Data format of ISS-IMAP's EUVI_t_point file

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EUVI_t_point is the tangential point data file for Extreme Ultra Violet Imager (EUVI) instrument of the ISS-Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere mapping (ISS-IMAP) mission. It contains the information of the coordinates of the tangential point of EUVI's line-of-sight (LOS). The tangential point is the location that has the lowest altitude along the line from EUVI in the direction of LOS. Location of the International Space Station (ISS) is also included in the file.

1　File name

One EUVI_t_point file contains the location data for one observation of EUVI. Nomenclature of EUVI_t_point file is as follows:

IMP_EU_$YYYY$–MM–DD–$hhmmss$_T_t_point.nc

$YYYY$: Year of the observation start time in UT
MM: Month of the observation start time in UT
DD: Day of the observation start time in UT
$hhmmss$: Hour, Minute and Second of the observation start time in UT
T: Telescope of EUVI

For example, name of EUVI_t_point file for the observation of Telescope A, 30.4nm, which started at 01:05:25UT on December 20 in 2012 is:

IMP_EU_2012–12–20–010525_A_t_point.nc

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2 Data file format

EUVI_t_point is in the format of netCDF (Network Common Data Format) version 4/HDF (Hierarchical Data Format) version 5.

3 Data

3.1 Attributes

Several attributes are defined in EUVI_t_point file. "MISSION" is the identifier of the mission. It is set as "ISS-IMAP" for all of the ISS-IMAP data. "DATA" is the identifier of the data type. It is set as "EUVI Location (loc)" for all of the EUVI_t_point files. "Version" is the version number of the EUVI_t_point data. "CONTACT" is the e-mail address of the contact persons on the EUVI_t_point files. "TELESCOPE" is identifier of the telescope. "A [He+: 30.4nm]" or "B [O+: 83.4nm]" is specified. "DATE" is the date of the observation start time in UT in the format of "YYYY–MM–DD". "START_TIME_SEC" is the second of the day of the observation start time in UT. "EXPOSURE_TIME_SEC" is the exposure time in second.

Table 1. Example values of attributes in EUVI_t_point

Attribute	Example value
MISSION	"ISS-IMAP"
DATA	"EUVI Mapping Location (Loc)"
Version	1.0
CONTACT	"yoshikawa@k.u-tokyo.ac.jp saitoua@kugi.kyoto-u.ac.jp"
TELESCOPE	"A [He+: 30.4nm]"
DATE	"2012-12-19"
START_TIME_SEC	86250
EXPOSURE_TIME_SEC	60

3.2 Dimensions

Several dimensions are defined in EUVI_t_point file. "DIM_XYZ" is 3 for the Cartesian coordinates. "NUM_X_PIX" is the number of pixels of the EUVI image along the x-axis. This is 128 for all the EUVI observations. "NUM_Y_PIX" is the number of pixels of the EUVI image along the y-axis. This is 128 for all the EUVI observations. The observed data is two-dimensional image whose size is "NUM_X_PIX" pixel × "NUM_Y_PIX" pixel.

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Table 2. Values of dimensions in EUVI_t_point

Dimension	Example value
DIM_XYZ	3
NUM_X_PIX	128
NUM_Y_PIX	128

3.3   Data arrays

EUVI_t_point file contains several data arrays. "ISS_LATI", "ISS_LONGI" and "ISS_ALTI" are the geographic coordinates of the ISS location in WGS-84. The units are, degree, degree and kilometer, respectively. "ISS_LATI" in the northern hemisphere has positive value, and in the southern hemisphere has negative value. "ISS_LONGI" in the eastern hemisphere has positive value, and in the western hemisphere has negative value. "ISS_XYZ" is the geographic coordinates of the ISS location in kilometer. "T_LATI" "T_LONGI" and "T_ALTI" is the location of the tangential point in WGS-84. The units are, degree, degree and kilometer, respectively. The tangential point is the location that has the lowest altitude along the line from EUVI in the direction of LOS. Location of the International Space Station (ISS) is also included in the file.

Table 3. Data arrays in EUVI_t_point

Name	Type	Dimension	Unit
ISS_LATI	float	(1)	Degree
ISS_LONGI	float	(1)	Degree
ISS_ALTI	float	(1)	km
ISS_XYZ	float	(3)	km
T_LATI	float	(NUM_X_PIX, NUM_Y_PIX)	Degree
T_LONGI	float	(NUM_X_PIX, NUM_Y_PIX)	Degree
T_ALTI	float	(NUM_X_PIX, NUM_Y_PIX)	km

4   Reference

Yoshikawa, I., T. Homma, K. Sakai, G. Murakami, K. Yoshioka, A. Yamazaki, T. Sakanoi and A. Saito, Imaging Observation of the Earth's Plasmasphere and Ionosphere by EUVI of ISS-IMAP on the International Space Station, IEEJ Trans. on Fundamentals and Materials, vol. 131, 12, 1006-1010, doi: 10.1541/ieejfms.131.1006, 2011.