Sample-rate ISFF Data for CASES99

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These data contain surface meteorology measurements of the Integrated Surface Flux Facility (ISFF) during the CASES99 field project, in October, 1999.

For general information about the operations of the ISFF during CASES99 see https://www.eol.ucar.edu/content/integrated-surface-flux-facility-during-cases99.

The sample-rate datasets contain values of variables which have been resampled using a simple nearest-in-time method to an evenly spaced time grid. Sensors which operated at 1 sample/sec or less have been resampled to a 1 Hz time grid. Higher rate sensors, such as 3-D sonic anemometers have been resampled to a 20 Hz time grid.

The data are stored in NetCDF files. Information on the NetCDF file format and software is available at http://www.unidata.ucar.edu/software/netcdf/. Information specfic to ISFS NetCDF files is available at https://www.eol.ucar.edu/content/isfs-netcdf-files.

High-rate Datasets and Download URLs

Four sample-rate datasetsare available.

- tower_hr: 3D wind and fast scalar variables from the main tower resampled to 20Hz. All wind vectors have been rotated to geographic coordinates (+U is wind to the east, +V is wind to the north), and 3D wind vectrors are corrected for tilt of the anemometer relative to a plane of mean flow (see #SonicTiltCorrection).
- tower_lr, : Slower sensors, such as hygrothermometers and radiation sensors on the main tower, resampled to 1 Hz.
- stns_hr: 3D wind and fast scalar variables from the six outlying stations, resampled to 20Hz. All wind vectors have been rotated to geographic coordinates (+U is wind to the east, +V is wind to the north), and 3D wind vectrors are corrected for tilt of the anemometer relative to a plane of mean flow (see #SonicTiltCorrection).
- stns_lr: Slower sensors, such as hygrothermometers, radiation and soil sensors at the six outlying stations, resampled to 1 Hz.

The file names are shown below, where YYYYMMDD_HH is the starting year, month and day and hour in UTC.

name	description	download	file names
tower_hr	main tower, high rate	http://data.eol.ucar.edu/codiac/dss/id=TBD	cases_tower_hr_YYYYMMDD_HH.nc
tower_lr	main tower, low rate	http://data.eol.ucar.edu/codiac/dss/id=TBD	cases_tower_lr_YYYYMMDD_HH.nc
stns_hr	stations, high rate	http://data.eol.ucar.edu/codiac/dss/id=TBD	cases_stns_hr_YYYYMMDD_HH.nc
stns_lr	stations, low rate	http://data.eol.ucar.edu/codiac/dss/id=TBD	cases_stns_lr_YYYYMMDD_HH.nc

Quality Control, Corrections

No removal of questionable data has been performed on this data.

Some variables can be used as quality indicators. The Campbell CSAT3 sonic anemometers at 1.5, 5, 30 and 50 meters on the tower provide a **diag** bit-field variable, which will be zero if the sonic transducer signal levels and measured speed of sound on the 3 axes are within acceptable ranges. Wind vectors and sonic temperature values should not be used when **diag** is non-zero.

The ATI sonic anemometers on the tower at 10, 20, 40 and 55 meters, and at 5 meters on the outlying stations provide **usamples**, **vsamples** and **wsamples** variables, which contain the number of 200Hz samples that were averaged within the sonic to create a 20 Hz sample. A value of 10 indicates the sonic was in good shape. Wind vectors and sonic temperature values should not be used when **usamples**, **vsamples** and **wsamples** are less than 10.

The online field logbook logbook has detailed information about sensor issues that were noted in the field.

The following corrections have been applied to both datasets

- All horizontal wind components, **U** and **V** from 2D anemometers, and **u** and **v** from fast 3D anemometers, have been rotated to geographic coordinates, where +**U** is wind to the east, +**V** is wind to the north. These rotations are based on compass measurements of the anemometer orientations.

Time Representation

The **base_time** variable contains one value, the time of the start of the file, as a number of POSIX (non-leap) seconds since 1970 Jan 1, 00:00 UTC.

Values for each time-varying measurement will be found in the NetCDF files, as a variable with a **time** dimension. For the low-rate data, the time dimension will be 43201 for a complete file, the number of seconds (plus 1) in twelve hours. For the high-rate data the time dimension will be 864001 in a comlete file.

Before being written to the NetCDF files, the raw, asynchronous samples are re-sampled to an evenly spaced time sequence, using a simple method of matching the raw sample nearest-in-time to the evenly-spaced times. No interpolation or averaging is done.

Many variables in the low-rate files were sampled slower than 1 Hz, and were resampled to the 1/sec time grid before writing to the NetCDF files. As a result, for a sensor such as the hygrothermometers (variables **T** and **RH**), which were sampled a 0.2 Hz, generally 3 or 4 out of 5 values every second will be the missing value. When resampling a lower resolution time series to a higher resolution gird, the resampling procedure will frequently repeat values. As a result there often be 2 repeated values and then 3 missing hygrothermometer and radiation values over 5 seconds.

The **time** variable contains the time to be associated with each 1 Hz sample, in units of seconds since **base_time**.

Dimensions

The NetCDF dimensions in each file are:

Dimension name	size	description
time	43201 (low-rate) or 864001 (high-rate)	number of samples in 12 hours
station	6	index for the six ISFF stations at CASES99

Short Name Attributes

Each measured variable will have a **short_name** NetCDF attribute. The field before the first period in the**short_name** is a generic variable name, such as **T** for temperature, **Rsw** for short wave radiation, or **u** for the U component of the wind.

Heights

The height in meters above ground of the measurement, if appropriate, will be indicated in a second field after a period in the **short_name**, for example **RH.30m**

NetCDF Variable Names

The actual NetCDF variable names will have underscores, '_', in place of periods and single quotes. Therefore a variable with a **short_name** attribute v**.5m** will have a NetCDF variable name of v_**5m**.

Units and Long Names

Variables have a NetCDF attribute specifying the units of the measurement.

Missing Data

The missing data value is 10^{37}. A missing value indicates either that the sensor was not reporting at the given time.

Sonic Tilt Correction

The 3D sonic anemometers were installed as level as was possible, but not perfectly "bubble" level.

The **tower_hr** and **stns_hr** datasets contains 3D wind vectors which have been rotated to a coordinate system where the mean **W** component is zero, as described in /content/sonic-tilt-corrections.

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PROJECT WEBSITES

- Former Project Page
- CASES-99 ISFS Project Page
- CASES-99 ISS Project Page
- CASES-99 GLASS Project Page
- CASES-99 NCAR/MMM Project Page
- Argonne National Laboratory

DIGITAL MEDIA

- Site Photos (Burns)

PARTICIPANTS AND MAILING LISTS

- PIs and Research Interests
- Official Mailing List

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