

Reference System Status December 2005

Gerard Cats

Main changes since May 2005

The current official release is version 6.4; apart from the technical change to implement this version number, it is equal to β -release 6.3.8, which was described in the previous newsletter. The current β -release is 6.4.3. Apart from possibly a few technical corrections this will be last release in the HIRLAM 6 series. The main changes between 6.4 and 6.4.3 are:

- Full unification of the code management system.
- Less weight to the observations in the data assimilation.
- Revisions to stomatal resistance and leaf area index.
- Revised postprocessing of mean sea level pressure and near-surface humidity.
- Several changes with minor or no impact on the forecast but some with substantial performance or portability improvements.

Implementing new developments

The new code management system, introduced in version 6.4.1, allows the implementation of code changes one by one, semi-continuously. From time to time the HIRLAM management group may decide to tag a certain combination of those changes with a β or official release number. The latest such release thus now is 6.4.3. After 6.4.3, a few technical code corrections have already been implemented, with the aim to include them in a next β release. They are available from the HIRLAM source code repository as version “HEAD”. New developments should be submitted for implementation after they have been tested on the “HEAD”. To help developers with this, the modifications to the “HEAD” after the last release number are listed on the HeXnet Bulletin Board. Note that the “HEAD” is not a fixed release; it changes with every introduction of a new development. Hence, users should not use the “HEAD” for experiments. Only at the final stage, when a change is being prepared for implementation into the HIRLAM system, should it be based on “HEAD”. At that stage, it is good to consult the system manager, to avoid overlap with other developments on the “HEAD”.

Detailed description of the changes

Version 6.4.1 (20 October 2005)

Full system integration

The code management system for HIRVDA deviated from that of the rest of the HIRLAM system. It used more modern Unix facilities, but the downside was that it was not really usable at ECMWF. The new system integrates the two systems, based on modern Unix and portable to many (if not all) computer configurations.

In principle, 6.4.1 should be the same as 6.4.0, meteorologically. In practice, however, small differences are observed. They result partly from different compiler flags, but

mainly they are due to slightly changed observation screening, due to different treatment of radiosonde observation times. This change is not completely understood and still under investigation

Version 6.4.2 (24 October 2005)

Reduced weight to the observations

The scaling factors for the structure functions have been decreased, resulting in less weight to the observations. This was done after numerous experiments showed improved mean sea level pressure and upper air scores.

Leaf area index and stomatal resistance

These fields are given as a set of numbers, one per month. The abrupt changes across month boundaries have now been replaced by a day-to-day interpolation. A decrease in the stomatal resistance now cures the too low evaporation in autumn, winter and spring.

Other changes with meteorological effect

The postprocessing of 2 meter humidity was changed to cure the unrealistic jump at sunset. The solar elevation was corrected for time-equation. Incremental DFI now keeps positive definite quantities, like cloud water, positive.

Technical changes

These result in better portability, better diagnosis of inconsistent configurations, *etc.*

Version 6.4.3 (9 December 2005)

Revised postprocessing of mean sea level pressure

By “horizontal” interpolation of pressure below ground the mean sea level contours over steep terrain are now much smoother, and presentable.

Technical changes

These again result in better portability. The system can now be built on a Linux system with the GNU Fortran-90 compiler.

After version 6.4.3 (16 December 2005)

A few technical code corrections have been added on the “HEAD”. They result in easier porting, *e.g.* by reducing the number of compiler warnings.