5 Minute ISFS Data for SOAS

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 five minute dataset contains first moments and some second moments of variables measured by the NCAR ISFS 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 one day of data, from 00:00 to 24:00 UTC. The file names are of the form "isfs_YYYYMMDD.nc", where YYYYMMDD is the year, month and day in UTC.

NetCDF Variables

See the table at the bottom of this page for a partial listing of the variables in the file. The second moments are not listed in that table.

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. There are 288 5 minute periods per day, so the time dimension is 288.

The **time** variable contains the time to be associated with each sample, in units of seconds since **base_time**, or 00:00 UTC of the day. Each time value is the middle of the averaging period, and will have values of 150 (00:02:30 UTC), 450 (00:07:30), etc, up to 86250 (23:57:30 UTC).

Dimensions

The NetCDF dimensions in each file are:

Dimension name	size	description
time	288	number of 5 minute periods in a day
site	2	index for the
layout	2	index to indicate one of two station layouts.

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. For second moments, such as variances and co-variances, the first field of the **short_name** will contain single quote marks after a variable to indicate it is an average of a deviation. For example, a leading short name of **w'tc'**, indicates the quantity is an average of (**w**-mean(**w**)) * (**tc**-mean(**tc**)), where mean(x) is the 5 minute mean of the variable x, **w** is the vertical wind component, and **tc** is the temperaure from the speed of sound.

Higher Moments

For each of the 3-D sonic anemometers, the following second moments in **u**,**v**,**w** and **tc** are provided for the computation of eddy-correlation fluxes. Scalar values such as water vapor density and carbon dioxide were also measured at the same locations. **kh2o** is a water vapor measurement from a Campbell krypton hygrometer at 2 and 13.9 meters on the AABC tower. **h2o** and **co2** are water vapor and carbon-dioxide measurements from LICOR 7500 gas analyzers at 8, 20, 26, 32 and 43.9 meters, and from a Campbell Scientific EC150 IRGA at 38 meters.

Second Moments

	u	v	w	tc	kh2o	h2o	co2
u	u'u'	u'v'	u'w'	u'tc'	u'kh2o'	u'h2o'	u'co2'
v		v'v'	v'w'	v'tc'	v'kh2o'	v'h2o'	v'co2'
w			w'w'	w'tc'	w'kh2o'	w'h2o'	w'co2'
scalar variances				tc'tc'	kh2o'kh2o'	h2o'h2o'	co2'co2'

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'tc'.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 **w'co2'.38m** will have a NetCDF variable name of **w_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.

Counts Attributes

Variables from sensors used in eddy-covariance flux measurements will have a **counts** attribute indicating the number of samples that were included in each statistic.

Missing Data

The missing data value is 1x10^37. A missing value indicates either that nothing was measured at the location indicated in the variable name and station index, or 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

The following is a partial listing of the variables in the NetCDF files. It does not contain the second moments.

NetCDF name	ISFF short name	Units	Dimensions	Long Name
kh2oV_2m	kh2oV.2m	V	time	CSI Krypton hygrometer voltage
u_2m	u.2m	m/s	time	Wind U component from CSAT3
v_2m	v.2m	m/s	time	Wind V component from CSAT3
w_2m	w.2m	m/s	time	Wind W component from CSAT3
tc_2m	tc.2m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_2m	ldiag.2m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
kh2o_2m	kh2o.2m	g/m^3	time	CSI Krypton water vapor
T_2m	T.2m	degC	time	Air Temperature from NCAR hygrothermometer
RH_2m	RH.2m	%	time	Relative Humidity from NCAR hygrothermometer
Rpar_2m	Rpar.2m	w/m^2	time	Photosynthetically active radiation
u_8m	u.8m	m/s	time	Wind U component from CSAT3
v_8m	v.8m	m/s	time	Wind V component from CSAT3
w_8m	w.8m	m/s	time	Wind W component from CSAT3
tc_8m	tc.8m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_8m	ldiag.8m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
p_8m	p.8m	mb	time	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
Wetness_8m	Wetness.8m	V	time	Decagon Leaf Wetness Sensor
Tsfc_8m	Tsfc.8m	degC	time	Infra-red surface temperature
Rpar_8m	Rpar.8m	w/m^2	time	Photosynthetically active radiation
lidiag_8m	lidiag.8m		time	LICOR 7500 diagnostic value
h2o_8m	h2o.8m	g/m^3	time	LICOR 7500 water vapor density
co2_8m	co2.8m	g/m^3	time	LICOR 7500 CO2 density
kh2oV_13_9m	kh2oV.13.9m	V	time	CSI Krypton hygrometer voltage
u_13_9m	u.13.9m	m/s	time	Wind U component from CSAT3
v_13_9m	v.13.9m	m/s	time	Wind V component from CSAT3
w_13_9m	w.13.9m	m/s	time	Wind W component from CSAT3
tc_13_9m	tc.13.9m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_13_9m	ldiag.13.9m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
kh2o_13_9m	kh2o.13.9m	g/m^3	time	CSI Krypton water vapor
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
Wetness_13_9m	Wetness.13.9m	V	time	Decagon Leaf Wetness Sensor
Rpar_13_9m	Rpar.13.9m	w/m^2	time	Photosynthetically active radiation
Tsfc_13_9m	Tsfc.13.9m	degC	time	Infra-red surface temperature
u_20m	u.20m	m/s	time	Wind U component from CSAT3
v_20m	v.20m	m/s	time	Wind V component from CSAT3
w_20m	w.20m	m/s	time	Wind W component from CSAT3

tc_20m	tc.20m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_20m	ldiag.20m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
p_20m	p.20m	mb	time	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
Wetness_20m	Wetness.20m	V	time	Decagon Leaf Wetness Sensor
Tsfc_20m	Tsfc.20m	degC	time	Infra-red surface temperature
Rpar_20m	Rpar.20m	w/m^2	time	Photosynthetically active radiation
lidiag_20m	lidiag.20m		time	LICOR 7500 diagnostic value
h2o_20m	h2o.20m	g/m^3	time	LICOR 7500 water vapor density
co2_20m	co2.20m	g/m^3	time	LICOR 7500 CO2 density
u_26m	u.26m	m/s	time	Wind U component from CSAT3
v_26m	v.26m	m/s	time	Wind V component from CSAT3
w_26m	w.26m	m/s	time	Wind W component from CSAT3
tc_26m	tc.26m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_26m	ldiag.26m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
lidiag_26m	lidiag.26m		time	LICOR 7500 diagnostic value
h2o_26m	h2o.26m	g/m^3	time	LICOR 7500 water vapor density
co2_26m	co2.26m	g/m^3	time	LICOR 7500 CO2 density
T_26m	T.26m	degC	time	Air Temperature from NCAR hygrothermometer
RH_26m	RH.26m	%	time	Relative Humidity from NCAR hygrothermometer
Wetness_26m	Wetness.26m	V	time	Decagon Leaf Wetness Sensor
Tsfc_26m	Tsfc.26m	degC	time	Infra-red surface temperature
Rpar_26m	Rpar.26m	w/m^2	time	Photosynthetically active radiation
u_32m	u.32m	m/s	time	Wind U component from CSAT3
v_32m	v.32m	m/s	time	Wind V component from CSAT3
w_32m	w.32m	m/s	time	Wind W component from CSAT3
tc_32m	tc.32m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_32m	ldiag.32m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
lidiag_32m	lidiag.32m		time	LICOR 7500 diagnostic value
h2o_32m	h2o.32m	g/m^3	time	LICOR 7500 water vapor density
co2_32m	co2.32m	g/m^3	time	LICOR 7500 CO2 density
p_32m	p.32m	mb	time	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
Wetness_32m	Wetness.32m	V	time	Decagon Leaf Wetness Sensor
Tsfc_32m	Tsfc.32m	degC	time	Infra-red surface temperature
Rpar_32m	Rpar.32m	w/m^2	time	Photosynthetically active radiation
u_38m	u.38m	m/s	time	Wind U component from CSAT3
v_38m	v.38m	m/s	time	Wind V component from CSAT3
w_38m	w.38m	m/s	time	Wind W component from CSAT3
tc_38m	tc.38m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_38m	ldiag.38m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
h2o_38m	h2o.38m	g/m^3	time	Water vapor density from CSI IRGA
co2_38m	co2.38m	g/m^3	time	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
irgadiag_38m	irgadiag.38m		time	CSI IRGA diagnostic
Wetness_41m	Wetness.41m	V	time	Decagon Leaf Wetness Sensor
u_43_9m	u.43.9m	m/s	time	Wind U component from CSAT3
v_43_9m	v.43.9m	m/s	time	Wind V component from CSAT3
w_43_9m	w.43.9m	m/s	time	Wind W component from CSAT3
tc_43_9m	tc.43.9m	degC	time	Virtual air temperature from speed of sound, CSAT3
ldiag_43_9m	ldiag.43.9m		time	CSAT3 logical diagnostic, 0=OK, 1=(diagbits!=0)
lidiag_43_9m	lidiag.43.9m		time	LICOR 7500 diagnostic value
h2o_43_9m	h2o.43.9m	g/m^3	time	LICOR 7500 water vapor density
co2_43_9m	co2.43.9m	g/m^3	time	LICOR 7500 CO2 density
p_43_9m	p.43.9m	mb	time	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
Rsw_dfs_spn1	Rsw.dfs.spn1	W/m^2	time	Incoming Diffuse Short Wave, SPN1
Rsw_global_spn1	Rsw.global.spn1	W/m^2	time	Incoming Short Wave, SPN1
Rsw_in	Rsw.in	W/m^2	time	Incoming Short Wave
Rsw_in_41m	Rsw.in.41m	W/m^2	time	CNR4 incoming short wave

Rsw_out	Rsw.out	W/m^2	time	Outgoing Short Wave
Rsw_out_41m	Rsw.out.41m	W/m^2	time	CNR4 outgoing short wave
Wetness_13_9m	Wetness.13.9m	V	time	Decagon Leaf Wetness Sensor
Wetness_20m	Wetness.20m	V	time	Decagon Leaf Wetness Sensor
Wetness_26m	Wetness.26m	V	time	Decagon Leaf Wetness Sensor
Wetness_32m	Wetness.32m	V	time	Decagon Leaf Wetness Sensor
Wetness_41m	Wetness.41m	V	time	Decagon Leaf Wetness Sensor
Wetness_8m	Wetness.8m	V	time	Decagon Leaf Wetness Sensor
Wetness_rad	Wetness.rad	V	time	Decagon Leaf Wetness Sensor
Gsoil_5cm_a	Gsoil.5cm.a	W/m^2	time	Soil Heat Flux
Gsoil_5cm_b	Gsoil.5cm.b	W/m^2	time	Soil Heat Flux
Lambdasoil_a	Lambdasoil.a	W/m/DegK	time	TP01 derived thermal conductivity
Lambdasoil_b	Lambdasoil.b	W/m/DegK	time	TP01 derived thermal conductivity
Qsoil_a	Qsoil.a	vol%	time	Soil Moisture
Qsoil_b	Qsoil.b	vol%	time	Soil Moisture
Tsoil_0_6cm_a	Tsoil.0.6cm.a	degC	time	Soil Temperature
Tsoil_0_6cm_a2	Tsoil.0.6cm.a2	degC	time	Soil Temperature
Tsoil_0_6cm_b	Tsoil.0.6cm.b	degC	time	Soil Temperature
Tsoil_1_9cm_a	Tsoil.1.9cm.a	degC	time	Soil Temperature
Tsoil_1_9cm_a2	Tsoil.1.9cm.a2	degC	time	Soil Temperature
Tsoil_1_9cm_b	Tsoil.1.9cm.b	degC	time	Soil Temperature
Tsoil_3_1cm_a	Tsoil.3.1cm.a	degC	time	Soil Temperature
Tsoil_3_1cm_a2	Tsoil.3.1cm.a2	degC	time	Soil Temperature
Tsoil_3_1cm_b	Tsoil.3.1cm.b	degC	time	Soil Temperature
Tsoil_4_4cm_a	Tsoil.4.4cm.a	degC	time	Soil Temperature
Tsoil_4_4cm_a2	Tsoil.4.4cm.a2	degC	time	Soil Temperature
Tsoil_4_4cm_b	Tsoil.4.4cm.b	degC	time	Soil Temperature
GPSnsat_pond	GPSnsat.pond	count	time	Number of GPS satellites tracked
GPSstat_pond	GPSstat.pond	none	time	GPS rcvr status: 1=OK(A), 0=warning(V)
Hailr_wxt_pond	Hailr.wxt.pond	s-1 cm-2	time	WXT hail rate
Ifan_3m_pond	Ifan.3m.pond	mA	time	NCAR hygrothermometer aspiration fan current
P_3m_pond	P.3m.pond	mb	time	WXT pressure
Rainr_ott_pond	Rainr.ott.pond	mm/hr	time	OTT optical distrometer
Rainr_tb_pond	Rainr.tb.pond	mm/hr	time	Tipping bucket
Rainr_wxt_pond	Rainr.wxt.pond	mm/hr	time	WXT rain rate
RH_3m_pond	RH.3m.pond	%	time	Relative Humidity from NCAR hygrothermometer
RH_wxt_3m_pond	RH.wxt.3m.pond	%	time	WXT relative humidity
Rsw_dfs_spn1_pond	Rsw.dfs.spn1.pond	W/m^2	time	Incoming Diffuse Short Wave, SPN1
Rsw_global_spn1_pond	Rsw.global.spn1.pond	W/m^2	time	Incoming Short Wave, SPN1
Rsw_in_pond	Rsw.in.pond	W/m^2	time	Incoming Short Wave
Spd_3m_pond	Spd.3m.pond	m/s	time	WXT 510 wind speed
T_3m_pond	T.3m.pond	degC	time	Air Temperature from NCAR hygrothermometer
T_wxt_3m_pond	T.wxt.3m.pond	degC	time	WXT ambient temp
U_3m_pond	U.3m.pond	m/s	time	WXT 510 wind U component
V_3m_pond	V.3m.pond	m/s	time	WXT 510 wind V component
Vdsm_pond	Vdsm.pond	V	time	Mote voltage
Vsupply_wxt_pond	Vsupply.wxt.pond	V	time	WXT 510 supply voltage
Wetness_pond	Wetness.pond	V	time	Decagon Leaf Wetness Sensor

‹ 30 Minute ISFS Data for SOAS up ISFS Planning and Logistics ›

PROJECT WEBSITES

SAS Project Page

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