),
- Using fine orography in the model(M. Elabed),
- Updating OULAN-BATOR version (H. Haddouch),
- Project of regional forecasts (J. Boutahar).

9. In Poland

- Administration and organisation, (M. Jerczynski),
- Operational system (M. Jerczynski, W. Owcarz),
- New products for hydrological service (A. Dziedzic),
- Organisation of auxiliary databases (M. Szczech),
- Enhancement of operational visualisation (J. Woyciechowska).

10. Portugal

- Operational ALADIN (C. Madeira),
- Verifications and developments (F. Prates).

11. In Romania

- Mesoscale studies (L. Dragulanescu, E. Cordoneanu)
- Code maintenance (C. Soci),
- Urban effects studies and input files for CROCUS model (M. Caian),
- Model output verification (S. Adriana, D. Otilia).

12. In Slovakia

- Visualization of ALADIN/LACE products (M. Kanokovska),
- Verification of ALADIN outputs, Kalman filter (J. Vivoda),
- Verification of ALADIN outputs and visualization (M. Bellus),
- Verification of pseudo-TEMPs (M. Gera),
- Implementation of ALADIN on DEC workstation (O. Spaniel),
- Development of operational suite for ALADIN/Slovakia (M. Siroka).

13. In Slovenia

- AL09 testing, phasing of utility programs, ee923, MAP (N. Pristov),
- Dynamical adaptation (M. Zagar),
- LACE visualization for MAP (M. Kozelj, J. Vehovar),
- ALADIN/cluster of workstations (J. Jerman).

14. Deported work by Météo-France people

- in Prague : preparation of the Assembly of Partners(J.-F. Geleyn),
- in Lisbonne : lectures on physics, perspectives of commun work, installation of 1D model (E. Bazile, J.-M. Piriou),
- in Ljubljana : definition of the subjects for deported work in Slovenia, definition of the field "ALADIN/Slovenia verifications" (C. Fischer, D. Giard, J.-M. Moisselin).

ALADIN developments in Prague during the first quarter of 1999

- The maintenance of ALADIN/LACE and the operational suite was shared by R. Bubnova, M. Janousek and M. Siroka.
- I. Ihasz worked on the developpement of a verification package for ALADIN/LACE.
- G. Radnoti worked on DIAG.PACK.
- A. Horanyi proted the Jo term calculation in 3DVar part of ALADIN.
- M. Gera developed data assimilation tools for ALADIN files.
- M. Bellus studied dry and moist convection in ALADIN.
- Porting and benchmarking of MPI version of ALADIN/LACE were done by J. Jerman.

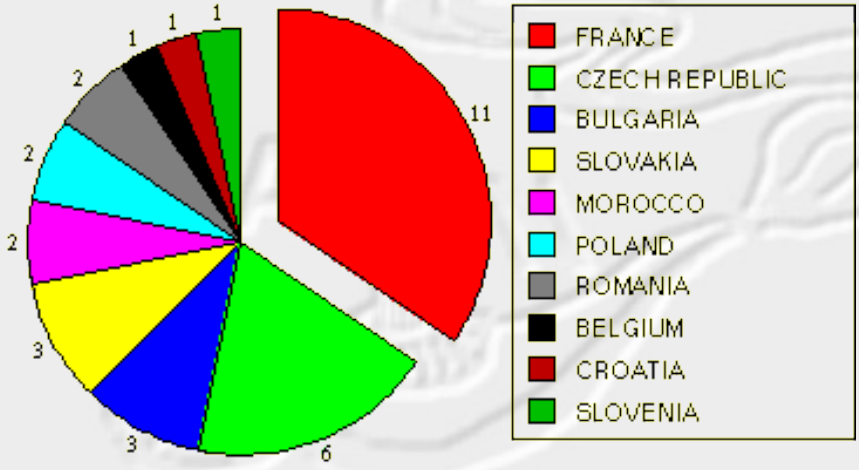
ALADIN developments in Toulouse during the first quarter of 1999

During the last months, GMAP offices have given to all ALADIN visitors and GMAP people the impression that they were less crowded than usual. It was not only a feeling. Only 32 persons (and only 2/3 of visitors) coming from 9 countries on 8 different funding) during this quarter. Their commun effort exceeds 50 people.month : few people but efficient ones !...

This quarter was more dedicated to maintenance (with the phasing) with I. Gospodinov, P. Neytchev, W. Sadiki, C. Soci and M. Zitouni (see 1.). Developments were mainly realized by PhD students (D. Banciu, I. Gospodinov, F. Vana and M. Zagar). During the final stays on 1998 embassy support, both developments and validation studies were realized (see 2.).

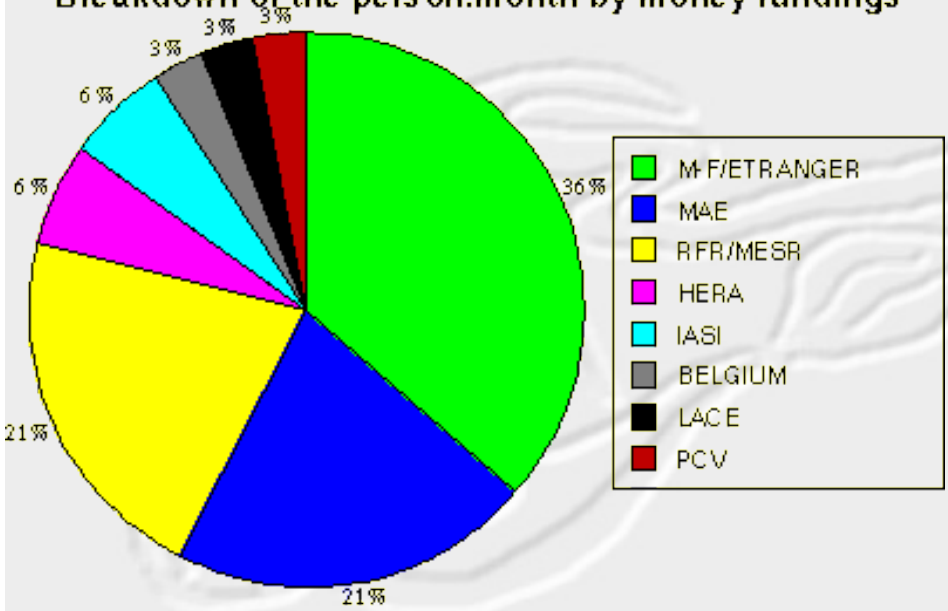
"ALADINers" in Toulouse during the first quarter of 1999

Breakdown of the persons by country



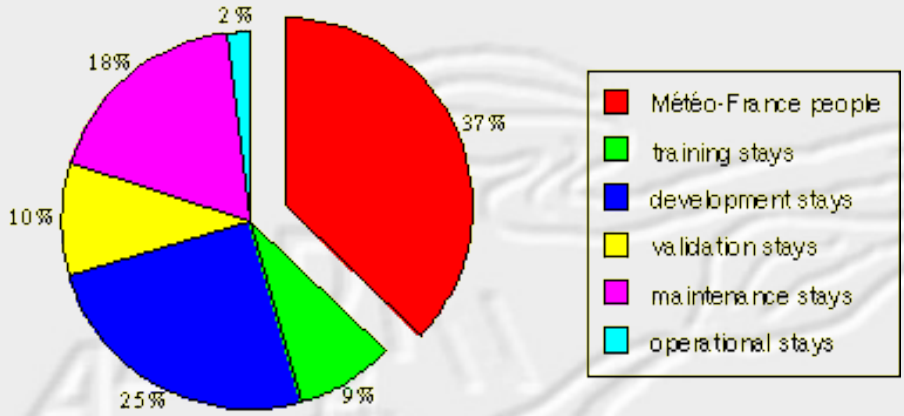
Stays in Toulouse during the first quarter of 1999

Breakdown of the person.month by money fundings



Toulouse work during the first quarter of 1999

Breakdown of the person.month by type of work



1. Main events in Toulouse this quarter

Most of the effort was devoted to the preparation of cycle 10, again, and the modifications required by the new parameterization of soil freezing. The full Toulouse team was involved in these task, helped by a few brave visitors : Plamen Neytchev, Wafaa Sadiki and Meriem Zitouni.

---

2. Other visitors research or development studies that ended during this quarter

Progress in scientific or technical aspects was ratherthe part of the 13 other ALADIN visitors :

- Thanks to Cornel Soci, an up-to-date documentation of CANARI is available ! You can find it on public-ftp : canari_doc.ps
- Dagmar Dufkova and Françoise Taillefer worked on another application of ALADIN for the forecast of tropical cyclones, in the framework of a COMPARE experiment. The technical environment is now ready and the first results promising. This study will be continued both in La Réunion and in Prague.
- Marta Janiskova helped the 4d-Var ARPEGE team to further improve the simplified physics package, then left for ECMWF.
- Olivier Latinne studied the feasibility and the impact of a mixed coupling for ALADIN-Belgique : with ALADIN-France up to 36h, with ARPEGE from 36h to 48h.
- Richard Mladek finished the MAP experiment of an inter-comparison of forecasted precipitations over the Alps.
- Vladimir Pastircak and Jean-Marcel Piriou managed to merge the latest contributions to the parameterization of convection and found some consistent tunings.
- André Simon and Marjan Sandev analysed thoroughly some severe forecast failures of last winter, and studied their sensitivity to changes in initial conditions or in some tunings in physics, but didn't find any definitive explanation.
- Valery Spiridonov and Ilian Gospodinov enabled a large progress in the implementation of a new, and better, semi-lagrangian scheme, and pointed out some possible improvements in the operational one.
- Petra Smolikova, with some help from Radmila Bubnova, designed a new formulation of semi-lagrangian interpolators to further avoid orographic resonance.
- Malgorzata Szczech and Jadwiga Woyciechowska updated Verif-Pack.

---

3. Other research or development studies by the Toulouse permanent staff

- nothing to report during this "phasing" quarter.
