

SSMIS FCDR File

File Format Specification

Release V1

May 15, 2013

1 Introduction

SSMIS FCDR files are in netCDF version 4.0 format. The filename has the form:

CSU_SSMIS_FCDR_VVRRR_FNN_DYYYYMMDD_SHHMM_EHHMM_RGGGGG.nc

where:

VVV	-	Algorithm version (e.g. V01)
RRR	-	Revision (e.g. R00)
FNN	-	Satellite Designation (e.g. F16)
DYYYYMMDD	-	Date as year month day
SHHMM	-	Start time as hour minute
EHHMM	-	End time as hour minute
RGGGGG	-	Granule number

An example filename is:

CSU_SSMIS_FCDR_V01R00_F16_D20051101_S0017_E0159_R10515.nc

2 Summary of Data Fields

Dimension definitions:

Name	Size	Description
npixel_img	180	Number of pixels per scan for imager channels
npixel_env	90	Number of pixels per scan for environmental channels
npixel_las	60	Number of pixels per scan for lower air sounder channels
npixel_uas	30	Number of pixels per scan for upper air sounder channels
nscan	varies	Number of scans
ntest	8	Number of quality control tests
nsensor	6	Number of feedhorns (env1, env2, img1, img2, las, uas)
numchar	23	Length of formatted datetime string

Variable definitions:

Name	Type	Dimensions
orbit	double	nscan
spacecraft_lat	float	nscan
spacecraft_lon	float	nscan
spacecraft_alt	float	nscan
scan_time	double	nscan
scan_datetime	char	(nscan, numchar)
lat_env1	float	(nscan, npixel_env)
lon_env1	float	(nscan, npixel_env)
eia_env1	float	(nscan, npixel_env)
sun_glint_env1	byte	(nscan, npixel_env)
quality_env1	byte	(nscan, npixel_env)

fcd_r_tb19v_env1	float	(nscan, npixel_env)
fcd_r_tb19h_env1	float	(nscan, npixel_env)
fcd_r_tb22v_env1	float	(nscan, npixel_env)
lat_env2	float	(nscan, npixel_env)
lon_env2	float	(nscan, npixel_env)
eia_env2	float	(nscan, npixel_env)
sun_glint_env2	byte	(nscan, npixel_env)
quality_env2	byte	(nscan, npixel_env)
fcd_r_tb37v_env2	float	(nscan, npixel_env)
fcd_r_tb37h_env2	float	(nscan, npixel_env)
lat_img1	float	(nscan, npixel_img)
lon_img1	float	(nscan, npixel_img)
eia_img1	float	(nscan, npixel_img)
sun_glint_img1	byte	(nscan, npixel_img)
quality_img1	byte	(nscan, npixel_img)
tb150h_img1	float	(nscan, npixel_img)
tb183_1h_img1	float	(nscan, npixel_img)
tb183_3h_img1	float	(nscan, npixel_img)
tb183_7h_img1	float	(nscan, npixel_img)
lat_img2	float	(nscan, npixel_img)
lon_img2	float	(nscan, npixel_img)
eia_img2	float	(nscan, npixel_img)
sun_glint_img2	byte	(nscan, npixel_img)
quality_img2	byte	(nscan, npixel_img)
fcd_r_tb91v_img2	float	(nscan, npixel_img)
fcd_r_tb91h_img2	float	(nscan, npixel_img)
lat_las	float	(nscan, npixel_las)
lon_las	float	(nscan, npixel_las)
eia_las	float	(nscan, npixel_las)
sun_glint_las	byte	(nscan, npixel_las)
quality_las	byte	(nscan, npixel_las)
tb50h_ch1_las	float	(nscan, npixel_las)
tb52h_ch1_las	float	(nscan, npixel_las)
tb53h_ch3_las	float	(nscan, npixel_las)
tb54h_ch4_las	float	(nscan, npixel_las)
tb55h_ch5_las	float	(nscan, npixel_las)
tb57rc_ch6_las	float	(nscan, npixel_las)
tb59rc_ch7_las	float	(nscan, npixel_las)
tb60rc_ch24_las	float	(nscan, npixel_las)
lat_uas	float	(nscan, npixel_uas)
lon_uas	float	(nscan, npixel_uas)
eia_uas	float	(nscan, npixel_uas)
sun_glint_uas	byte	(nscan, npixel_uas)
quality_uas	byte	(nscan, npixel_uas)
tb63rc_ch19_uas	float	(nscan, npixel_uas)
tb60rc_ch20_uas	float	(nscan, npixel_uas)
tb60rc_ch21_uas	float	(nscan, npixel_uas)
tb60rc_ch22_uas	float	(nscan, npixel_uas)

tb60rc_ch23_uas	float	(nscan, npixel_uas)
quality_tests	int	nscan
nominal_elevation_angle	float	1
spacecraft_roll	float	1
spacecraft_pitch	float	1
spacecraft_yaw	float	1
delta_elevation_angle	float	nsensor
sensor_roll	float	nsensor
sensor_pitch	float	nsensor
sensor_yaw	Float	nsensor
crs	char	1

3 Description of Data Fields

- orbit** : Fractional orbit number
Missing data value is: -9999.9

- spacecraft_lat** : Spacecraft latitude at scan_time, in degrees
Missing data value is: -9999.9f

- spacecraft_lon** : Spacecraft longitude at scan_time, in degrees
Missing data value is: -9999.9f

- spacecraft_alt** : Spacecraft altitude at scan_time, in km
Missing data value is: -9999.9f

- scan_time** : Scan start time (UTC) in seconds since 1987
Missing data value is: -9999.9

- scan_datetime** : Scan start time (UTC) in ISO8601 date/time (YYYY-MM-DDTHH-MM-SS.SSZ) format
Missing data value is: 0

- lat_env1** : Latitude for environmental scene channels (19v, 19h, 22v), in degrees
Missing data value is: -9999.9f

- lon_env1** : Longitude for environmental scene channels (19v, 19h, 22v), in degrees
Missing data value is: -9999.9f

- eia_env1** : Earth Incidence Angle for environmental scene channels (19v, 19h, 22v), in degrees
Missing data value is: -9999.9f

- sun_glint_env1** : Sun Glint Angle for environmental scene channels (19v, 19h, 22v), in degrees

Missing data value is: -99b

- quality_env1** : Quality Flag for environmental scene channels (19v, 19h, 22v)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major issues (channel data set to missing). All quality flag values are listed in the Appendix.

- fcd_r_tb19v_env1** : NOAA FCDR of 19.35 GHz vertically-polarized brightness temperature (channel 13), in kelvin
Missing data value is: -9999.9f

- fcd_r_tb19h_env1** : NOAA FCDR of 19.35 GHz horizontally-polarized brightness temperature (channel 12), in kelvin
Missing data value is: -9999.9f

- fcd_r_tb22v_env1** : NOAA FCDR of 22.235 GHz vertically-polarized brightness temperature (channel 14), in kelvin
Missing data value is: -9999.9f

- lat_env2** : Latitude for environmental scene channels (37v, 37h), in degrees
Missing data value is: -9999.9f

- lon_env2** : Longitude for environmental scene channels (37v, 37h), in degrees
Missing data value is: -9999.9f

- eia_env2** : Earth Incidence Angle for environmental scene channels (37v, 37h), in degrees
Missing data value is: -9999.9f

- sun_glint_env2** : Sun Glint Angle for environmental scene channels (37v, 37h), in degrees
Missing data value is: -99b

- quality_env2** : Quality Flag for environmental scene channels (37v, 37h)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major issues (channel data set to missing). All quality flag values are listed in the Appendix.

- fcd_r_tb37v_env2** : NOAA FCDR of 37.0 GHz vertically-polarized brightness temperature (channel 16), in kelvin
Missing data value is: -9999.9f

- fcd_r_tb37h_env2** : NOAA FCDR of 37.0 GHz horizontally-polarized brightness temperature (channel 15), in kelvin
Missing data value is: -9999.9f

- lat_img1** : Latitude for imager scene channels (150 and 183 +/- 1,3,7), in degrees
Missing data value is: -9999.9f

- lon_img1** : Longitude for imager scene channels (150 and 183 +/- 1,3,7), in degrees
Missing data value is: -9999.9f
- eia_img1** : Earth Incidence Angle for imager scene channels (150 and 183 +/- 1,3,7),
in degrees
Missing data value is: -9999.9f
- sun_glint_img1** : Sun Glint Angle for imager scene channels (150 and 183 +/- 1,3,7), in
degrees
Missing data value is: -99b
- quality_img1** : Quality Flag for imager scene channels (150 and 183 +/- 1,3,7)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major
issues (channel data set to missing). All quality flag values are listed in
the Appendix.
- tb150h_img1** : 150.0 GHz horizontally-polarized brightness temperature (channel 8), in
kelvin
Missing data value is: -9999.9f
- tb183_1h_img1** : 183.31 +/- 1.0 GHz horizontally-polarized brightness temperature
(channel 11), in kelvin
Missing data value is: -9999.9f
- tb183_3h_img1** : 183.31 +/- 3.0 GHz horizontally-polarized brightness temperature
(channel 10), in kelvin
Missing data value is: -9999.9f
- tb183_7h_img1** : 183.31 +/- 6.6 GHz horizontally-polarized brightness temperature
(channel 9), in kelvin
Missing data value is: -9999.9f
- lat_img2** : Latitude for imager scene channels (91v, 91h), in degrees
Missing data value is: -9999.9f
- lon_img2** : Longitude for imager scene channels (91v, 91h), in degrees
Missing data value is: -9999.9f
- eia_img2** : Earth Incidence Angle for imager scene channels (91v, 91h), in degrees
Missing data value is: -9999.9f
- sun_glint_img2** : Sun Glint Angle for imager scene channels (91v, 91h), in degrees
Missing data value is: -99b
- quality_img2** : Quality Flag for imager scene channels (91v, 91h)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major
issues (channel data set to missing). All quality flag values are listed in
the Appendix.

- fcd_r_tb91v_img2** : NOAA FCDR of 91.655 GHz vertically-polarized brightness temperature (channel 17), in kelvin
Missing data value is: -9999.9f
- fcd_r_tb91h_img2** : NOAA FCDR of 91.655 GHz horizontally-polarized brightness temperature (channel 18), in kelvin
Missing data value is: -9999.9f
- lat_las** : Latitude for lower air sounding scene channels (channels 1-7, 24), in degrees
Missing data value is: -9999.9f
- lon_las** : Longitude for lower air sounding scene channels (channels 1-7, 24), in degrees
Missing data value is: -9999.9f
- eia_las** : Earth Incidence Angle for lower air sounding scene channels (channels 1-7, 24), in degrees
Missing data value is: -9999.9f
- sun_glint_las** : Sun Glint Angle for lower air sounding scene channels (channels 1-7, 24), in degrees
Missing data value is: -99b
- quality_las** : Quality Flag for lower air sounding scene channels (channels 1-7, 24)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major issues (channel data set to missing). All quality flag values are listed in the Appendix.
- tb50h_ch1_las** : 50.3 GHz horizontally-polarized brightness temperature (channel 1), in kelvin
Missing data value is: -9999.9f
- tb52h_ch1_las** : 52.8 GHz horizontally-polarized brightness temperature (channel 2), in kelvin
Missing data value is: -9999.9f
- tb53h_ch3_las** : 53.596 GHz horizontally-polarized brightness temperature (channel 3), in kelvin
Missing data value is: -9999.9f
- tb54h_ch4_las** : 54.40 GHz horizontally-polarized brightness temperature (channel 4), in kelvin
Missing data value is: -9999.9f
- tb55h_ch5_las** : 55.50 GHz horizontally-polarized brightness temperature (channel 5), in kelvin

Missing data value is: -9999.9f

tb57rc_ch6_las : 57.29 GHz horizontally-polarized brightness temperature (channel 6), in kelvin
Missing data value is: -9999.9f

tb59rc_ch7_las : 59.4 GHz horizontally-polarized brightness temperature (channel 7), in kelvin
Missing data value is: -9999.9f

tb60rc_ch24_las : 60.792668 GHz right-hand circularly-polarized brightness temperature (channel 24), in kelvin
Missing data value is: -9999.9f

lat_uas : Latitude for upper air sounding scene channels (channels 19-23), in degrees
Missing data value is: -9999.9f

lon_uas : Longitude for upper air sounding scene channels (channels 19-23), in degrees
Missing data value is: -9999.9f

eia_uas : Earth Incidence Angle for upper air sounding scene channels (channels 19-23), in degrees
Missing data value is: -9999.9f

sun_glint_uas : Sun Glint Angle for upper air sounding scene channels (channels 19-23), in degrees
Missing data value is: -99b

quality_uas : Quality Flag for upper air sounding scene channels (channels 19-23)
0=Good data, 1-99=Minor issues (use with caution), 100-255: Major issues (channel data set to missing). All quality flag values are listed in the Appendix.

tb63rc_ch19_uas : 63.283248 GHz right-hand circularly-polarized brightness temperature (channel 19), in kelvin
Missing data value is: -9999.9f

tb60rc_ch20_uas : 60.792668 GHz right-hand circularly-polarized brightness temperature (channel 20), in kelvin
Missing data value is: -9999.9f

tb60rc_ch21_uas : 60.792668 GHz right-hand circularly-polarized brightness temperature (channel 21), in kelvin
Missing data value is: -9999.9f

tb60rc_ch22_uas : 60.792668 GHz right-hand circularly-polarized brightness temperature

(channel 22), in kelvin
Missing data value is: -9999.9f

tb60rc_ch23_uas : 60.792668 GHz right-hand circularly-polarized brightness temperature (channel 23), in kelvin
Missing data value is: -9999.9f

quality_tests : Results from quality control tests
Descriptions of each of the 7 tests are listed in the Appendix.

nominal_elevation_angle : Nominal sensor elevation angle, in degrees

spacecraft_roll : Spacecraft roll angle offset from nominal, in degrees

spacecraft_pitch : Spacecraft pitch angle offset from nominal, in degrees

spacecraft_yaw : Spacecraft yaw angle offset from nominal, in degrees

delta_elevation_angle : Offset in the sensor elevation angle from nominal for each of the six feedhorns (env1, env2, img1, img2, las, uas), in degrees

sensor_roll : Sensor offset from spacecraft roll angle for each of the six feedhorns (env1, env2, img1, img2, las, uas), in degrees

sensor_pitch : Sensor offset from spacecraft pitch angle for each of the six feedhorns (env1, env2, img1, img2, las, uas), in degrees

sensor_yaw : Sensor offset from spacecraft yaw angle for each of the six feedhorns (env1, env2, img1, img2, las, uas), in degrees

crs : Coordinate reference system

4 Appendix

Definition of Quality Flag Values for the 6 SSMIS Quality Flags: quality_env1, quality_env2, quality_img1, quality_img2, quality_las, and quality_uas

Category	Value	Description
Good Data	0	
Warning Flags (use data with caution)	1	Possible sun glint
	2	Climatology check warning (19V Channel)
	3	Climatology check warning (19H Channel)
	4	Climatology check warning (22V Channel)
	5	Climatology check warning (37V Channel)
	6	Climatology check warning (37H Channel)
	7	Climatology check warning (91V Channel)
	8	Climatology check warning (91V Channel)
	9	Climatology check warning (150H Channel)
	10	Climatology check warning (183+/-1 Channel)
	11	Climatology check warning (183+/-3 Channel)
	12	Climatology check warning (183+/-7 Channel)
	13	Climatology check warning (Multiple enviro sensor channels)
	14	Climatology check warning (Multiple imager sensor channels)
	15	Climatology check warning (Multiple LAS channels)
	16	Climatology check warning (Multiple UAS channels)
	17	Correction for lunar intrusion into warm load
	18	Correction for solar intrusion into warm load
Catastrophic Errors (data is set to missing)	101	Geolocation check flagged in input BASE file
	102	Climatology check flagged in input BASE file
	103	Antenna temperatures are < 50 or > 350
	110	Climatology check failure (19V Channel)
	111	Climatology check failure (19H Channel)
	112	Climatology check failure (22V Channel)
	113	Climatology check failure (37V Channel)
	114	Climatology check failure (37H Channel)
	115	Climatology check failure (91V Channel)
	116	Climatology check failure (91V Channel)
	117	Climatology check failure (150H Channel)
	118	Climatology check failure (183+/-1 Channel)
	119	Climatology check failure (183+/-3 Channel)
	120	Climatology check failure (183+/-7 Channel)
	121	Climatology check failure (Multiple enviro sensor channels)
	122	Climatology check failure (Multiple imager sensor channels)
	123	Climatology check failure (Multiple LAS channels)
	124	Climatology check failure (Multiple UAS channels)
	125	Failure of 150H channel on DMSP F18

Descriptions of the quality control tests whose results are reported in quality_tests

Test	Description
Test 1	Number of nonphysical or bad pixel values
Test 2	Number of pixels with geolocation error
Test 3	Number of scans with geolocation error in input BASE file
Test 4	Number of scans with climatology error in input BASE file
Test 5	Number of scans exceeding specified variance from climatological values for enviro sensor
Test 6	Number of scans exceeding specified variance from climatological values for imager sensor
Test 7	Number of scans exceeding specified variance from climatological values for LAS sensor
Test 8	Number of scans exceeding specified variance from climatological values for UAS sensor