# Description of the "MF-tethersonde" fileset for BLLAST.

Météo-France CNRM/GMEI/TRAMM

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This document is a description of the format and the parameter list of the MF-tethersonde fileset, which contains in-situ meteorological measurements made with a Vaisala TTS111 probe under the tethered balloon operated by the 4M team (Meteo-France/CNRM).

## 1 Format

The files are in NASA-Ames 1001 format, which is a text format with a descriptive header. A presentation of the format is available at http://badc.nerc.ac.uk/help/formats/NASA-Ames/.

Conformance to standards has been checked by the online validator operated by BADC [1].

## 2 File naming convention

The naming pattern is : `MF-tethersonde_1Hz-full_2011`*MMDD*`_lt110`*nnn*`.txt`
where :

- *MM* is the month number (06 or 07)
- *DD* is the number of the day in the month (see flight calendar)
- *nnn* is the number of the day in the year (see flight calendar)

## 3 Flights calendar

The table below gives the calendar of the flights, and, for each day, the take-off time of the first flight and the landing time of the last flight.

| date | day of year | IOP num. | flight num. | take-off time | landing time |
|---|---|---|---|---|---|
| 14 june | 165 | 0 | 0 | 14h33m20s | 14h55m47s |
| 15 june | 166 | 1 | 1 | 14h45m30s | |
| | | | 3 | | 19h27m50s |
| 19 june | 170 | 2 | 4 | 13h13m45s | |
| | | | 5 | | 20h30m40s |
| 20 june | 171 | 3 | 6 | 12h51m10s | |
| | | | 7 | | 20h04m40s |
| 24 june | 175 | 4 | 8 | 13h11m23s | |
| | | | 9 | | 20h03m00s |
| 25 june | 176 | 5 | 10 | 12h25m40s | |
| | | | 11 | | 20h00m45s |
| 26 june | 177 | 6 | 12 | 11h47m25s | |
| | | | 13 | | 20h06m40s |
| 27 june | 178 | 7 | 14 | 13h11m20s | |

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[1] http://badc.nerc.ac.uk/cgi-bin/dataex_file.cgi.pl

| date | day of year | IOP num. | flight num. | take-off time | landing time |
|---|---|---|---|---|---|
| | | | 15 | | 20h04m20s |
| 30 june | 181 | 8 | 16 | 12h16m20s | |
| | | | 17 | | 20h19m50s |
| 1 july | 182 | 9 | 18 | 12h53m00s | |
| | | | 19 | | 19h58m00s |
| 2 july | 183 | 10 | 20 | 12h13m20s | |
| | | | 21 | | 20h01m45s |
| 5 july | 186 | 11 | 22 | 12h57m20s | |
| | | | 23 | | 19h53m35s |

# 4 Parameter description

The data part of the files contains 7 columns. The first one (the independant variable, in NASA-AMES parlance) is the time, expressed in linear scale (seconds since midnight).

The sampling rate is 1 Hz.

Most of the data are the exact copy of what was recorded by the Vaisala data acquisition software. A few corrections were made :

- the take-off altitude was adjusted to 593 m.
- all data recorded below 610 m ASL (17 m AGL) were removed.
- for altitude, pressure, temperature and humidity, spikes were removed and replaced by an interpolated value. A spike is defined as a sample whose differences to prior and following samples are above a certain threshold and of opposite sign. Threshold values for each parameter are listed in the table below. No more than ten spikes per flight were corrected.
- apparent wind measurements where both direction and speed are nul are considered as missing.
- samples of apparent wind speed of exact nul value are considered as missing (to filter out some cases of anemometer blocking).

Here follows a description of the six measured parameters :

| | **name** | **unit** | **description** |
|---|---|---|---|
| 1 | `altitude` | *meter* | Computed by Vaisala data acquisition software<br>Threshold for spike detection : $20m$ |
| 2 | `air_pressure` | *hPa* | From BAROCAP SILICON sensor<br>Threshold for spike detection : $5hPa$ |
| 3 | `air_temperature` | °C | From F-THERMOCAP capacitive wire<br>Threshold for spike detection : 2°C |
| 4 | `relative_humidity` | % | From H-HUMICAP thin film capacitor<br>Threshold for spike detection : 20% |
| 5 | `relative_wind_from_direction` | *degree* | From digital compass (degree) |
| 6 | `relative_wind_speed` | *m/s* | From 3-cup anemometer |

# 5 Contacts

If you have further questions, you may contact :

- Dominique Legain (`dominique.legain@meteo.fr`), about operation, sensors and acquisition issues.
- Bruno Piguet (`bruno.piguet@meteo.fr`), about data processing and file format issues.