REPORT ON THE ALADIN-ALATNET COUPLING MINI-WORKSHOP

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Environmental Agency of Slovenia

Participants : Klaus Stadlbacher and Alexander Beck from Austria, Chantal Moussy and Piet Termonia from Belgium, Martina Tudor and Stjepan Ivatek-Sahdan from Croatia, Petra Smolikova from Czech Republic, Jean-Marc Audoin from France, Gabor Radnoti from Hungary, Raluca Radu from Romania, Gregor Gregoric, Jure Jerman and Neva Pristov from Slovenia.

The purpose of the mini-workshop was to call together those ALADIN developers who work on some coupling related field.
On the first day we had presentations by specialists in ALADIN community. Based on the presentations and the discussions we have set up a work plan for the rest of the week. Below we summarize the topics of presentations and the related work performed during the workshop.

The topics of presentations were:

- Fairly well-posed LBC-s : The article of A. Mc Donald was presented by P. Termonia together with the plans how the Belgian team intends to check the idea in a spectral limited area model. The first implementation is planned to be on the spectral 2D barotropic model developed by the ALADIN team in the very beginning of the ALADIN project. We have discussed the possibilities with a special respect on the already existing normal mode computation part of the barotropic model, which can be used for the LBC tests.
- R. Radu presented her results on spectral coupling both in a 1D shallow-water model and in the full 3D ALADIN model. In the latter tests the 1999 Christmas Storm cases were used. The conclusions of both sets of tests were that it is possible to couple spectrally the signal not resolved by the time frequency of the Davies coupling over the LB zone. Spectral coupling is capable for passing the information down to the coupled model, but it is not desirable to use it every time-step. Moreover the spectral coupling has a shock-like impact with the sudden appearance of the coupling model's spectrum in the LAM solution. Therefore it was decided to complete the scheme with a temporal relaxation of the spectral coupling (spectral nudging) in order to obtain a smooth transition not only along the spectrum but along time as well. This was the plan for one working team for the rest of the week. The work has been completed successfully in the 1D case. More detailed description of results and preliminary conclusions can be read at :
http://www.rzs-hm.si/alatnetseminar/mcw.html.
- G. Radnoti and J.M. Audoin presented the surface-pressure tendency coupling scheme introduced experimentally in ALADIN. The first results do not look very promising. Scores are neutral, and the scheme in its original form is unstable : it is necessary to weaken the correction term with respect to the original form (in the scheme the coupling is performed as a normal surface-pressure coupling + correction term representing the tendency coupling). It should be studied what causes the instability (code bug, conception bug in the approach that correction is introduced in different part of time-stepping than that of original coupling with having horizontal diffusion in between, or a more basic conceptual problem). A first test to get the answer could be to check the same solution in an explicit model run, where SI correction does not play a role, therefore the tendency-coupling correction can be introduced at the same location of time-stepping as the rest of coupling. These tests require some careful work on the code, therefore it was not considered for the mini-workshop week.
- K. Stadlbacher shortly presented his results on NH experiments with different target resolutions. His results suggest that the resolution jump between coupling and coupled model may have significant impact on the results.

- G. Gregoric presented the idea of using ECMWF ERA40 data for down-scaling by ALADIN for climate research purposes. This requires to run the 901 configuration of ARPEGE. A working group was set up to implement 901 and it was successfully performed in a single case experiment during the workshop.

- G. Radnoti presented the plan to re-code the ALADIN coupling-data stream in order to make it more understandable and consistent with B-level parallelization requirements. Based on the prepared plan the code was rewritten during the workshop on the base of AL15 and first successful tests were also made.

- P. Termonia presented his earlier work on time-interpolation scheme in ALADIN coupling. His conclusions are that there is no straightforward way to simply improve the time-interpolation scheme, but there is a potential to diagnose cases when the present operational scheme is not satisfying due to missing the information at Davies relaxation step applied on temporally interpolated LBC-s. It was concluded that the spectral diagnostics in principle can be well combined by the spectral coupling (nudging) technique on case by case basis.

Majority of planned actions were successfully fulfilled. Participants were satisfied with achieved results and with working environment. It was a common conclusion that this kind of the workshop format is highly appreciated and efficient. Even in one week time results could be significant and new ideas were raised.