The Hirlam-Aladin verification working group

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During the Oslo HIRLAM-ALADIN mini-workshop on 12 and 13 December 2005 it was decided to start a small working group on the verification of special cases for physics development. The idea is to select a comprehensive set of representative test cases, covering the average weather types for which it is important for our models to perform well. This set can then be used for testing schemes in a more general way and for a larger variety of circumstances than is usually done in validation exercises.

Usually, the new developments in physics schemes or new physics schemes are aimed at the improvement of certain processes that the schemes were not capable of representing correctly before. In the process, the new or updated schemes are usually tested for a few selected cases, that comprise the phenomena that were not described correctly. After that, most of the time the updated model is run for a few longer periods, to see if the general performance of the model is not degraded by the update, which is sometimes extended with the test of a few extremely important historic cases for the country involved in the testing or upgrading of the model. However, in these tests and test periods, not all weather phenomena that we encounter in day to day forecasting are included or they are not visible anymore in the average statistics over these periods. The verification working group was therefore asked to set up a list of cases that are a challenge for the physics, that are not extreme, but important to forecast correctly, similar to the procedure that the MetOffice uses for the validation of their models and to be added as an extra step to the validation and verification of the models. It is very nice to have a model that is well capable of forecasting extreme weather, but when it fails in the normal day to day weather, the forecasters will not trust the model and tend to discard its output, also when it does give very useful results. Also it is very hard to win back the trust of the forecasters, whenever they have lost it due to earlier experiences.

Until now, the verification working group consists of 9 persons, 6 from Aladin and 3 from Hirlam. These persons are (in alphabetical order): Doina Banciu, Mariska Derkova, Kalle Eerola, Gwenaelle Hello, Tamas Hirsch, Mariken Homleid, Siham Sbii, Sander Tijm and Francois Vinit. So far the work of the working group has consisted of setting up a work plan, putting up a web-page (http://www.knmi.nl/~tijm/Verif/Verifworkg.html), proposing weather types that are challenges for physics, deciding on which weather types are important for (mesoscale) models at the Hirlam-Aladin workshop and describing the cases that encompass the weather types we decided on before. The descriptions of most of these cases can now be found on the website mentioned before.

At the Hirlam-Aladin workshop it was decided that a few weather types could not be missing from our list. The most important ones that are challenges to the current model physics, according to the discussions, were: low clouds and fog, the very cold stable boundary layer, shallow cumulus (see figure 1), deep convection and the impact of mountains on wind and precipitation. Later, we included the daily cycle of precipitation, the inland penetration of precipitation, sea breezes and/or other mesoscale circulations caused by differential heating, the daily cycle of fair weather and rapid cyclogenesis to this list.

Apart from the compilation and selection of a number of cases with different weather types, we also want to collect the results of the current models for these cases, to have a baseline score for future models and model versions to compare against. To enable this comparison we will also have to set up a verification database, comprising not only the baseline scores but also the observations against which we can verify the models. As most of the weather phenomena are quite special, the current standard verification packages that are available in the different model environments will probably not suffice for a good validation of the physics performance. We will therefore also have to look at new verification and validation routines, e.g. routines that use satellite or radar data, and incorporate these into the verification packages that we currently have available.

We hope to have the first set of model runs and verification archive ready at the start of 2007, so we can start comparing the performance of the models and to learn from each others weaknesses and strengths.

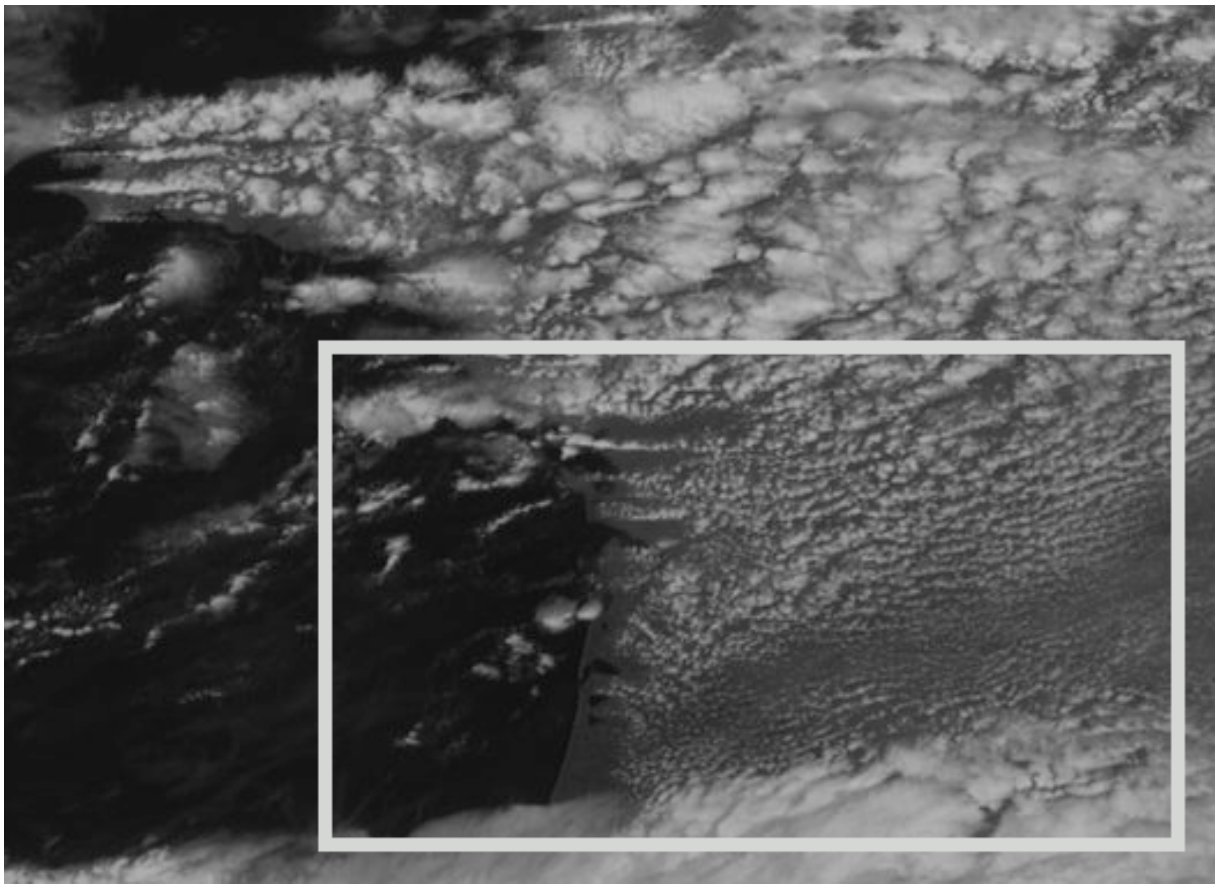

Figure 1: Visible MSG satellite image on 4-6-2005, 12.30 UTC, with shallow cumulus convection over SW-France. Note also the cloud streets that develop in the northern part of the white box and over Bretagne.