

# Hirlam mast verification plots

## *Data description*

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### 1 Input data files

The mast verification routines use *two sets* of input files, one for forecast and another for measurements. The data structure is similar (see below), only the naming differs slightly.

#### 1.1 Forecast files

The name of the forecast file is of form

```
Fcst_Modl_MastID_yyyymmdd_hh.txt
```

where *Modl* and *MastID* are 4-letter strings identifying the forecast model and measurement mast, respectively, and the timestamp giving the forecast analysis time, is expressed as UTC time:

```
yyyy = year (four digits)
mm   = calendar month (two digits)
dd   = calendar month (two digits)
hh   = hour (two digits)
```

The model string (*Modl*) is to be formed as a combination of two (capital) letters identifying the country of origin followed by a two number string identifying the resolution, e.g. "FI22" for the Finnish 22 km resolution model, "NL22" for the corresponding Dutch model. Suggested acronyms are:

FI	=	Finland	SW	=	Sweden	NO	=	Norway
DK	=	Denmark	IS	=	Iceland	NL	=	the Netherlands
IR	=	Ireland	SP	=	Spain	FR	=	France
UK	=	United Kingdom	EC	=	ECMWF			

The mast string *MastID* is a four letter string in uppercase letters, suggested acronyms being:

SODA	=	Sodankylä	CABA	=	Cabauw	VALL	=	Valladolid
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These lists can be supplemented as necessary and modified in case of naming conflicts or other needs.

A separate file is thus used for each forecast. At present, the first 24 hours of each forecast are plotted and should be included in the file.

## 1.2 Mast measurement files

To allow for possibility to supply measurement data at two different time intervals, two sets of measurement data files are used, one for fluxes (30 min interval in Sodankylä) and another for other measured variables (10 min interval in Sodankylä), their names being of form

```
Meas_MastID_Type.txt
```

where *MastID* and *Type* are 4-letter strings identifying the measurement mast (as described above) and measurement type. *Type* can take values:

```
Flux = Flux measurements           Mast = other mast measurements
```

A constant file name (time independent) is used here. The data is picked according to the time labels inside the file. When plotting, a new file is downloaded and substituted for data to be plotted. No appending of data is done, so each file should cover the whole period to be plotted.

At present, a time period starting from two days backward from the present day midnight up to the latest available data is plotted. The data in the file should thus cover at least this period. Older data in the file is allowed, it is cropped away by the plotting routines. For performance reasons, not too much data should be included in the files, however.

## 2 Input file structure

Both forecast and measurement data files have similar structure. Input files are ASCII files, containing on each line first the timestamp (starting from the first column) and then the data for that time item by item separated by one or more blanks:

```
yyyymmddhhnn param1 param2 param33 ....
```

where timestamp is expressed as UTC time:

```
yyyy = year (four digits)
mm   = calendar month (two digits)
dd   = calendar month (two digits)
hh   = hour (two digits)
nn   = minutes (two digits)
```

For example, the beginning of the file might look like:

```
200408310000 432.7 400.2 2.337 2.619 2.746
200408310010 430.7 400 2.867 2.95 2.714 1.633
200408310020 432.9 400 3.556 3.214 -99999 1.676
```

where the data is provided at 10 minute intervals. Missing data is represented by -99999 (integer value).

### 3 Input file contents

The forecast and mast data files should contain the following data columns (format as described above):

#### 3.1 Forecast data (Fcst\_Modl\_Mast\_yyyymmdd\_hh.txt)

1. Time stamp	-
2. Air temperature (2m)	degrees Celsius
3. Air temperature (31m, first model level)	degrees Celsius
4. Temperature difference between 2 and 3 (t2-t31)	degrees Celsius
5. Relative humidity	%
6. Wind speed (10m)	m/s
7. Global (short wave solar) radiation <b>downwards</b>	W/ m <sup>2</sup>
8. Long wave radiation <b>upwards</b>	W/ m <sup>2</sup>
9. Sensible heat flux <b>upwards</b>	W/ m <sup>2</sup>
10. Latent heat flux <b>upwards</b>	W/ m <sup>2</sup>
11. Evaporation	mm/h
12. Momentum flux	N/ m <sup>2</sup>

##### 3.1.1 Mast measurement data (Meas\_MastID\_Mast.txt)

1. Time stamp	-
2. Air temperature (2m)	degrees Celsius
3. Air temperature (31m, first model level)	degrees Celsius
4. Temperature difference between 2 and 3 (t2-t31)	degrees Celsius
5. Relative humidity	%
6. Wind speed (10m)	m/s
7. Global (short wave solar) radiation <b>downwards</b>	W/ m <sup>2</sup>
8. Long wave radiation <b>upwards</b>	W/ m <sup>2</sup>

##### 3.1.2 Mast flux measurement data (Meas\_MastID\_Flux.txt)

1. Time stamp	
2. Sensible heat flux <b>upwards</b>	W/ m <sup>2</sup>
3. Latent heat flux <b>upwards</b>	W/ m <sup>2</sup>
4. Evaporation	mm/h
5. Momentum flux	N/ m <sup>2</sup>

### 4 Data transfer

The suggested method to transfer the data to FMI is to have a server address at [hirlam.org](http://hirlam.org), where data is transferred (by ssh or otherwise) by the data providers, and from where it is then downloaded to FMI for plotting purposes.