

ISFS CHATS High-rate Data

The operations and measurements of the [ISFS](https://www.eol.ucar.edu/field_projects/chats) (formerly called ISFF) at CHATS are documented in the CHATS home page, at https://www.eol.ucar.edu/field_projects/chats.

ISFS data are typically made available in NetCDF form, The format of ISFS NetCDF files is documented at <https://www.eol.ucar.edu/content/isfs-netcdf-files>.

The ISFS variable naming convention is discussed at <https://www.eol.ucar.edu/content/isfs-variable-names>.

Data Disclaimer

Time-tags

The time-tag associated with each sensor sample was read from the data system clock when each sample was received. Unfortunately the ISFS data systems were using a faulty method to maintain the accuracy of their clocks, and as a result the sample time-tags were frequently in error on the order of a second, with both backward and forward discontinuities. This problem could have been significantly improved in post-processing, but the raw archive data files were sorted in time, placing the samples out-of-order in the archive. The original, unsorted archive files are no longer available.

Samples from Campbell CSAT3 sonic anemometers contain a 6 bit sequence number (0-63), which provides a way to re-order the anemometer samples, and then assign corrected time-tags. This is a best-effort correction and a small fraction of samples may still be out-of-order with incorrect time tags. This re-ordering also resulted in some samples to be discarded when no correction could be determined. Values from the krypton hygrometers were recorded with the sonic anemometer samples, and so those have been corrected. Time-tag corrections to 10/sec samples from the Licor 7500 H₂O/CO₂ analyzers were not possible. In addition, no corrections were applied to time-tags of the remaining sensors, those sampled at 1/sec or less.

Only the sonics' time stamp has been corrected (time is sequential). Analyses using sensor data on their own should be fine, such as validation with other instruments and models. Time averaging (~5-10 min) may be needed for variables where the unresolved time offset remains. Please note, the time stamp offsets will affect cross correlations, power spectrums, etc. where high rate time resolved data is important and thus such analyses on instantaneous data is not recommended.

Dataset “hr_qc_geo_tiltcor_shadowcor60”

The high-rate NetCDF files contain data from all primary sensors deployed at CHATS by ISFS, at the sampling rate of each sensor. Sonic anemometers were operated at 60 samples per second, and the majority of the remaining sensors sampled at 1 sps. As noted above, time-tag corrections to water vapor and carbon dioxide samples from Licor 7500's were not possible and these data have been removed.

3-D Wind Data from Sonic Anemometers

The u, v and w components of wind vectors have been corrected for the estimated tilt of the sonic anemometers, as discussed under Sonic Anemometers and Sensor Notes in the CHATS home page. Components u and v have then been rotated from instrument coordinates to geographic coordinates, where +u is wind to the east, +v is wind to the north, using the

anemometer orientation, as described in the sensor notes.

Files and Downloads:

The typical data file size range is between 300 - 550 Mbytes unzipped. If your request is larger than permitted, please adjust the data period to obtain a smaller chop of the data, and repeat downloads to get all data.