

JEM/SMILES L2 Products Guide for 005-06-0150

STRUCTURE OF STANDARD SMILES L2 PRODUCTS

Draft 1.3

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JEM/SMILES L2 Products Guide

1. STANDARD LEVEL 2 PRODUCTS OVERVIEW

(1) **FILE NAME**

The file name is defined as follows.

SMILES_L2_{*product_name*}_{*band_name*}_{*version_name*}_{*date*}.he5

(2) **A COMBINATION OF PRODUCT_NAME AND BAND_NAME**

The combination of a *product_name* and *band_name* are as follows.

No.	Product name	Band name
1	O3	A
	HCl	
	CH3CN	
2	HCl	B
	HNO3	
	BrO	
3	Temperature	C
	O3	
	O3-sym-17	
2	O3	B
	HCl	
	CH3CN	
3	HNO3	C
	ClO	
	BrO	
2	Temperature	B
	O3	
	O3-asym-18	
3	O3	C
	HNO3	
	BrO	
2	Temperature	B
	O3	
	O3-asym-18	
3	HNO3	C
	ClO	
	BrO	
2	Temperature	B
	O3	
	O3-asym-18	

(3) **VERSION_NAME**

version_name is represented as follows.

xxx-yy-zzzz :

xxx : Level 1 B version

yy : Climatological DB version

zzzz : Level 2 Algorithm version

(4) **DATE**

date is represented as follows.

yyyymmdd : (ex. 20091009)

yyyy : Observation year

mm : Observation month

dd : Observation day



2. PRODUCT FORMAT

1) STRUCTURE OF HDF5-EOS DATA FILES

We show below the format structure of the HDF5^{*}-EOS data file.

No.	Filed	Attributes
1	<i>FileAttribute</i>	File Level Attributes: <ul style="list-style-type: none">• Instrument Name• Processing Level• Version• Observation day• Band name• Scan number• L1B file name
2	<i>GeolocationField</i>	Geolocation Field Attributes: <ul style="list-style-type: none">• Observation point• Time• Altitude• Solar Zenith Angle• Azimuth View• Ascending/Descending flag
3	<i>Data Field</i>	Data Field Attributes: <ul style="list-style-type: none">• Data value• Estimate error• Status

*: [HTTP://WWW.HDFGROUP.ORG/](http://www.hdfgroup.org/)



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2) STRUCTURE OF STANDARD SMILES L2 PRODUCTS

● Standard processing data (HDF5-EOS)

Structure of standard processing data is as follows.

<File Attributes>

No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Byte
1	<i>LIBID</i>	L1B file name	(nTimes)	char	20*nTimes
2	<i>InstrumentName</i>	Instrument Name (SMILES)	-	char	6
3	<i>ProcessLevel</i>	Processing level (L2)	-	char	2
4	<i>StartUTC</i>	Start time in this file (yyyy-mm-ddT00:00:00.000)	-	char	23
5	<i>EndUTC</i>	End time in this file (yyyy-mm-ddT23:59:59.000)	-	char	23
6	<i>GranuleMonth</i>	Month (mm)	-	int	4
7	<i>GranuleDay</i>	Day (dd)	-	int	4
8	<i>GranuleDayofYear</i>	Granule Day of Year	-	int	4
9	<i>GranuleYear</i>	Year (yyyy)	-	int	4
10	<i>PGEVersion</i>	Processing version (XXX-XX-XXXX)	-	char	11
11	<i>StartScan</i>	Scan count of first day in this file	-	char	6
12	<i>EndScan</i>	Scan count of end day in this file	-	char	6
13	<i>BandName</i>	Band name	-	char	4
			Total	107+20*nTimes	

<Swath Attributes>

No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Unit	Byte
1	<i>Altitude</i>	Calculation Altitude	(nLevels)	float	km	4*nLevels
2	<i>VerticalCoordinate</i>	vertical coordinate system name	-	char		8
			Total	8+4*nLevels		



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<Geolocation/Data fields Attributes>: Next information is added to each field item.

No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Byte
1	<i>MissingValue</i>	Missing value	-	float	4
2	<i>Title</i>	Filed name	-	char	30
3	<i>Units</i>	Unit	-	char	12
4	<i>UniqueFieldDefinition</i>	Filed Definition	-	char	20
			Total		66

<Geolocation Fields>

No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Unit	Byte
1	<i>Time</i>	Observation time (Total second since 1/1/1958)	(nTimes)	double	* 1	8*nTimes
2	<i>TimeUTC</i>	Observation time (UTC) yyyy-mm-dd hh:mm:ss.sss	(nTimes)	char	-	23*nTimes
3	<i>Altitude</i>	Representative altitude	(nLevel)	float	km	4*nLevel
4	<i>Latitude</i>	Observation Latitude	(nTimes)	float	degrees	4*nTimes
5	<i>Longitude</i>	Observation Longitude	(nTimes)	float	degrees	4*nTimes
6	<i>SolarZenithAngle</i>	Solar Zenith Angle	(nTimes)	float	degrees	4*nTimes
7	<i>LocalTime</i>	Local time (hh:mm:ss)	(nTimes)	char	-	8*nTimes
8	<i>LineOfSightAngle</i>	Azimuth View	(nTimes)	float	degrees	4*nTimes
9	<i>AscendingDescending</i>	Ascending/Descending flag	(nTimes)	int	-	4*nTimes
10	<i>Reserved</i>	Reserved field	(nTimes)	int	-	4*nTimes
			Total	63*nTimes+4*nLevel		

*1: seconds since 1958-1-1



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<Data Fields>

No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Unit	Byte
1	<i>L2Value</i>	Value	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
2	<i>L2Precision</i>	calculation error	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
3	<i>MeasurementError</i>	Measurement error	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
4	<i>SmoothingError</i>	Smoothing Error	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
5	<i>Apriori</i>	A priori value	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
6	<i>AprioriError</i>	A priori error	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
7	<i>CorrLength</i>	Correlative length of A priori	(nTimes)	float	km	4*nTimes *nLevel
8	<i>AveragingKernel</i>	Averaging Kernel	(nLevel,nLeveln Times)	float	-	4*nTimes *nLevel^2
9	<i>VerticalResolution</i>	Vertical Resolution	(nLevel,nTimes)	float	km	4*nTimes *nLevel
10	<i>InformationValue</i>	Information Value	(nLevel,nTimes)	float	-	4*nTimes *nLevel
11	<i>Pressure</i>	Retrieved pressure	(nLevel,nTimes)	float	hPa	4*nTimes *nLevel
12	<i>Temperature</i>	Retrieved temperature	(nLevel,nTimes)	float	K	4*nTimes *nLevel
12	<i>WaterVapor</i>	Using Water Vapor of retrieval	(nLevel,nTimes)	float	vmr	4*nTimes *nLevel
13	<i>Baseline0</i>	Coefficient of Continuum	(nLevel,nTimes)	float	km ⁻¹	4*nTimes *nLevel
14	<i>Baseline0Precision</i>	Baseline error of coefficient	(nLevel,nTimes)	float	km ⁻¹	4*nTimes *nLevel
15	<i>Baseline1</i>	primary coefficient of Continuum	(nLevel,nTimes)	float	Hz ⁻¹ .km ⁻¹	4*nTimes *nLevel
16	<i>Baseline1Precision</i>	Baseline error of primary coefficient.	(nLevel,nTimes)	float	Hz ⁻¹ .km ⁻¹	4*nTimes *nLevel
17	<i>Baseline2</i>	2nd coefficient of Continuum	(nLevel,nTimes)	float	Hz ⁻² .km ⁻¹	4*nTimes *nLevel
18	<i>Baseline2Precision</i>	Baseline error of 2nd coefficient	(nLevel,nTimes)	float	Hz ⁻² .km ⁻¹	4*nTimes *nLevel
19	<i>Baseline3</i>	3rd coefficient of Continuum	(nLevel,nTimes)	float	Hz ⁻³ .km ⁻¹	4*nTimes *nLevel
20	<i>Baseline3Precision</i>	Baseline error of 3rd coefficient	(nLevel,nTimes)	float	Hz ⁻³ .km ⁻¹	4*nTimes *nLevel
21	<i>RadianceResidualMax</i>	Max. Radiance Residual	(nTimes)	float	K	4*nTimes
22	<i>RadianceResidualMean</i>	Mean Radiance Residual	(nTimes)	float	K	4*nTimes
23	<i>RadianceResidualRMS</i>	RMS Radiance Residual	(nTimes)	float	K	4*nTimes
24	<i>RetrievedAltitudeOffset</i>	Altitude Offset	(nTimes)	float	km	4*nTimes
25	<i>RetrievedAltitudeOffsetError</i>	Altitude Offset error	(nTimes)	float	km	4*nTimes
26	<i>NumIterPerform</i>	Convergence loop number and result	(nTimes)	int	-	4*nTimes
27	<i>MaxNumIteration</i>	Max. convergence number	(nTimes)	int	-	4*nTimes
28	<i>Status</i>	Status information	(nTimes)	int	-	4*nTimes
29	<i>AOSUnitNum</i>	Number of observed AOS Unit	(nTimes)	int	-	4*nTimes



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No.	HDF-EOS5 Name	Explanation	Dimension	Data type	Unit	Byte
30	Convergence	Convergence status	(nTimes)	float	-	4*nTimes
31	FOVInterference	Interference flag *2	(nTimes)	int	-	4*nTimes
		Total	$4*nTimes*nLevel^2 + 72*nTimes*nLevel + 52*nTimes$			

*2 FOVInterference field:

value	Explanation
-1	No interference information
0	No FOV interference
>0	Do not use this profile (see the `information`).
1	Information: FOV interference by Sun
2	Information: FOV interference by Moon
4	Information: FOV interference by ISS Solar paddle

<StructMetadata>

No.	HDF-EOS5 Name	Explanation	Dimension	Byte
1	StructMetadata.0	Matrix information of swath data	1	32000

< coremetadata >

No.	HDF-EOS5 Name	Explanation	Dimension	Byte
1	coremetadata.0	HDF-EOS information	1	6974



3.4 EXAMPLE OF USING PRODUCTS

3.4.1 DATA ACCESS METHOD

Please start web browser, and access following URL.

`http://smiles.isas.jaxa.jp/access/`



Figure 3.4-1 Data access screen



3.4.2 EXAMPLE OF ACCESSING STANDARD SMILES L2 PRODUCTS

When “Data Access Page” of Figure 3.4-1 is clicked, login screen (Figure 3.4-2) is displayed.

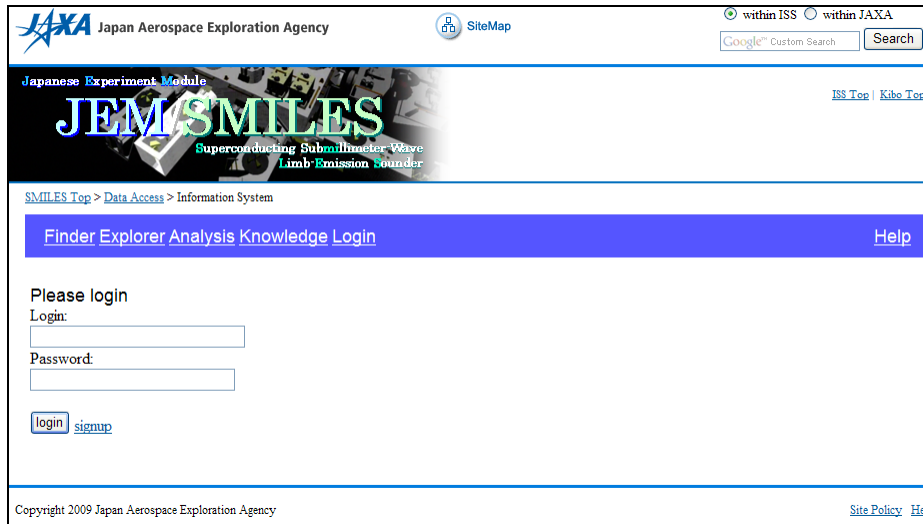


Figure 3.4–2 Login screen

On the login screen (Figure 3.4-2), Please login with the registered user and password. When login is completed, please click on the “Finder” button. Please retrieve necessary data by using directory tree at the left of the finder screen (Figure 3.4-3)

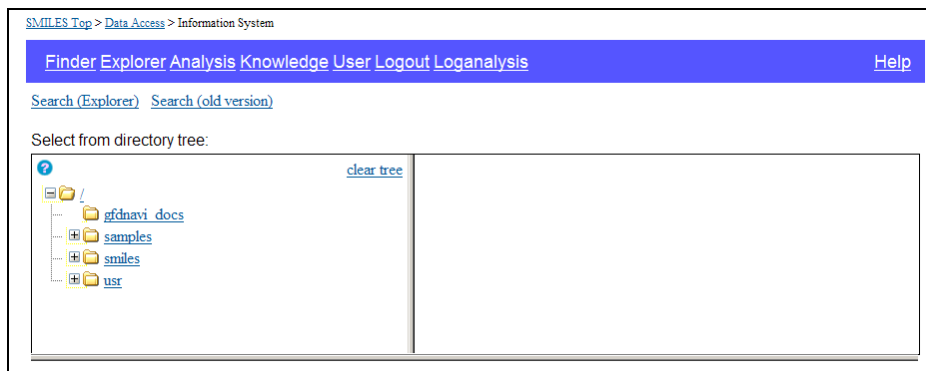


Figure 3.4–3 Finder screen

Please click on a “DL” button when the data to be downloaded is found. The download screen in Figure 3.4 - 4 is displayed.



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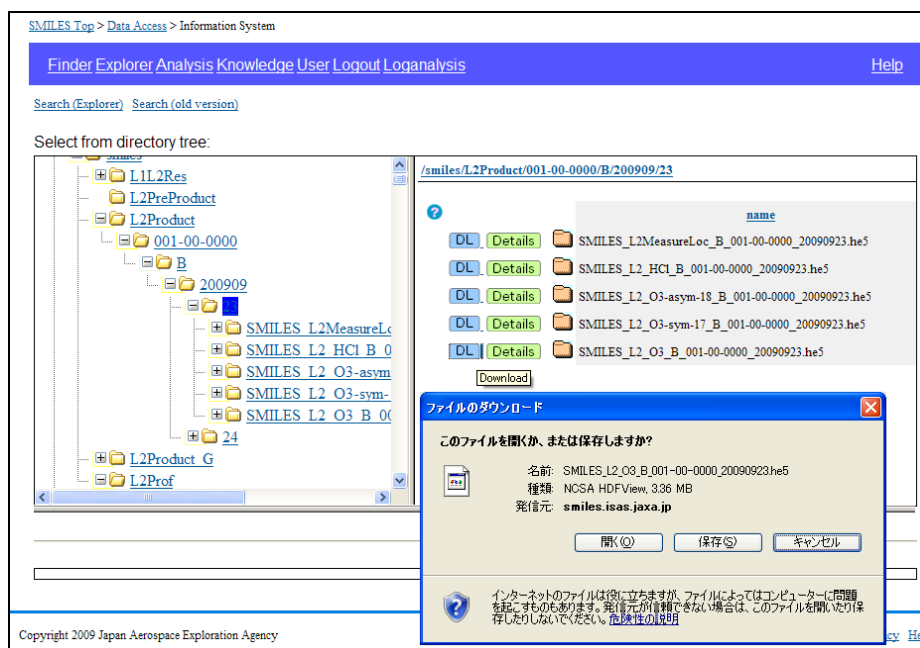


Figure3.4—4 Download screen



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3.4.2 EXAMPLE OF USING DATA

The display in HDFViewer is shown as an example of using data.

The screenshot displays the HDFViewer application window. On the left, a tree view shows the data structure under 'O3' > 'Data Fields', with 'L2Value' selected. The main window shows a 'Table' view of the 'L2Value' data, consisting of 37 rows and 6 columns. The data is presented in scientific notation. The status bar at the bottom indicates the data type and dimensions: 'L2Value (64808) 32-bit floating-point, 166 x 21'.

	0	1	2	3	4	5	€
0	1.091368E-8	1.487188E-8	1.793495E-8	-2.822716...	4.690311E-6	-4.134107...	3.7424
1	1.224684E-8	1.562089E-8	1.887523E-8	5.589834E-8	1.093213E-5	2.926852E-6	2.9946
2	1.210906E-8	1.424515E-8	1.542305E-8	-1.403134...	2.980885E-6	2.708308E-6	2.8656
3	1.210906E-8	1.429337E-8	1.54028E-8	8.881716E-9	2.677261E-6	2.424112E-6	3.1057
4	1.210906E-8	1.429337E-8	1.5321E-8	-5.514501...	1.308276E-6	2.152564E-6	2.9692
5	1.210906E-8	1.429337E-8	1.538229E-8	-4.61368E-9	2.516952E-6	1.980731E-6	3.2515
6	1.108046E-8	1.350759E-8	1.439685E-8	1.926964E-8	1.5334E-6	2.23618E-6	3.1111
7	1.108046E-8	1.343447E-8	1.440026E-8	1.18742E-8	7.41771E-7	1.495988E-6	3.2302
8	1.108046E-8	1.343347E-8	1.439257E-8	1.409173E-8	1.08366E-6	8.620181E-7	3.3316
9	1.108046E-8	1.343294E-8	1.439788E-8	1.230266E-8	5.87603E-7	1.286058E-6	3.2704
10	1.037082E-8	1.429124E-8	1.541394E-8	-2.94867E-8	7.075862E-7	2.324776E-6	3.0933
11	1.037082E-8	1.429151E-8	1.481114E-8	-1.580565...	2.126859E-7	3.244181E-6	3.4576
12	1.037082E-8	1.429162E-8	1.47954E-8	-1.027516...	7.341145E-7	2.931585E-6	3.1541
13	1.164144E-8	1.447406E-8	1.474848E-8	-4.313816...	4.68379E-7	2.48828E-6	3.1461
14	1.385929E-8	1.588744E-8	1.754097E-8	8.821474E...	7.847626E-7	1.781253E-6	3.4011
15	1.385929E-8	1.588772E-8	1.741994E-8	-1.2629E-8	4.973348E-7	3.866838E-6	3.2981
16	1.385929E-8	1.588717E-8	1.703514E-8	-5.628628...	4.787024E-7	3.013337E-6	3.6864
17	1.385929E-8	1.588768E-8	1.713931E-8	-5.108736...	5.868818E-7	2.535257E-6	3.2723
18	1.704823E-8	1.852196E-8	2.187821E-8	-2.390316...	2.753987E-6	2.456322E-6	3.4257
19	1.800945E-8	2.000759E-8	2.736226E-8	-3.299732...	1.889938E-6	2.073623E-6	3.1315
20	1.800945E-8	2.000843E-8	2.845875E-8	-1.836046...	6.94184E-6	2.886675E-6	3.2504
21	1.800945E-8	2.00079E-8	2.824511E-8	-1.092056...	7.123486E-6	2.703057E-6	3.1275
22	1.801801E-8	2.141853E-8	5.795027E-8	-6.605592...	4.919362E-7	1.526768E-6	3.4437
23	1.801801E-8	2.142026E-8	-1.07621E-7	-4.877507...	-2.92225E-7	2.450995E-6	3.3115
24	1.934674E-8	2.331288E-8	-4.766722...	-5.411541...	-4.032477...	1.899554E-6	3.3551
25	1.934674E-8	2.331089E-8	-7.356305...	-5.427624...	-1.810503...	4.383771E-6	2.5193
26	1.934674E-8	2.331183E-8	1.956232E-8	-7.177905...	-8.045899...	4.138206E-6	2.7851
27	1.934674E-8	2.331228E-8	-6.592211...	-8.207246...	-1.362198...	5.172973E-6	2.6103
28	1.878777E-8	2.29215E-8	4.900734E-8	-7.622811...	-3.369346...	3.264043E-6	2.9090
29	2.080193E-8	2.541033E-8	4.662504E-8	-6.380158...	-4.860237...	2.571503E-6	3.1905
30	2.162547E-8	2.841672E-8	8.444037E-8	-3.987755...	-4.705695...	1.951723E-6	3.3706
31	2.163084E-8	2.829341E-8	9.218006E-8	-4.197796...	-1.987509...	2.05462E-6	3.2593
32	2.16377E-8	2.848602E-8	7.262561E-8	-2.897658...	-1.456783...	2.07654E-6	3.1948
33	2.163409E-8	2.831856E-8	8.73852E-8	-4.388222...	-2.136903...	2.134151E-6	3.1923
34	1.975143E-8	2.215522E-8	4.49157E-8	-4.030807...	-2.035555...	2.155369E-6	3.2835
35	1.967076E-8	2.218757E-8	-4.738431...	-5.33298E-6	-5.068712...	2.386264E-6	3.5628
36	1.792042E-8	2.414243E-8	3.509741E-8	-6.451737...	-2.793319...	3.054216E-6	2.5042



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Appendix-1 Acronyms & Abbreviations

C

CRL : Communications Research Laboratory

D

DPS : Data Processing System

E

EOS : Earth Observing System

F

FWHM : Full Width at Half Maximum

H

HDF : Hierarchical Data Format

HDF-EOS: HDF Earth Observing System

I

ISAS : Institute of Space and Astronautical
Science

ISS: International Space Station

J

JAXA : Japan Aerospace eXploration Agency

JEM : Japan experiment module

N

NASDA : National Space Development Agency
of Japan

NICT : National Institute of Information and
Communications Technology

O

OEM : Optimal Estimation Method

R

RMS : *Root Mean Square*

S

SIS: Superconductor-Insulator-Super-conductor

SMILES: Superconducting Submillimeter-Wave
Limb Emission Sounder

T

TKSC : Tsukuba Space Center

U

UTC : Coordinated Universal Time

UOA : User Operations Area