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High Rate ISFS Data for SOAS

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These data contain surface meteorology measurements of the Integrated Surface Flux System (ISFS) during the Southern Oxidant and Aerosol Study (SOAS), at the Alabama Aquatic Biodiversity Center (AABC), during May, June and July of 2013.

For general information about the operations of the ISFS during SOAS see https://www.eol.ucar.edu/field_projects/soas.

The ISFS high rate dataset contains data from the 45 meter tower at the AABC site during during SOAS.

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.

NetCDF File Names

Each NetCDF file contains two hours of data. The file names are of the form "aabc_YYYYMMDD_HH.nc", where YYYYMMDD is the year, month and day in UTC, and HH is the UTC hour of the start of the data in the file.

NetCDF Variables

See the table at the bottom of this page for a listing of the variables in the file.

See the table at https://www.eol.ucar.edu/content/soas-isfs-page for information on the sensors that were deployed.

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.

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.

Variables of three time resolutions are stored in the files. State parameters such as temperature and humidity were sampled at 1/sec. These variables will have a time dimension of 7200, the number of samples in two hours. Data from sonic anemometers, fast water vapor and CO_2 gas analyzers were sampled at 20/sec. These variables will have an additional **sample** dimension of 20 in addition to the **time** dimension. Pressure data was sampled a approximately 14.85 /sec. These are stored with a **sample** dimension of 15.

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

For variables with a sample dimension of 20, the timetags for the 20 samples of the second are evenly spaced around the corresponding **time**. The time-tag for a sample from a variable with **time** index **i**, sample index **j,** is:

$$t_{i,j} = base\_time + time_i - 0.5 + (1/20) \times (1/2 + j)$$

i is the time index
j is the sample index, ranging from 0 to 19 (**sample** dimension minus one)

In a similar manner, the time-tags of the 15 Hz pressure data are:

$$t_{i,j} = base\_time + time_i - 0.5 + (1/15) \times (1/2 + j)$$

j is the sample index, ranging from 0 to 14

Dimensions

The NetCDF dimensions in each file are:

Dimension name	size	description
time	7200	seconds in two hours
site	2	index for the two ISFS sites at SOAS, the 45 meter tower and the pond site
sample	20	additional dimension for 20 Hz variables
sample_15	15	additional dimension for 15 Hz variables (pressure)

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, 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.26m**, or **u.38m**.

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 of **co2.38m** will have a NetCDF variable name of **co2_38m**.

Units and Long Names

Each variable will have NetCDF attributes containing the units of the measurement, and a long name giving more information on the measurement.

Missing Data

The missing data value is 1x10^37. A missing value indicates either that the sensor was not reporting at the given time, or it was detemined that the data value did not meet QC criteria during post-project analysis.

Table of NetCDF Variables

NetCDF name	ISFS short name	Units	Dimensions	Long Name
u_2m	u.2m	m/s	time,sample	Wind U component from CSAT3
v_2m	v.2m	m/s	time,sample	Wind V component from CSAT3
w_2m	w.2m	m/s	time,sample	Wind W component from CSAT3
tc_2m	tc.2m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_2m	diagbits.2m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
kh2o_2m	kh2o.2m	g/m^3	time,sample	CSI Krypton water vapor
kh2oV_2m	kh2oV.2m	V	time,sample	CSI Krypton hygrometer voltage
T_2m	T.2m	degC	time	Air Temperature from NCAR hygrothermometer
RH_2m	RH.2m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_2m	Ifan.2m	mA	time	NCAR hygrothermometer aspiration fan current
u_8m	u.8m	m/s	time,sample	Wind U component from CSAT3
v_8m	v.8m	m/s	time,sample	Wind V component from CSAT3
w_8m	w.8m	m/s	time,sample	Wind W component from CSAT3
tc_8m	tc.8m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_8m	diagbits.8m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_8m	h2o.8m	g/m^3	time,sample	LICOR 7500 water vapor density
co2_8m	co2.8m	g/m^3	time,sample	LICOR 7500 CO2 density
lidiag_8m	lidiag.8m		time,sample	LICOR 7500 diagnostic value
p_8m	p.8m	mb	time,sample_15	Barometric Pressure, Paroscientific 6000
T_8m	T.8m	degC	time	Air Temperature from NCAR hygrothermometer
RH_8m	RH.8m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_8m	Ifan.8m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_8m	Wetness.8m	.001V	time	Decagon Leaf Wetness Sensor
u_13_9m	u.13.9m	m/s	time,sample	Wind U component from CSAT3
v_13_9m	v.13.9m	m/s	time,sample	Wind V component from CSAT3
w_13_9m	w.13.9m	m/s	time,sample	Wind W component from CSAT3
tc_13_9m	tc.13.9m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_13_9m	diagbits.13.9m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
kh2o_13_9m	kh2o.13.9m	g/m^3	time,sample	CSI Krypton water vapor
kh2oV_13_9m	kh2oV.13.9m	V	time,sample	CSI Krypton hygrometer voltage
T_13_9m	T.13.9m	degC	time	Air Temperature from NCAR hygrothermometer
RH_13_9m	RH.13.9m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_13_9m	Ifan.13.9m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_13_9m	Wetness.13.9m	.001V	time	Decagon Leaf Wetness Sensor
u_20m	u.20m	m/s	time,sample	Wind U component from CSAT3
v_20m	v.20m	m/s	time,sample	Wind V component from CSAT3
w_20m	w.20m	m/s	time,sample	Wind W component from CSAT3
tc_20m	tc.20m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_20m	diagbits.20m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_20m	h2o.20m	g/m^3	time,sample	LICOR 7500 water vapor density

co2_20m	co2.20m	g/m^3	time,sample	LICOR 7500 CO2 density
lidiag_20m	lidiag.20m		time,sample	LICOR 7500 diagnostic value
p_20m	p.20m	mb	time,sample_15	Barometric Pressure, Paroscientific 6000
T_20m	T.20m	degC	time	Air Temperature from NCAR hygrothermometer
RH_20m	RH.20m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_20m	Ifan.20m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_20m	Wetness.20m	.001V	time	Decagon Leaf Wetness Sensor
u_26m	u.26m	m/s	time,sample	Wind U component from CSAT3
v_26m	v.26m	m/s	time,sample	Wind V component from CSAT3
w_26m	w.26m	m/s	time,sample	Wind W component from CSAT3
tc_26m	tc.26m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_26m	diagbits.26m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_26m	h2o.26m	g/m^3	time,sample	LICOR 7500 water vapor density
co2_26m	co2.26m	g/m^3	time,sample	LICOR 7500 CO2 density
lidiag_26m	lidiag.26m		time,sample	LICOR 7500 diagnostic value
T_26m	T.26m	degC	time	Air Temperature from NCAR hygrothermometer
RH_26m	RH.26m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_26m	Ifan.26m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_26m	Wetness.26m	.001V	time	Decagon Leaf Wetness Sensor
u_32m	u.32m	m/s	time,sample	Wind U component from CSAT3
v_32m	v.32m	m/s	time,sample	Wind V component from CSAT3
w_32m	w.32m	m/s	time,sample	Wind W component from CSAT3
tc_32m	tc.32m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_32m	diagbits.32m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_32m	h2o.32m	g/m^3	time,sample	LICOR 7500 water vapor density
co2_32m	co2.32m	g/m^3	time,sample	LICOR 7500 CO2 density
lidiag_32m	lidiag.32m		time,sample	LICOR 7500 diagnostic value
p_32m	p.32m	mb	time,sample_15	Barometric Pressure, Paroscientific 6000
T_32m	T.32m	degC	time	Air Temperature from NCAR hygrothermometer
RH_32m	RH.32m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_32m	Ifan.32m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_32m	Wetness.32m	.001V	time	Decagon Leaf Wetness Sensor
u_38m	u.38m	m/s	time,sample	Wind U component from CSAT3
v_38m	v.38m	m/s	time,sample	Wind V component from CSAT3
w_38m	w.38m	m/s	time,sample	Wind W component from CSAT3
tc_38m	tc.38m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_38m	diagbits.38m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_38m	h2o.38m	g/m^3	time,sample	Water vapor density from CSI IRGA
co2_38m	co2.38m	mg/m^3	time,sample	CO2 density from CSI IRGA
T_38m	T.38m	degC	time	Air Temperature from NCAR hygrothermometer
RH_38m	RH.38m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_38m	Ifan.38m	mA	time	NCAR hygrothermometer aspiration fan current
Wetness_41m	Wetness.41m	V	time	Decagon Leaf Wetness Sensor
u_43_9m	u.43.9m	m/s	time,sample	Wind U component from CSAT3
v_43_9m	v.43.9m	m/s	time,sample	Wind V component from CSAT3
w_43_9m	w.43.9m	m/s	time,sample	Wind W component from CSAT3
tc_43_9m	tc.43.9m	degC	time,sample	Virtual air temperature from speed of sound, CSAT3
diagbits_43_9m	diagbits.43.9m		time,sample	CSAT3 diagnostic sum, 1=low sig,2=high sig,4=no lock,8=path diff,16=skipped samp
h2o_43_9m	h2o.43.9m	g/m^3	time,sample	LICOR 7500 water vapor density
co2_43_9m	co2.43.9m	g/m^3	time,sample	LICOR 7500 CO2 density
lidiag_43_9m	lidiag.43.9m		time,sample	LICOR 7500 diagnostic value
p_43_9m	p.43.9m	mb	time,sample_15	Barometric Pressure, Paroscientific 6000
T_43_9m	T.43.9m	degC	time	Air Temperature from NCAR hygrothermometer
RH_43_9m	RH.43.9m	%	time	Relative Humidity from NCAR hygrothermometer
Ifan_43_9m	Ifan.43.9m	mA	time	NCAR hygrothermometer aspiration fan current

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PROJECT WEBSITES

SAS Project Page

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