

Report

ALADIN Forecasters meeting

10-11 September 2014

Ankara, Turkey

Piet Termonia

Context

This meeting is one of the steps planned already in 2011 (cfr. outcomes of the Brussels Strategy meeting), in the process of “defining our end users”. During the GA in 2012 the role of the forecasters was highlighted. Indeed, weather offices in the participating member states can be seen as “end users” of the ALADIN program.

During the General Assembly meeting in Tunis in 2013, the following goals were put forth:

- proposal for **building a portfolio** with specific cases where the high-resolution performs better than ECMWF; This portfolio will be arranged in a form that will allow the countries to make brochures or catalogs to be used by their services for providing information about the model use for their end users and policy makers. The *portfolio* of cases should prove our “added value”; examples are the 2013 CE flooding case, the Belgian Pukkelpop festival, EV scores of GLAMEPS w.r.t ECMWF.
- **developing common tools** to help each country assess the quality of their products supplied to end users.

Additionally, there was the observation that forecasters need guidance on how to use convection-permitting model output and that the link between the research and the forecasters needs to be improved. This meeting was the first one during the present ALADIN MoU to organize such a meeting.

Format

The first meeting was kept short and had the following sessions:

Sessions	
Wednesday, morning 10 September	From science to operations
Wednesday, afternoon 10 September	Forecast experience in the countries
Thursday, morning 11 September	Working group discussion

There were 20 participants representing 11 countries. The presentations were collected and can be found on the website: <http://212.175.180.126/aladin/fm/>.

Conclusions and outcomes

- Forecasters highly focus on warning situations. Spatial aspects are less important. (in contrast to downstream applications such as providing input for hydrological applications or air pollution)

- In comparison (and addition) to global models, AROME and ALARO are mostly used for precipitation.
- It is observed that the forecasts of wind (speed) improve across all applications when increasing the resolutions (and may thus be a reason to go to higher resolutions).
- Forecasters need guidance to interpret high-resolution model output. This was a recurring problem during the discussions and emphasized by several forecasters. This related to the intrinsic stochastic nature of clouds and microphysics processes. It was also concluded that the human eye is not capable of interpreting a weather map in a probabilistic sense; i.e. it is not possible to interpret spatial variation in forecast patterns as probabilities over a wider area.
- Many cases were presented, successful ones and problematic ones. A list of selected cases is attached in an appendix.
- One can argue that we are adding value with respect to the output of the global model(s).
- About the format of the meeting:
 - The split between science and applications was found good, and the level of the scientific presentations was correct (not too much pure science and the presentations were understandable).
 - The time table was kept loose to stimulate discussion and interaction.
 - The meeting was too short. Many discussions already took place during the presentations of the forecasters (demonstrating the usefulness of a loose time table). But this left only 1 hour for a general discussion and a debriefing.
- Some concrete cases of problems in the installation of the model were identified. For instance, cases of unrealistically high precipitation amounts were found in the Turkish implementation of the model. It was concluded that the Turkish NWP experts should send their configuration details to experts in other member states to diagnose the problem (possibly linked to unrealistic SSTs in the climatological files).
- A meeting of this type is a good forum where forecasters can provide their feedback on the models.
- The topic of diagnostics (e.g. lightning, CAPE, diagnosed hail) was not planned, but there were nevertheless many discussions on that.

The way to go forward

1. The forecasters meeting should be organized on an annual basis. Portugal showed a posterior an interest to organize it next year. The meeting should be at least three days long. Given the enthusiasm of the participants it will not be a problem to set up a meeting for extended time.
2. For the next workshop the scope of the meeting should be better established (e.g. emphasis on scores or cases or work practices). It was proposed to build it around a specific topic; in particular next year it could be on convection-permitting EPSs.
3. The outcomes of this meeting have to be presented in the ALADIN workshop and discussed by the scientists. The coupling data for the bad cases could be made available for model development, i.e. new model versions should improve for these cases.
4. Given that the ALADIN workshop is already quite charged, it is not feasible to embed this meeting within the annual ALADIN workshop.
5. The scientific plans should be (re)oriented after the workshop to put sufficient emphasis on
 - convection-permitting EPS systems, and
 - to diagnose the problematic cases.
6. There is sufficient material in the presentations to make a first draft of a portfolio, see appendix for a list of cases.

Participants:

Florian Weidle	Austria
Christoph Zingerle	Austria
Piet Termonia	Belgium
Alex Deckmyn	Belgium
Pieter De Meutter	Belgium
Lovro Kalin	Croatia
Tomas Mejstrik	Czech Republic
Claude Fischer	France
Bernard Roulet	France
Zsolt Patkai	Hungary
Diana Bostan	Romania
Jana Kusmirekova	Slovakia
Neva Pristov	Slovenia
Andrej Velkavrh	Slovenia
Mehrez Ghannouchi	Tunisia
Melik Ahmet Tastan	Turkey
Ayhan Erdogan	Turkey
Fatih Kocaman	Turkey
Ersin Kucukkaraca	Turkey
Alper Guser	Turkey

Appendix: reported cases

<http://212.175.180.126/aladin/fm/>

The lists below are not meant to be exhaustive but are a personal selection.

A selection of examples of added value w.r.t. to the global model output

Better scores, in terms of exceedance of precipitation thresholds were reported in the AROME model of Météo France compared to the global models. Also it has been shown that the high-resolution prototype version of AROME running at 1.3 km has a better counting of convective cells than the version at a resolution of 2.5 km and has a better diurnal cycle (presentation of Claude Fischer). It has also been shown that the latest baseline version of the ALARO-0 produces a better daily cycle of precipitation (presentation of Neva Pristov). Many forecasts with a version of the ALARO-0 baseline of high-precipitation cases were reported in Romania with satisfactory results (Diana-Corina Bostan).

It has been shown that the combination of the LAM EPS systems GLAMEPS and LAEF have more economic value than the global IFS model (mind that this includes output of IFS EPS through the boundary conditions), so one can say that the LAM EPS used in the ALADIN community adds skill with respect to ECMWF EPS. This has been published by Smet *et al.* (2012). The increased skill in the LAEF system has also been found in specific cases, see the discussion of the high precipitation event on 17/5/2014 in the presentation of Florian Weidle and coauthors on ALADIN-LAEF, where LAEF gave a better forecast than the EPS of ECMWF.

A number of interesting case were reported. The most conspicuous ones are the flooding cases in Central Europe. There was the flooding case in Central Europe in May 2014, which was discussed for the ALADIN-LAEF system, but also for a flooding of the Sava River in Croatia (presentation of Lovro Kalin et al.) and it was also shown that the deterministic model did a better job in Austria with respect to the IFS (presentation of Christoph Zingerle).

Several cases were shown that point to the fact the increasing the resolution leads to better wind forecasts (e.g. the presentation of Bernard Roulet), in particular there was a case of improved wind gusts (of up to about 200 km/h) at the mountain top of Pic du Midi in France. Some stratus cases were discussed and it was shown how a tuning led to better forecasts of fog (presentation of Zsolt Patkai).

Examples of bad cases: input for the ALADIN workshop

Test-bed cases can be selected from the following list:

- A number of cases were identified in the Austrian applications with overestimation in weakly driven situations (e.g weak cold fronts coming from North West). It is not clear so far whether this can be attributed to problems in the dynamical couplings or whether it is related to the physics. Extra efforts are needed to understand this. If the problem is linked to the physics then one or two cases should be documented and made available to tests new model versions.
- Similarly there was the “Pentecost storm” in Belgium, where a forecast of hail was missed (during a national football match). It is not clear whether this should be attributed to a lack of resolution and details of the physics or whether it is a coupling problem.

- Two high-impact challenging cases were identified with an interesting interaction between an orographically driven dynamical forcing was determined for the production of precipitation. The first was the documented Pukkelpop case on 18/8/2011 (this is documented in a paper accepted for publication in Monthly Weather Review) and secondly, there was the case in Slovenia of the freezing rain at the end of January 2014, that was not forecast at all. In the latter case it could be that there was a missing feedback between the snow layer and the depth of the driving inversion (Andrej Velkavrh). The freezing rain certainly has to be studied more in depth.
- There were several reports of overestimation of precipitation in Turkey (presentation of Ayhan Erdoğan and Melik Ahmet Taştan). One such case should be selected as a test bed.
- Biases in temperature still occur (presentation of Jana Kusmirekova).

Additionally it appears that Tunisia is still running a version of the ALADIN model and it would be advised to switch to ALARO or AROME (Mehrez Ghannouchi). In fact ALARO can be run at a resolution of 10 km and can replace the ALADIN version. This would not lead to an increase of resolution, but it would make a more recent physics available for the Tunisian applications.

The issues of diagnostic indicators came back in several presentations (in particular the one of Tomas Mejstrik). This might be reported to the ALADIN workshop next year.

It was stressed (in particular in the presentation of Andrej Velkavrh) that it is difficult for the human eye to interpret deterministic maps in a probabilistic spatial sense. Given the fact that we find theoretically improved skill in our EPS systems, it makes sense to focus on the development of convection-permitting EPS systems.