OMI Level 2 Aerosol Data Product Specification

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1 Introduction

1.1 Purpose of the document

This document specifies the OMI Level 2 Aerosol data product. This release of the document described version 1.2.3.1 of the PGE. This product will be produced by the OMI Aerosol software, as described in AD1.

1.2 Definitions, acronyms and abbreviations

ECS	EOS Core System
HDF	Hierarchical Data Format
HDF-EOS	Hierarchical Data Format - Earth Observing System
MW	Multi-Wavelength
NRT	Near Real Time
NUV	Near UV
ODL	Object Description Language
OMI	Ozone Monitoring Instrument
ONVS	Ozone Near-real-time and Very-fast-delivery System.
PGE	Product Generation Executive
SDP	Science Data Production
SAA	South Atlantic Anomaly
TAI	International Atomic Time

1.3 References

1.3.1 Applicable Documents

AD1 URD for the OMI Aerosol PGE, RS-OMIE-KNMI-543, 05-02-2004

AD2 HDF-EOS Aura File Format Guidelines, NCAR SW-NCA-079, Version 1.3, 27 August 2003.

1.3.2 Reference Documents

RD1 HDF-EOS Interface Based on HDF5, 175-TP-511-003, May 2002.

RD2 Release 6A.07 SDP Toolkit Users Guide for the ECS Project, 333-CD-605-001, May 2002.

RD3 OMI Level 1B Product Format Specification, SE-OMIE-0562-DS/02, issue 1 (draft 7), 9 August, 2002.

RD4 Near Real-Time SSM/I EASE-Grid Daily Global Ice Concentration and Snow Extent, March 2002, URL: http://nsidc.org/data/docs/daac/nise1_nise.gd.html

RD5 OMIS Activity Definitions, RP-OMIE-KNMI-335, Issue 1, June 17 2002.

RD6 Release 6A.07 Toolkit Users Guide for the ECS Project, 333-CD-605-001, p. 6-310, May 2002.

1.4 Overview of the document

This document is laid out as follows:
Chapter 1 is the introduction.
Chapter 2 gives a general overview of the product.
Chapter 3 describes the product data file format and contents.
Chapter 4 describes the product metadata file.

2 Overview of the product.

The OMI Level 2 Aerosol Product contains geolocated aerosol column amount information. In addition, it also contains intermediate results, such as cloud information, diagnostics, etc.. Also, the product contains metadata. Every OMI Level 2 Aerosol Product consists of two files: the data file which contains the actual data and metadata, and a metadata file which contains a subset of the metadata. The metadata file is used to search data archives like the NASA DAAC. The format of the data files are developed according to the guidelines given in AD2. The metadata file is produced by calling the SDP Toolkit [RD2] library.

2.1 Product Identifier

The identifier for the OMI Aerosol product as provided by the OMI Science Support Team is “OMAERO” for global products and “OMAEROZ” for zoom products.

2.2 File Names

The file name convention is specified in AD2. OMI file names will have 4 sections within the basis of the file name. Each section will be delimited by an *underscore*. The suffix will follow the basis and be delimited by a period. The four sections in the basis are Instrument ID, Data Type, Data ID and Version. Thus, the filename is constructed in the following way:

<InstrumentID>_<DataType>_<DataID>_<Version>.<Suffix>

In Table 1 details the contents of the four sections and the suffix are given. The following is an example of a file name:

OMI-Aura_L2-OMAERO_2004m0601t0732-o01696_v002-2004m0612t124127.he5

Table 1. Description of the different sections and the suffix of the filename.

Section	Format	Description
InstrumentID	“OMI-Aura”	ID for instrument and spacecraft.
DataType	“L2-OMAERO” for global products “L2- OMAEROZ” for zoom products	Level and product indicators
DataID	<start date and time>-o<orbit>	date and orbit indicators: date-time format: <yyyy>m<mmdd>t<hhmm> orbit format o<nnnnn>
Version	v<version>-<production date and time>	version indicators: version format <nnn> date-time format: <yyyy>m<mmdd>t<hhmmss>
Suffix	“he5” or “he5.met”	Suffixes for product file and metadata file.

3 The Data File

3.1 Description

The OMI Level 2 Aerosol product data file contains the data and metadata produced by the OMI Aerosol software, as described in AD1. The input for this product can either be Global or Zoom-in OMI Level 1B products.

3.2 Format

The format of the data file is HDF-EOS 5, as described in RD1. To ease the use of Aura data sets, the Aura teams have agreed to make their files match as closely as reasonably possible. To this end, the Aura teams have agreed on a set of guidelines for their file formats, which are described in AD2.

3.3 Structure

The data file uses HDF-EOS Swath[1] format. The number of Swath structures used in the data file depends on the L1B input product. If the product is produced from an OMI Global Level 1B product, the file contains a single swath structure named “ColumnAmountAerosol”. Figure 1 shows an example of the structure of a data file produced from Global data.
If the product is produced from an OMI Zoom-in Product the file may contain more than one swath structures. The names of these swaths always starts with “ColumnAmountAerosol”, and is followed by the <Size> identifier that follows the swath naming for the UV1 swaths in L1B Zoom product [RD3]. The purpose of the <Size> identifier is to make the swath name unique. The <Size> identifier has the following format:

“<nXtrack>”x”<nWavel>”x”<binning_factor>.

An example of a swath name in case of a zoom product is:

“ColumnAmountAerosol 60x123x4”.

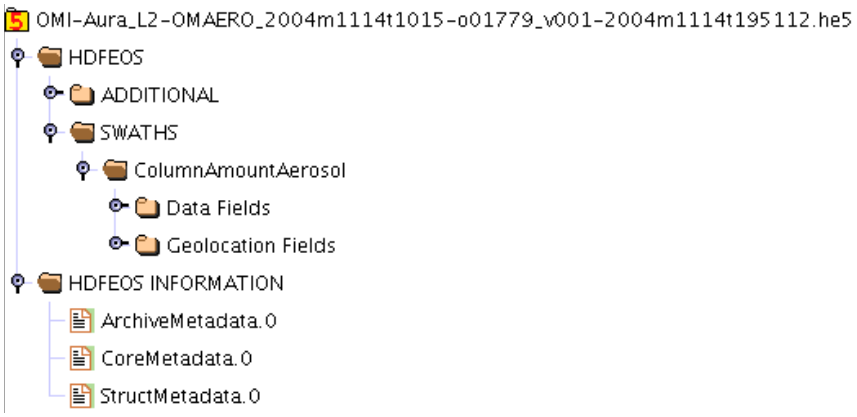

Figure 1. Structure of a product data file.

3.4 Swath Structure

Each Swath structure consists of data fields, geolocation fields and profile fields. In this product no profile fields are used. All data and geolocation fields are defined by their type, dimension and attributes. The dimensions that are used are listed in Table 2. The nTimes and nXtrack are identical to those used in the Level 1B radiance files. The nTimesSmallPixelUV and nTimesSmallPixelVIS are identical to the nTimesSmallPixel in the Level 1B radiance files for the UV-2 and VIS, respectively. In addition to these dimension, which are copied from the

[1] Note that in the OMI community ‘swath’ is often referred to as the across track direction. However, in this document the ‘swath’ is only used for HDF-EOS elements, see RD1.

Level 1B data, there are several dimensions added. The nPointer dimension is by definition equal to 2 and is used for the SmallPixelPointerUV and SmallPixelPointerVIS data fields. The nModel dimension is used for the AerosolModelsPassedThreshold data field only. The nWavelNUV is the number of wavelength that are used for the Near UV data fields. The nWavelMW is the number of wavelength that are used for the multi-wavelength data fields. Finally, the nWavelDiagnostic is the number of wavelength for which certain diagnostic data is produced.

In HDF a dimension can either be fixed or unlimited. Fixed indicates that the dimension is determined when the file is created (but they may vary from file to file). Unlimited indicates that the dimension can grow and thus not has to be determined when the file is created. For the dimensions nTimes and nTimesSmallPixel the size is not known at file creation, because parts of the orbit can be processed by the Level 1-2 software, therefore these dimensions are set to unlimited. As a service to the user, the actual size of the nTimes, nTimesSmallPixelUV and nTimesSmallPixelVIS are stored as the Swath level attributes NumTimes, NumTimesSmallPixelUV and NumTimesSmallPixelVIS. The reason for this is that the size of unlimited dimension can otherwise not be retrieved using the HDF-EOS library. Note that this is possible using the plain HDF library calls. Besides the size of the unlimited dimensions, there is also a swath level attribute to indicate the vertical coordinate. This is a mandatory attribute from AD2 and is set to “Total Column” to indicate that the data fields do not have a pressure or altitude dimension. The Swath level attributes are listed in Table 3, their names and types follow the Level 1B products.
All data and geolocation fields have attributes. The attributes for data and geolocation fields are listed in Table 4. In case the data is missing, fill values are used. These fill values depend on the data type. Table 5 shows a list of the fill values for all the types used in the product.

Table 2. Dimensions of the Swath structures.

Dimension Name	**Size**	**Dimension Description**
nTimes	unlimited	Number of OMI measurements
nXtrack	fixed	Number of ground pixels per measurement
nTimesSmallPixelUV	unlimited	Number of OMI small pixel measurements
nTimesSmallPixelUV	unlimited	Number of OMI small pixel measurements
nPointer	fixed (2)	Dimension used for the SmallPixelPointer data fields
nModel	fixed	Number of aerosol models
nWavelNUV	fixed	Number of wavelength used for the Near UV (NUV) method.
nWavelMW	fixed	Number of wavelength used for the Multi Wavelength (MW) method.
nWavelDiagnostic	fixed	Number of wavelength for which diagnostic data is produced.

Table 3. Swath level attributes.

Dimension Name	**Size**	**Dimension Description**
NumTimes	HE5T_NATIVE_INT32	Actual size of the dimension nTimes
NumTimesSmallPixelUV	HE5T_NATIVE_INT32	Actual size of the dimension nTimesSmallPixelUV
NumTimesSmallPixelVIS	HE5T_NATIVE_INT32	Actual size of the dimension nTimesSmallPixelVIS
VerticalCoordinate	HE5T_NATIVE_CHAR	“Total Column”

Table 4. Data and geolocation field attributes.

Attribute name	**Attribute Type**	**Attribute Description**
MissingValue	Same type as data Field	Contains the value for missing data
Title	HE5T_NATIVE_CHAR	Title of the field
Units	HE5T_NATIVE_CHAR	Units after applying scales and offsets.
ScaleFactor	HE5T_NATIVE_FLOAT	Factor for scaling data
Offset	HE5T_NATIVE_FLOAT	Value to add to the data
UniqueFieldDefinition	HE5T_NATIVE_CHAR	Describes if definition of field is shared with other Aura Instruments ("Aura-Shared", "X-Specific", where X=Instrument Name, "X-Y[-Z]-Shared" where X,Y, and optional Z are instrument names (in alphabetical order)

Table 5. Fill values.

Data Type	Fill Value
HE5T_NATIVE_INT8	-127
HE5T_NATIVE_UINT8	255
HE5T_NATIVE_INT16	-32767
HE5T_NATIVE_UINT16	65535
HE5T_NATIVE_INT32	-2147483647
HE5T_NATIVE_UINT32	4294967295
HE5T_NATIVE_FLOAT	-2^{100} (-0X1P+100)
HE5T_NATIVE_DOUBLE	-2^{100} (-0X1P+100)

3.4.1 Geolocation Fields

The geolocation fields are stored in the Geolocation Fields group of the Swath structure. Table 6 Gives a description of the Geolocation Fields. In Table 7 the usage of the bit fields of the GroundPixelQualityFlags geolocation field are given. For detailed information of the Snow/Ice flags and the Land/Water flags used in the GroundPixelQualityFlags, see RD4 and RD6. For each of the fields the UniqueFieldDefinition (see Table 4) indicates if a field is shared with other instruments, see AD2. The default value is "OMI-Specific". In case of a shared field, this is indicated as note in the first column of Table 6.

Table 6. The Geolocation Fields.

Name	Type	Dimensions	Unit	Description
Time [s]	HE5T_NATIVE_DOUBLE	nTimes	s	Time in TAI-93 format.
Latitude [s]	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg	Latitude of the center of the groundpixel
Longitude [s]	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg (-180 to 180)	Longitude of the center of the groundpixel
OrbitPhase	HE5T_NATIVE_FLOAT	nTimes	NoUnits	The place of OMI in orbit
SpacecraftLatitude [hot]	HE5T_NATIVE_FLOAT	nTimes	deg	Geodetic Latitude above WGS84 ellipsoid
SpacecraftLongitude [hot]	HE5T_NATIVE_FLOAT	nTimes	deg (-180 to 180)	Geodetic Longitude above WGS84 ellipsoid
SpacecraftAltitude [hot]	HE5T_NATIVE_FLOAT	nTimes	m	Altitude above WGS84 ellipsoid
SolarZenithAngle [s]	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg	Solar zenith angle at WGS84 ellipsoid for center co-ordinate of the ground pixel.
SolarAzimuthAngle [hot]	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg	Solar azimuth angle at WGS84 ellipsoid for center co-ordinate of the ground pixel, defined East-of-North.
ViewingZenithAngle	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg	Viewing zenith angle at WGS84 ellipsoid for center co-ordinate of the ground pixel..
ViewingAzimuthAngle	HE5T_NATIVE_FLOAT	nTimes, nXtrack	deg	Viewing azimuth angle at WGS84 ellipsoid for center co-ordinate of the ground pixel, defined Eastof-North.
TerrainHeight	HE5T_NATIVE_INT16	nTimes, nXtrack	m	Terrain height at for center co-ordinate of the ground pixel

GroundPixelQualityFlags	HE5T_NATIVE_ UINT16	nTimes, nXtrack	NoUnits	See Table 7.

[s]) UniqueFieldDefinition = “Aura-Shared”
[hot]) UniqueFieldDefinition = “HIRLDS-OMI-TES-Shared”
[ot]) UniqueFieldDefinition = “OMI-TES-Shared”

Table 7. Definition of the GroundPixelQualityFlags

Bit	**Description**
0-3	Land/Water flags [RD6] 0=Shallow Ocean 1=Land 2=Shallow Inland Water 3=Ocean coastline / Lake shoreline 4=Ephemeral (intermittent) water 5=Deep Inland Water 6=Continental Shelf Ocean 7=Deep Ocean 8-14=Not used 15=Error flag for Land/Water
4	Sun Glint Possibility flag
5	Solar Eclipse possibility flag
6	Geolocation Error flag
7	Reserved for future use
8-14	Snow/Ice flags [based on NISE, RD5] 0=Snow-free land 1-100=Sea ice concentration (%) 101=Permanent ice (Greenland, Antarctica) 102=Not used 103=Dry snow 104=Ocean [NISE-255] 105-123=Reserved 124=Mixed pixels at coastline [NISE-252] 125=Suspect ice value [NISE-253] 126=Corners (undefined) [NISE-254] 127=Error
15	NISE nearest neighbour filling flag 0=Not set 1=Set

3.4.2 Data Fields

The data fields are stored in the Data Fields group of the Swath structure. Table 8 gives a description of the Data Fields. Table 9, 10 and 11 give the detailed bit-level description of the MeasurementQualityFlags, ProcessingQualityFlagsNUV and ProcessingQualityFlagsMW. As for the geolocation fields, the notes in the first column of Table 8 indicate that the UniqueFieldDefinition differs from the default value, which is "OMI-Specific".

Table 8. The Data Fields.

Name	Type	Dimensions	Unit	Description
AerosolIndexUV	HE5T_NATIVE_INT16	nTimes, nXtrack	NoUnits	UV Aerosol Index
AerosolIndexVIS	HE5T_NATIVE_INT16	nTimes, nXtrack	NoUnits	VIS Aerosol Index
AerosolOpticalThicknessNUV	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelNUV	NoUnits	Spectral Aerosol Optical Thickness derived with the Near UV method. Scaled by a factor 1000.
SingleScatteringAlbedoNUV	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelNUV	NoUnits	Spectral Single Scattering Albedo derived with the Near UV method. Scaled by a factor 1000.
ProcessingQualityFlagsNUV	HE5T_NATIVE_UINT16	nTimes, nXtrack	NoUnits	See Table 10
AerosolOpticalThicknessMW	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelMW	NoUnits	Spectral Aerosol Optical Thickness for best fit aerosol model, derived with the Multi-Wavelength method. Scaled by a factor 1000.
AerosolOpticalThicknessMWPrecision	HE5T_NATIVE_INT16	nTimes, nXtrack	NoUnits	Precision of the Aerosol Optical Thickness at the reference Wavelength for best fit aerosol model, derived with the Multi-Wavelength method. Scaled by a factor 1000.
SingleScatteringAlbedoMW	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelMW	NoUnits	Spectral Single Scattering Albedo for best fit aerosol model, derived with the Multi-Wavelength method. Scaled by a factor 1000.
SingleScatteringAlbedoMWPrecision	HE5T_NATIVE_INT16	nTimes, nXtrack	NoUnits	Precision of the spectral Single Scattering Albedo at the reference wavelength for best fit aerosol model derived with the Multi-Wavelength method, scaled by a factor 1000
AerosolModelMW	HE5T_NATIVE_UINT16	nTimes, nXtrack	NoUnits	Aerosol model indicator for best fit aerosol model, derived with the Multi-Wavelength method.
ProcessingQualityFlagsMW	HE5T_NATIVE_UINT16	nTimes, nXtrack	NoUnits	See Table 11
NumberOfModelsPassedThreshold	HE5T_NATIVE_UINT8	nTimes, nXtrack	NoUnits	Number of aerosol models that passed the threshold test.
AerosolModelsPassedThreshold	HE5T_NATIVE_UINT16	nTimes, nXtrack, nModels	NoUnits	Aerosol model indicators of the aerosol models that passed the threshold test, ordered by increasing Root-Mean-Square error.

AerosolOpticalThicknessPassedThreshold	HE5T_NATIVE_INT16	nTimes, nXtrack, nModels, nWavelDiagniostic	NoUnits	Spectral Aerosol Optical Thickness of aerosol models that passed the threshold, ordered by increasing RMS error. Scaled by a factor 1000.
SingleScatteringAlbedoPassedThreshold	HE5T_NATIVE_INT16	nTimes, nXtrack, nModels, nWavelDiagniostic	NoUnits	Spectral Single Scattering Albedo of aerosol models that passed the threshold, ordered by increasing RMS error. Scaled by a factor 1000.
RootMeanSquareErrorOfFitPassedThreshold	HE5T_NATIVE_INT16	nTimes, nXtrack, nModels	NoUnits	Root-Mean-Square error of the multi-wavelength fit, for aerosol models that passed the threshold ordered by increasing RMS error. Scalled by a factor 1000.
AerosolOpticalThicknessPassedThresholdMean	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelDiagniostic	NoUnits	Mean spectral Aerosol Optical Thickness of aerosol models that passed the threshold. Scaled by a factor 1000. The averging is done using as weight the inverse of the square of the retrieval error given in the field RootMeanSquareErrorOfFitPassedThres.
AerosolOpticalThicknessPassedThresholdStd	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelDiagniostic	NoUnits	Standard deviation of the spectral Aerosol Optical Thickness of aerosol models that passed the threshold. Scaled by a factor 1000.
SingleScatteringAlbedoPassedThresholdMean	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelDiagniostic	NoUnits	Mean spectral Single Scattering Albedo of aerosol models that passed the threshold. Scaled by a factor 1000. The averging is done using as weight the inverse of the square of the retrieval error given in the field RootMeanSquareErrorOfFitPassedThres.
SingleScatteringAlbedoPassedThresholdStd	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelDiagniostic	NoUnits	Standard deviation of the spectral Single ScatteringAlbedo of aerosol models that passed the threshold. Scaled by a factor 1000.
EffectiveCloudFraction	HE5T_NATIVE_INT8	nTimes, nXtrack	NoUnits	Effective cloud fraction channel. Scaled by a factor 100.
CloudPressure	HE5T_NATIVE_INT16	nTimes, nXtrack	hPa	Effective Cloud Pressure.
CloudFlags	HE5T_NATIVE_UINT8	nTimes, nXtrack	NoUnits	See Table 12
TerrainReflectivity	HE5T_NATIVE_INT16	nTimes, nXtrack, nWavelDiagnostic	NoUnits	Reflectivity of the ground pixel, scaled by a factor 1000
TerrainPressure	HE5T_NATIVE_INT16	nTimes, nXtrack	hPa	Pressure of the centre of the ground pixel.
MeasurementQualityFlags	HE5T_NATIVE_UINT8	nTimes	NoUnits	See Table 9
SmallPixelRadianceUV	HE5T_NATIVE_	nTimesSmal	photons/	Radiance of small pixel data column of

	FLOAT	lPixelUV, nXtrack	(s.nm.cm 2.sr)	the UV CCD.
SmallPixelRadiancePointerUV	HE5T_NATIVE_INT16	nTimes, nPointer	NoUnits	Offset and count of nTimesSmallPixeUVl wrt nTimes
SmallPixelWavelengthUV	HE5T_NATIVE_UINT16	nTimesSmallPixelUV, nXtrack	nm	Wavelength of the small pixel data for the UV CCD.
SmallPixelRadianceVIS	HE5T_NATIVE_FLOAT	nTimesSmallPixelVIS, nXtrack	photons/ (s.nm.cm 2.sr)	Radiance of small pixel data column of the VIS CCD.
SmallPixelRadiancePointerVIS	HE5T_NATIVE_INT16	nTimes, nPointer	NoUnits	Offset and count of nTimesSmallPixelVIS wrt nTimes
SmallPixelWavelengthVIS	HE5T_NATIVE_UINT16	nTimesSmallPixelVIS, nXtrack	nm	Wavelength of the small pixel data for the UV CCD.
InstrumentConfigurationId	HE5T_NATIVE_UINT8	nTimes	NoUnits	Unique ID for instrument settings for current measurement, see [RD5].
XTrackQualtityFlags	HE5T_NATIVE_UINT8	nTimes, nXtrack	No units	Indicates whether the Level-1B data were classified as being affected by a row anomaly. See table 13 for details.

Table 9. Definition of the MeasurementQualityFlags

Bit	Name	Description
0	Measurement Missing Flag 0 Not set 1 Set	Set if all Ground Pixels give Earth Radiance Missing Flag.
1	Measurement Error Flag 0 Not set 1 Set	Set if any of the L1B MeasurementQualityFlags bit 0, 1 or 3 are set for the Radiance or for the used Solar product.
2	Measurement Warning Flag 0 Not set 1 Set	Set if any of the L1B MeasurementQualityFlags bit 2, 4, 5, 8, 9 are set for the Radiance or for the used Solar product.
3	Rebinned Measurement Flag 0 Not set 1 Set	Set if L1B radiance MeasurmentQualityFlags bit 7 is set to 1.
4	SAA Flag 0 Not set 1 Set	Set if L1B MeasurmentQualityFlags bit 10 is set to 1, for the Radiance or for the used Solar product
5	Spacecraft Maneuver Flag 0 Not set 1 Set	Set if L1B MeasurmentQualityFlags bit 11 is set to 1, for the Radiance or for the used Solar product
6	Instrument Settings Error Flag 0 Not set 1 Set	The Earth and Solar InstrumentConfigurationIDs are not compatible.
7	Cloud Data Not Synchronized Flag 0 Not set 1 Set	Set if radiance and cloud data are not synchronized

Table 10. Definition of the ProcessingQualityFlagsNUV

Bit	Name	Description
0	Solar Irradiance Missing Flag 0 Not set 1 Set	The number of wavelength bins for which data is missing exceeds an OPF threshold.
1	Solar Irradiance Error Flag 0 Not set 1 Set	The number of wavelength bins for which error flags are set exceeds an OPF threshold.
2	Solar Irradiance Warning Flag 0 Not set 1 Set	The number of wavelength bins for which warning flags are set exceeds an OPF threshold.
3	Earth Radiance Missing Flag 0 Not set 1 Set	The number of wavelength bins for which error flags are set exceeds an OPF threshold.
4	Earth Radiance Error Flag 0 No error 1 Error	The number of wavelength bins for which warning flags are set exceeds an OPF threshold.
5	Earth Radiance Warning Flag 0 Not set 1 Set	For any of the radiance pixels contained in the fit window: - L1B PixelQualityFlags bit 3-10 is set - wavelenghtPrecision > maxWavelengthPrecision - wavelengthPrecision <= 0 - wavelengthPrecision contains fill value - radiancePrecision > maxRadiancePrecision - radiancePrecision <= 0 - radiancePrecision contains fill value - Any of the radiance or geolocation fields used is out-of-bounds

6	Aerosol Index Error 0 Not set 1 Set	Set if one or both of the aerosol indices could not be computed.
7	Aerosol Index Warning 0 Not set 1 Set	Set if warnings were detected when computing one or both of the aerosol indices.
8	NUV Fit Error 0 Not set 1 Set	Set if the NUV fit method failed.
9	NUV Fit Warning 0 Not set 1 Set	Set if warnings were detected by the NUV fit method.
10	Surface Albedo Rejection Flag	The pixel was skipped because: - the pixel is covered with snow or sea ice; - the surface albedo is larger than the threshold value;
11	Reserved	Reserved for future use
12	Reserved	Reserved for future use
13	Reserved	Reserved for future use
14	Reserved	Reserved for future use
15	Reserved	Reserved for future use

Table 11. Definition of the ProcessingQualityFlagsMW

Bit	**Name**	**Description**
0	Solar Irradiance Missing Flag 0 Not set 1 Set	The number of wavelength bins for which data is missing exceeds an OPF threshold.
1	Solar Irradiance Error Flag 0 Not set 1 Set	The number of wavelength bins for which error flags are set exceedsan OPF threshold.
2	Solar Irradiance Warning Flag 0 Not set 1 Set	The number of wavelength bins for which warning flags are set exceeds an OPF threshold.
3	Earth Radiance Missing Flag 0 Not set 1 Set	The number of wavelength bins for which error flags are set exceeds an OPF threshold.
4	Earth Radiance Error Flag 0 No error 1 Error	The number of wavelength bins for which warning flags are set exceeds an OPF threshold.
5	Earth Radiance Warning Flag 0 Not set 1 Set	For any of the radiance pixels contained in the fit window: - L1B PixelQualityFlags bit 3-10 is set - wavelenghtPrecision > maxWavelengthPrecision - wavelengthPrecision <= 0 - wavelengthPrecision contains fill value - radiancePrecision > maxRadiancePrecision - radiancePrecision <= 0 - radiancePrecision contains fill value - Any of the radiance or geolocation fields used is out-of-bounds
6	NUV Fit Error 0 Not set 1 Set	Set if the NUV fit method failed.
7	Threshold Warning Flag 0 No error 1 Error	The number of aerosol models that passed the threshold test is larger than the size of the nModels dimension.

8	Threshold Error Flag 0 No error 1 Error	All aerosol models failed the RMS threshold test.
9	NUV Fit Warning 0 Not set 1 Set	Set if warnings other than those of bit 7 and bit 8 were detected by the NUV fit method.
10	Surface Albedo Rejection Flag	The pixel was skipped because: - the pixel is covered with snow or sea ice; - the surface albedo is larger than the threshold value;
11	Aerosol Model Warning Flag	The best-fit aerosol model from the *a priori* selected aerosol models is not the best-fit of all aerosol models.
12	Reserved	Reserved for future use
13	Reserved	Reserved for future use
14	Reserved	Reserved for future use
15	Reserved	Reserved for future use

Table 12. Definition of the CloudFlags

Bit	**Name**	**Description**
0	Cloud Clearing Missing Flag 0 Not set 1 Set	One or more of the cloud clearing steps were skipped because the necessary input data was missing of not of sufficient quality.
1	Cloud Clearing Error Flag 0 Not set 1 Set	One or more cloud clearing steps resulted in an error.
2	Cloud Clearing Warning Flag 0 Not set 1 Set	One or more of the cloud clearing steps produced a warning.
3	Cloud Fraction Test 0 Passed 1 Failed	The cloud fraction test is failed when the cloud fraction exceeds the OPF threshold value.
4	Aerosol Index Test 0 Passed 1 Failed	This test is failed if the UV aerosol index is less than an OPF threshold value and if the reflectance exceeds another OPF threshold value.
5	Pixel Homogeneity Test 0 Passed 1 Failed	If the SmallPixelVarianceUV is larger than an OPF threshold, or if the SmallPixelVarianceVIS is larger than the threshold, this test is failed.
6	Reserved	Reserved for future use
7	Reserved	Reserved for future use

Table 13. XTrackQualityFlag – a combination of the XTrackQualityFlags from UV2 and VIS channels.

Bits	value	Meaning
0-2	0	Pixel is not affected by row anomaly, pixel can be used.
	1	Pixel is affected by row anomaly; pixel not corrected, do not use pixel.
	2	(slightly) affected by row anomaly; pixel not corrected, pixel can be used with caution.
	3	Affected by row anomaly; pixel corrected, but correction is not optimal, use pixel with caution.
	4	Affected by row anomaly; pixel corrected and correction is optimal, pixel can be used, but is still less accurate than pixels that are not affected by row anomaly.
	5-6	Not used.
	7	Error during correction for row anomaly, do not use pixel.
3		Reserved for future use
4		Pixel may be affected by the wavelength-shift effect.
5		Pixel may be affected by the blockage effect.
6		Pixel may be affected by the stray sunlight effect.

7		Pixel may be affected by the stray earth radiance effect.

3.5 Metadata

In this document the term “metadata” is reserved for metadata on file (granule) level. Examples of metadata on granule level are the date and time that the data was measured, the percentage of the data that is missing for the granule, the geographic coverage, etc..
The metadata is implemented in two ways:

1. as HDF-EOS file level attributes
2. as ECS metadata.

The metadata fields that are implemented as HDF-EOS file level attributes are only available in the data file, whereas part of the ECS metadata fields are stored both in the data and in the metadata file. The advantage of storing a metadata field as HDF-EOS file attributes are that they are easily available for the users. Another advantage of using HDF-EOS file attributes is that there are no iterations needed with ECS to change or add such a metadata field. The ECS metadata on the other hand have the advantage that they are ingested by the ECS system (via the metadata file), and can be used for searching the DAAC archive. There are three types of ECS metadata:

1. Collection
2. Inventory
3. Archived.

The collection type metadata describe the collection of all the product files. Thus, collection metadata fields described in this document are the same for all the granules for the OMI Level 2 Aerosol Product. The collection level metadata consist of fields like the instrument name (“OMI”), the platform name (“EOS-Aura”), etc.. The Inventory metadata describe a single granule. It contains standard ECS fields, as well as the so-called product specific attributes. Like the product specific attributes, the archive metadata can also be defined per product. The difference between archive and inventory metadata is that archive metadata cannot be used for searching the DAACs. Furthermore, the Archive level attributes are not part of the metadata file, whereas the Collection and Inventory metadata are contained in the metadata file. The Collection, Inventory and Archive ECS metadata are listed in Tables, 13, 14 and 15, respectively.

The HDF-EOS file attributes are stored in the “FILE_ATTRIBUTES” group, see Figure 1. The parameters that are stored as Global Attributes are listed in Table 16. Some of these parameters are also part of the ECS metadata, like for instance the the GranuleDay, GranuleMonth, GranuleYear attributes. The reason of this duplication is that the Global Attributes provide a simpler interface to this information.

Table 14. Collection metadata.

Name	**Value**
DLLName	libDsESDTOmOMIPoly.001Sh.so
SpatialSearchType	Orbit
ShortName	“OMAERO” for global, “OMAEROZ” for zoom products
LongName	“OMI/Aura Aerosol Optical Thickness & Single Scattering 1-Orbit L2 Swath 13x24km” for global products, “OMI/Aura Aerosol Optical Thickness & Single Scattering 1-Orbit L2 Swath 13x12km” for zoom products
CollectionDescription	OMI/Aura Aerosol Optical Thickness & Single Scattering
VersionID	1
RevisionDate	2004-01-12
SuggestedUsage	Sience Research
ProcessingCenter	OMI SIPS
ArchiveCenter	GSFC
VersionDescription	Pre-launch test using simulated and on-ground-acquired data
CitationforExternalPublication	OMI data contained herein were obtained through joined research

	between the Netherlands (NIVR/KNMI), Finland (FMI), and the U.S. (NASA) in the Earth Observing System (EOS) Aura Mission
CollectionState	In Work
MaintenanceandUpdateFrequency	Continually
TimeType	UTC
DateType	Gregorian
TemporalRangeType	Continuous Range
PrecisionofSeconds	1
EndsatPresentFlag	Y
RangeBeginningDate	2004-06-01
RangeBeginningTime	00:00:00.000000
RangeEndingDate	2004-06-01
RangeEndingTime	00:00:00.000000
ContactOrganizationContainer.Role	Archive
ContactOrganizationContainer.HoursofService	08:00 to 18:00:00 EDT (-0500 GMT)”
ContactOrganizationContainer.ContactInstructions	Contact for format/distribution issues
ContactOrganizationContainer.ContactOrganizationName	Goddard DAAC User Services
ContactOrganizationAddressContainer.StreetAddress	NASA/GSFC Code 902
ContactOrganizationAddressContainer.City	GREENBELT
ContactOrganizationAddressContainer.StateProvince	MD
ContactOrganizationAddressContainer.PostalCode	20771
ContactOrganizationAddressContainer.Country	USA
OrganizationTelephoneContainer.TelephoneNumber	301-614-5473
OrganizationTelephoneContainer.TelephoneNumberType	Voice
OrganizationTelephoneContainer.TelephoneNumber	301-614-5304
OrganizationTelephoneContainer.TelephoneNumberType	Facsimile
OrganizationEmail.ElectronicMailAddress	daac_usg@gsfcsrvr4.gsfcmo.ecs.nasa.gov
ECSDisciplineKeyword	Earth Science
ECSTopicKeyword	Atmosphere
ECSTermKeyword	Aerosols
ECSVariableKeyword	Aerosol Optical Depth / Thickness
ProcessingLevelDescription	Geophysical Quantities at sensor resolution or geolocated
ProcessingLevelID	2
PlatformShortName	Aura
PlatformLongName	EOS Aura Mission Satellite
PlatformType	Spacecraft
PlatformCharacteristicName	OrbitInclination
PlatformCharacteristicDescription	Angle between the orbit plane and the Earth’s equatorial plane
PlatformCharacteristicDataType	float
PlatformCharacteristicUnit	Degrees

PlatformCharacteristicValue	98.2
InstrumentShortName	OMI
InstrumentLongName	Ozone Monitoring Instrument
InstrumentTechnique	Nadir-Viewing Cross-Track Imaging Spectroradiometry
NumberofSensors	2
SensorShortName	CCD Ultra Violet
SensorLongName	Charge Coupled Device Ultra Violet
SensorTechnique	Frame Transfer CCD Imaging Spectroradiometry
SensorCharacteristicName	CCD_UV_bandwidth
SensorCharacteristicDescription	The sensor's Ultra Violet wavelength range.
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	nm
SensorCharacteristicValue	270-380
SensorShortName	CCD Visible
SensorLongName	Charge Coupled Device Visible
SensorTechnique	Frame Transfer CCD Imaging Spectroradiometry
SensorCharacteristicName	CCD_VIS_bandwidth
SensorCharacteristicDescription	The sensor's Visible wavelength range.
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	nm
SensorCharacteristicValue	350-500
PrimaryCSDT	Complex Swath
Implementation	HDF-EOS
GranuleTimeDuration	6600

Table 14. Inventory metadata. Entries in blue are Product Specific Attributes.

Name	Mandatory	Location	nr. of values	Type	Value
SizeMBECSDataGranule	FALSE	DSS	1	Double	
ReprocessingPlanned	TRUE	DP	1	String	"Yes"
ReprocessingActual	TRUE	PCF	1	String	
DayNightFlag	TRUE	MCF	1	String	"Day"
LocalGranuleID	TRUE	PGE	1	String	Filename, as specified in section 2.2
LocalVersionID	TRUE	PCF	1	String	
ProductionDateTime	TRUE	TK	1	DateTime	
ParameterName	TRUE	PGE	1	String	
AutomaticQualityFlag	TRUE	PGE	1	String	*)
AutomaticQualityFlagExplanation	TRUE	PGE	1	String	**)
OperationalQualityFlag	TRUE	MCF	1	String	"Passed"
OperationalQualityFlagExplanation	TRUE	MCF	1	String	***)
ScienceQualityFlag	TRUE	MCF	1	String	"Not Investigated"
ScienceQualityFlagExplanation	TRUE	MCF	1	String	****)
QAPercentMissingData	TRUE	PGE	1	Integer	Percentage of data for which ProcessingQuality-Flags bit 13 is set.
QAPercentOutOfBoundsData	TRUE	PGE	1	Integer	Percentage of pixels for which the aerosol optical thickness is outside the boundaries set in the OPF
OrbitNumber	TRUE	PGE	1	Integer	
EquatorCrossingDate[1]	TRUE	PGE	1	Date	
EquatorCrossingTime[1]	TRUE	PGE	1	Time	
EquatorCrossingLongitude[1]	TRUE	PGE	1	Double	
ShortName	TRUE	MCF	1	String	"OMAERO" for global "OMAEROZ" for zoom
VersionID	TRUE	MCF	1	Integer	"0"
InputPointer	TRUE	PGE	20	String	
RangeBeginningDate[2]	TRUE	PGE	1	Date	
RangeBeginningTime[2]	TRUE	PGE	1	Time	
RangeEndingDate[2]	TRUE	PGE	1	Date	
RangeEndingTime[2]	TRUE	PGE	1	Time	
PGEVersion	TRUE	PCF	1	String	
AssociatedPlatformShortName	TRUE	MCF	1	String	"Aura"
AssociatedInstrumentShortName	TRUE	MCF	1	Aura	"OMI"
AssociatedSensorShortname	TRUE	MCF	2	String	"CCD Ultra Violet", "CCD Visible"
OperationMode	TRUE	PCF	1	String	"Global" or "Zoom"
NrMeasurements[1]	TRUE	PGE	1	Integer	Range(0,5000)
NrZoom[1]	TRUE	PGE	1	Integer	Range(0,5000)
NrSpatialZoom[1]	TRUE	PGE	1	Integer	Range(0,5000)
NrSpectralZoom[1]	TRUE	PGE	1	Integer	Range(0,5000)
ExpeditedData[1]	TRUE	PGE	1	String	"True" or "False"
SouthAtlanticAnomalyCrossing[1]	TRUE	PGE	1	String	"True" or "False"
SpacecraftManeuverFlag[1]	TRUE	PGE	1	String	"True" or "False"
SolarEclipse[1]	TRUE	PGE	1	String	"True" or "False"
InstrumentConfigurationIDs[1]	TRUE	PGE	256	Integer	Range(0,255)

MasterClockPeriods[1]	TRUE	PGE	256	Float	Range(0,255)
ExposureTimes[1]	TRUE	PGE	256	Float	Range(0,255)
PathNr[1]	TRUE	PGE	500	Integer	Range(1,466)
StartBlockNr[1]	TRUE	PGE	500	Integer	Range(1,500)
EndBlockNr[1]	TRUE	PGE	500	Integer	Range(1,500)

Table 16. The value can be copied from the L1B Radiance metadata fields.

[2]) The value can be copied from the L1B Radiance metadata fields or set via the time tags in the PCF.

*) "Failed" if :
RadianceScienceQualityFlag is "Failed".
IrradianceScienceQualityFlag is "Failed".
The maximum of the following parameters is larger than or equal to the AutomaticQAFailed parameter in the OPF:
QAPctRadianceError
QAPctMWError
QAPctNUVError

"Suspect" if:
RadianceScienceQualityFlag is "Suspect".
IrradianceScienceQualityFlag is "Suspect".
The maximum of the following parameters is smaller than the AutomaticQAFailed but larger or than or equal to the AutomaticQASuspect parameter in the OPF:
QAPctRadianceError
QAPctMWError
QAPctNUVError

"Passed" for all other conditions.

**) "The value is based on a combination of the RadianceScienceQualityFlag, IrradianceScienceQualityFlag, QAPctRadianceError, QAPctMWError, and QAPctNUVError. Thresholds used: xx% for Failed and yy% for Suspect."

***) "This granule passed operational tests that were administered by the OMI SIPS. QA metadata was extracted and the file was successfully read using standard HDF-EOS utilities."

****) "An updated science quality flag and explanation is put in the product .met file when a granule has been evaluated. The flag value in this file, Not Investigated, is an automatic default that is put in every granule during production."

Table 15. Archive metadata.

Name	Location	Mandatory	# values	Type	Description
LongName	MCF	TRUE	1	String	"OMI/Aura Aerosol Optical Thickness & Single Scattering 1-Orbit L2 Swath 13x24km" for global products, "OMI/Aura Aerosol Optical Thickness & Single Scattering 1-Orbit L2 Swath 13x12km" for zoom products
ESDTDescriptorRevision	MCF	TRUE	1	String	TBD

Table 16. Global Attributes of the OMI Level 2 Aerosol data files.

Name	Data Type	nr	Description
InstrumentName	HE5T_NATIVE_CHAR	1	"OMI"
ProcessLevel	HE5T_NATIVE_CHAR	1	"2"
GranuleMonth	HE5T_NATIVE_INT	1	Month of start of granule (1-12)
GranuleDay	HE5T_NATIVE_INT	1	Day of start of granule (1-31)
GranuleYear	HE5T_NATIVE_INT	1	Year of start of granule (i.e. 2003)
TAI93At0zOfGranule	HE5T_NATIVE_DOUBLE	1	TAI time at 00:00 UTC at date of start of granule
PGEVersion	HE5T_NATIVE_CHAR	1	Version of the PGE
ProcessingSystem	HE5T_NATIVE_CHAR	1	"OFFLINE", "NRT" or "VFD"
AerosolModels	HE5T_NATIVE_CHAR	1	List of format aerosol "indicator = aerosol model description", ordered by aerosol indicator number.
AerosolOpticalThicknessHistogram	HE5T_NATIVE_INT32	21	Histogram of Aerosol Optical Thickness at largest wavelength of best fit aerosol model derived with the multi-wavelength method, with bin size of 0.1 .
SingleScatteringAlbedoHistogram	HE5T_NATIVE_INT32	9	Histogram of the Single Scattering Albedo at largest wavelength of best fit aerosol model derived with the multi-wavelength method, engths, with bin size of 0.025, starting at 0.8.
SolarProductMissing 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if the Solar product could not be opened, read, is in unexpected format or the data is missing. The Backup product is used in this case.
SolarProductOutOfDate 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if the difference of the dates of the measurements of the Earth radiance and Solar irradiance is larger than maxSolarAge
SolarIrradianceWarning 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if QAPctIrradianceWarning is larger than 0
BackupSolarProductUsed 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if the backup Solar product is used instead of the normal Solar product.
ParametersInconsistent 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if there is an inconsistency between the OPF parameters and the parameters of the LUTs.
RadianceParametersMissing 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if any of the general parameters from the L1B radiance product are missing.
LUTOutOfRange 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if one the LUTs contains invalid data that were ignored.
RadianceScienceQualityFlag	HE5T_NATIVE_CHAR	1	Set to the value set for the radiance product ScienceQualityFlag metadata attribute

IrradianceScienceQualityFlag	HE5T_NATIVE_CHAR	1	Set to the value set for the Solar product ScienceQualityFlag metadata attribute
CloudProductMissing 0 Not set 1 Set	HE5T_NATIVE_INT	1	Set if the Cloud product could not be opened, read or is in unexpected format.
WavelengthCalibrationMethod	HE5T_NATIVE_CHAR	1	Method used for the wavelength calibration in the retrieval. Possible values are “assigned” or “fitted”.
QAPctSunGlint	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 GroundPixelQualityFlags bit 4 is set
QAPctEclipse	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 GroundPixelQualityFlags bit 5 is set
QAPctIrradianceMissing	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 0 is set
QAPctIrradianceError	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 1 is set
QAPctIrradianceWarning	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 2 is set
QAPctRadianceMissing	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 3 is set
QAPctRadianceError	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 4 is set
QAPctRadianceWarning	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 5 is set
QAPctNUVError	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsNUV bit 8 is set
QAPctNUVWarning	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsNUV bit 9 is set
QAPctMWError	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 6 is set
QAPctMWWarning	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 ProcessingQualityFlagsMW bit 7 is set
QAPctCloudy	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 CloudFlags bits 3, 4 and 5 are not set
QAPctCloudClearingMissing	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 CloudFlags bit 0 is set
QAPctCloudClearingError	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 CloudFlags bit 1 is set
QAPctCloudClearingWarning	HE5T_NATIVE_INT	1	Percent of ground pixels for which L2 CloudFlags bit 2 is set
QAPctMeasMissing	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 1 or 3 are set
QAPctMeasError	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 1 is set
QAPctMeasWarning	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 2 is set
QAPctRebinned	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 3 is set
QAPctSAA	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 4 is set
QAPctSpacecraftManeuver	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 5 is set
QAPctInstrumentSettingsError	HE5T_NATIVE_INT	1	Percent of measurements for which L2

			MeasurementQualityFlags bit 6 is set
QAPctCloudDataNotSynchronized	HE5T_NATIVE_INT	1	Percent of measurements for which L2 MeasurementQualityFlags bit 7 is set
OPF_OpfVersion	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxSolarIrradianceAgeInDays	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxSpectralPixelsMissing%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxSpectralPixelsError%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxSpectralPixelWarning%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxWavelengthPrecision	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxRadiancePrecision	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxIrradiancePrecision	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsEarthRad	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsLatitude	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsLongitude	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsSZA	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsSAZ	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsVZA	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsVAZ	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsSurfaceHeight	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LimitsSurfacePressure	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AutomaticQualityFailed	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AutomaticQualitySuspect	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxBinWarning%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxBinMissing%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxBinError%	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxTimeDifference	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxLatitudeDifference	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxLongitudeDifference	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxReflectanceDifference	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_FixedContrast_AIVIS	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Reflectance_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AerosolIndexUV_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_SmallPixelVarianceUV_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_SmallPixelVarianceVIS_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_CloudFraction_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_RMS_Threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AI_uv0	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AI_vis0	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_NUV_Fit_exponent	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_NUV_Fit_maxDistance	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_NUV_Fit_maxNodes	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Rad_UV2_Offset	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Rad_UV2_Slope	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Irrad_UV2_Offset	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Irrad_UV2_Slope	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Rad_VIS_Offset	HE5T_NATIVE_CHAR	1	OPF Parameter

OPF_Rad_VIS_Slope	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Irrad_VIS_Offset	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Irrad_VIS_Slope	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Albedo_threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_LER_threshold	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MaxNumberOfPassedAerosolModels	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Wavelengths	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MW_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Output_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Wavelength_Bin_Size	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_NUV_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AI_UV_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_AI_VIS_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Cloud_wavelength_index	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Overlap_wavelength_index	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Diagnostic_wavelength_indices	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Wavelength_UV2-VIS_boundary	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseOceanBRDFinMW	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseOceanBRDFinNUV	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseNearUVMethod	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseMultiWavelengthMethod	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_MWPostSelectionMethod	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseFixedContrast_AIVIS	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_NUV_fit_noPreselection	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_SplineTension	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Air_Transmission	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Color_Coefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Table_Wavels	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Water_Absorption_Coefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Water_Scattering_Coefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Particle_Scattering_C	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Particle_Scattering_Pspm	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Particle_Scattering_Lambda0	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Particle_Scattering_m	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Chl_Absorption_Coefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_Chl_Absorption_P	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_DOM_Absorption_g	HE5T_NATIVE_CHAR	1	OPF Parameter

OPF_Ocean_DOM_Absorption_S	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Ocean_DOM_Absorption_lambda0	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_WhitecapCoverageCoefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_WhitecapReflectanceCoefs	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_SunGlintAngleThresh			
OPF_Rdif	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_UseWavelengthFitCoefficient			
OPF_XTrackQualityFlagsErrorMask			
OPF_Level1ReadBufferSize	HE5T_NATIVE_CHAR	1	OPF Parameter
OPF_Level2WriteBufferSize	HE5T_NATIVE_CHAR	1	OPF Parameter

3.6 Data File Size

The size of the data files depends on the number of measurements and whether it is generated from a Global or Zoom-in Level 1B product. Table 15 shows estimates for the data file for an orbit of Global data and part of the orbit of Global or Zoom-in data.

Table 16. Estimated data file sizes.

L1B Product	Duration [min]	Dimensions		File Size [Mbytes]	Size per Groundpixel [bytes]
		nTimes	nXtrack		
Global	53 (orbit)	1600	60	~18 TBC	TBD
Global	10	300	TBD	TBD	TBD
Zoom-in	10	300	TBD	TBD	TBD

4 The Metadata File

4.1 Description

The metadata file contains the metadata of the granule. It is produced by call to the SDP Toolkit.

4.2 Format

The metadata file is in ASCII.

4.3 Structure

The metadata uses ODL.

Metadata Fields
The metadata fields for the ECS metadata are listed in tables 12, 13 and 14.