

## Introduction and Comments by the Project Leader

The HIRLAM-5 Newsletter NL39 is produced relatively short time after the summer for many of the Hirlam staff and contains some additional results that have been achieved during the summer and early autumn. The last Newsletter (38) after the ASM in Reykjavik was quite comprehensive and exhaustive in many of the areas.

Work has continued in many of the Project areas and additional verifications and validations have been done. In this issue there are further results from the turbulence scheme validations and another interesting validation, from the originator of our radiation scheme, Hannu Savijärvi, comparing different radiation schemes.

The testing and validation of the Reference system has received a lot of attention and is a very high priority in the Project. The Reference system is now 5.1 and the most important practical implication is that mini-SMS is used from now on. This provides a much higher efficiency at ECMWF, where different hosts are and should be used for computationally demanding tasks as opposed to compilations and file handling. A meteorological benefit in this version is the shallow convection parameterisation in STRACO, see results in Xiaohua Yang's article and in the Technical Report 50 by Bent Hansen Sass.

At the ASM it was agreed that the ongoing validation of the two CBR revisions and some additional tests should be completed and done. This was done at KNMI, INM and for numerical stability, at Met Éireann. The results (some of them displayed here, but a lot more sent to the Management Group) showed that the two revisions (KNMI and INM ones) were very similar in performance, both addressing the low level wind bias problem. There was only a very slight advantage for the KNMI version, in the KNMI tests, over all parameters, but some increased bias in T2m compared with the INM revision. There are some explanations for this, and this problem is small and is also related to problems in other parts of the physics. The period tested at INM also showed this slight problem to a small degree, but showed that for this period and area, the INM version performed worse for upper air than the Reference. The Management Group decided to introduce the KNMI revision as the new beta-release in September, not so much based on the results mentioned above, but to a large degree due to the very high level of support and effort from the KNMI group in the development and validation phase. In parallel to this work, the INM version has also evolved to address the same problems, but in a way that alters the scheme in a less radical way. It is hoped that this work will also continue, in order to understand the problems in the turbulence scheme better to be able to improve the scheme.

A problem that has been highlighted with the event of the introduction of the KNMI revision to CBR is that the pressure negative bias has shown to be too large in the three tests run so far, to be acceptable as they are. (See the article by Xiaohua Yang). This feature has been seen in Simo Järvenoja's test for January 2000 (see NL38), but in that case the effect over Scandinavia was to eliminate the monthly large positive bias. Wim de Rooy showed in NL38 that there is a systematic negative trend in the pressure bias, with decreasing pressure. This problem is receiving high priority at the moment and the model benefits from a higher level of drag.

A particular unfortunate and unforeseen consequence of combining the CBR revision on top of the STRACO modification was a very marked degradation in the ABL against Cabauw data for one month (see Wim de Rooy's article). One reason for this is the

redefinition of the levels for TKE from full to half levels, thereby using half-way the wrong level in the shallow convection parameterisation in STRACO. Therefore the revised CBR is currently only implemented **without** this STRACO modification. (It may, in fact, be the case that both modifications work in the same direction, reducing low level clouds and precipitation).

In parallel there has been a lot of activity in both testing and improving the ISBA surface parameterisation and analysis scheme. Some tuning affecting evaporation and for rejecting observations was done early in the summer. The most important change was for the postprocessing and observation operator for T2m, where instead of averaging all fractions, the average of the land fractions is done, if there is both land and water in the grid square in question. This had a large impact on the perceived diurnal cycle for Scandinavia and Finland. The scheme has now an overall positive impact and reduces biases of temperature, and particularly for humidity at 2m. The work on the implementation for a future beta-release is ongoing, but before a release there will be final validations over 4 seasons. More about this at the Workshop in Madrid.

3D-VAR is available as an option. (Denmark, Norway, Sweden and Ireland are operational). Testing for the Spanish area show that it performs at least as well as OI also at those relatively low latitudes (in fact, the increments look a lot better).

The Scientific Documentation is almost complete and will soon be available in draft version on H<sub>E</sub>X N<sub>E</sub>T.

**Per Undén, 4 October, 2001.**

#### **Recent meetings:**

- HIRLAM-5 Management Group Meeting 11a, 5 September, telephone conference.
- HIRLAM-5 visit to DMI and Management Group Meeting 11 , 17-19 September, Copenhagen.

#### **Forthcoming meetings:**

- Hirlam/SRNWP workshop on surface processes, turbulence and mountain effects. 22-23 October, INM, Madrid.
- HIRLAM Advisory Committee meeting, 29-30 October, KNMI, De Bilt.
- Hirlam singular vector mini-workshop, 19-20 November, SMHI, Norrköping.
- HIRLAM Council Meeting No. 4, xx December, Reading.
- Variational Data Assimilation and remote sensing, 21-23 January 2002, FMI.
- HIRLAM-5 visit to Met Éireann and Management Group Meeting, preliminarily February 2002, Dublin.
- Hirlam All Staff Meeting, prel. 8-10 April 2002, DMI, Copenhagen.
- Mesoscale modelling and verification, probably September 2002, Met Éireann, Dublin.