



PREPARATION AND OPERATIONS OF THE MISSION PERFORMANCE CENTRE
(MPC) FOR THE COPERNICUS SENTINEL-3 MISSION

Product Data Format Specification - OLCI Level 2
Land Products



*Mission
Performance
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AMENDMENT POLICY

This document shall be amended by releasing a new edition of the document in its entirety. The Amendment Record Sheet below records the history and issue status of this document.

Amendment Record Sheet

ISSUE	DATE	REASON
1.0	01 Oct 2012	DR1 data-package release
1.1	18 Dec 2012	DR1 update and DR2 release
1.2	12 Feb 2013	Change of Template
1.3	04 Dec. 2013	DR2 update
1.4	24 Mar 2014	RIDs and SPRs correction update
1.5	31 Mar 2014	PDGS PRE-V2 alignment
1.6	15 May 2014	DV2 update
1.7	23 July 2014	Correction of typos
1.8	18 Nov 2014	Correct error on reduced resolution product size
1.9	10 Feb 2015	Update references
1.10	28 May 2015	Implementation of the launch critical changes
2.0	30 May 2016	Implementation of the minor changes
2.2	09 Oct 2017	Documentation split into: L1, L2 land and L2 marine volumes
2.3	20 Mar 2020	Introduction of the COASTLINE Flag
2.4	19 May 2021	OGVI renaming in GIFTAPAR (Green Instantaneous Fraction of Absorbed Photosynthetically Available Radiation); renaming of all uncertainty variable <code>var_err</code> into <code>var_unc</code> and corresponding description update.

Document Change Record

No.	Change in Issue	Description	Affected Section
1	1.1	S3IPF-319: length of product type set to 11 characters.	
2	1.1	S3IPF-372: Secondary metadata for OLCI L1 SPC is maintained in Excel file only.	
3	1.1	S3IPF-390: browse product manifest description pushed to metadata specification document	
4	1.1	S3IPF-450: global attributes are referred to from the "product structures" volume of the PDS.	

No.	Change in Issue	Description	Affected Section
5	1.1	S3IPF-451: CF standard name use is defined in the product structure volume.	
6	1.1	S3IPF-456 and S3IPF-487: Quality flags details provided.	
7	1.1	S3IPF-457: manifest content refers to Excel file. Clarification on the number of browse images.	
8	1.1	S3IPF-458: References and links repaired throughout the document.	
9	1.1	S3IPF-472: Secondary metadata for OLCI L1 SPC is maintained in Excel file only.	
10	1.1	S3IPF-475: Manifest section reviewed	
11	1.1	S3IPF-485: global attributes are referred to from the "product structures" volume of the PDS. All justification for not including all attributes are in this document.	
12	1.1	S3IPF-486: DEM_corrected_longitude changed to longitude (same for latitude).	
13	1.1	S3IPF-507: column availability to the user removed.	
14	1.1	S3IPF-520: add caption to tables, correct TOC errors, correct wrong references.	
15	1.2	Change of template.	Entire document
16	1.3	S3IPF-390: secondary metadata reference for Browse products removed	4.4
17	1.3	S3IPF-457: Improve browse product description	4.4.3
18	1.3	S3IPF-487: Straylight risk flag included in the flag definitions	4.2.1.3.1
19	1.3	S3IPF-913 and 912: special changed to spatial, radiometric to spectral	7.1.3
20	1.3	S3IPF-922: change manifest name in table 4-1 and link to section	4.2.1.1
21	1.3	S3IPF-928: clarify the scope of table 4-22	4.2.2.4.1.2
22	1.3	S3IPF-929: harmonize the definition of the global attributes	4.3.2.4.2

No.	Change in Issue	Description	Affected Section
23	1.3	S3IPF-792 and 930: remove the reference to specific metadata and to DPM	4.4.1
24	1.3	S3IPF-794: update of AD references	5.2
25	1.3	S3IPF-932: package map of the products updated	5.1
26	1.3	S3IPF-687: Section 4.2.1.2 renamed to Manifest file	4.2.1.2
27	1.3	S3IPF-689 and 793: Reference to SLSTR removed	5
27	1.3	S3IPF-686: Package summary completed, introductory sentence reworded	4.2.1.1
28	1.3	S3IPF-692: Size of the products updated	7
29	1.3	S3IPF-693: Driver TN reference replaced	7.1.1
30	1.3	S3IPF-691: Driver TN reference replaced with product structure document	5.2
31	1.3	S3IPF-694: List of AD and RD updated	1.3
32	1.3	S3IPF-699: OLQC section removed	4.2.2.4.2
33	1.3	S3IPF-787: IWV description moved to a common section for water and land products	4.2.2.3, 4.2.3.3
34	1.3	S3IPF-789: water replaced with land in description field	4.2.3.1.1
35	1.3	S3IPF-790: clarification for reference pressuer levels variable	4.2.4.5
36	1.3	Harmonization for S3IPF-696	4.1.2
37	1.3	S3IPF-907: RISKGLINT changed to HIGHGLINT	4.2.2.4.1.1
38	1.4	Information package map and data object section update	5.1, 5.3
39	1.5	Wrong ADFS reference (S3IPF-457)	4.4
40	1.5	AD reference update	1.3.1
41	1.6	AD reference update	1.3.1
42	1.7	Correct typos in the content of instrument_data.nc file	Table 4-1, 4.2, 4-9, 4-22
43	1.8	Correct error on product size for the RR (1 TP every row)	7
44	1.8	Remove unit for Level 2 reflectance	4.2.2.3.1
45	1.9	Reference update	1.3

No.	Change in Issue	Description	Affected Section
46	1.10	Additional global attributes	4.1.3.1
47	1.10	Complete product variable attributes	4.2
48	1.10	Addition of OTCI_quality_flags variable	4.2.3.3.2
49	1.10	Deletion of flag OTCI_CLASS_ANG	4.2.3.4.1
50	2.2	Common and Level 2 Land information are gathered in a separate document	
51	2.3	Introduction of the COASTLINE Flag	7.1.1.4.1.1
52	2.4	Update the OLCI Browse Products Tree for OGVI renaming into GIFAPAR	3.1
53	2.4	Update the IWV data set description to reflect uncertainty variables renaming	4.2.1.1
54	2.4	Update the L2 Land package description for OGVI renaming into GIFAPAR	7.1.1.1
55	2.4	Update name and content of the gifapar.nc file (former ogvi.nc) and the rc_gifapar.nc (former rc_ogvi.nc)	7.1.1.1.1
56	2.4	Update section title and content to reflect impact of OGVI renaming on file name and content	7.1.1.3.1
57	2.4	Update OTCI uncertainty variable name and description	7.1.1.3.2
58	2.4	Update LQSF flag names and description according to OGVI renaming into GIFAPAR	7.1.1.4.1.1
59	2.4	Update LQSF masks description according to OGVI renaming into GIFAPAR	7.1.1.4.1.2
60	2.4	Update label and content of Table 7-8 to reflect renaming of rc_ogvi.nc file into rc_gifapar.nc and var_err variables into var_unc	7.1.1.4.2
61	2.4	InformationPackage Map of Land L2 products updated to reflect OGVI renaming.	8.1.1
62	2.4	Update Land L2 products Data Objects description to reflect OGVI renaming.	8.3.1.1 & 8.3.2
63	2.4	Update Land L2 products size section according to OGVI renaming	9.1.1

1. INTRODUCTION

1.1 Purpose and Scope

This document aims to identify and specify the format of Sentinel 3 OLCI Level 2 Land products, browse products included.

1.2 Structure of the Document

In addition to this introduction, the document is divided into a number of major sections that are briefly described below:

Chapter Number	Title	Contents
1	INTRODUCTION	This section.
2	OVERVIEW OF THE INSTRUMENT: OLCI	A description of the main features and characteristics of the OLCI instrument is provided here.
3	PRODUCT OVERVIEW	The Product Tree for OLCI instruments and the product names convention are specified here.
4	OLCI PRODUCT FORMAT: COMMON PART	In this section the format of each OLCI common elements is specified. NetCDF Data Files of each product are reported in this section.
5	MANIFEST FILE: COMMON PART	In this section details for the implementation of the common part of the manifest file is provided.
6	XML SCHEMAS	In this section details of the schemas used to generate the manifest is provided.
7	OLCI PRODUCT FORMAT	In this section the format of each OLCI Level 2 Land is specified. NetCDF Data Files of each product are reported in this section.
8	MANIFEST FILE	In this section details for the implementation of the manifest file is provided.
9	PRODUCT SIZE	In this section the size of each file composing the OLCI products is provided.

Table 1-1: Document Structure

1.3 Applicable and Reference Documents

1.3.1 Applicable documents

The following table lists the documents with a direct bearing on the content of this document.

ID	Document	Reference
AD- 1	Sentinel 3 PDGS File Naming Convention	EUM/LEO-SEN3/SPE/10/0070 GMES-S3GS-EOPG-TN-09-0009, 1.4, 24/06/2016
AD- 2	Product Data Format Specification - Product Structures	S3IPF.PDS.002, Issue 1.7, 09/10/2017
AD- 3	Drivers for the S3 PDGS Processing Function Implementation	GMES-GSEG-EOPG-TN-11-0062, i1r7, 27/06/2014
AD- 4	Metadata Specification, Excel document	S3IPF.PDS.008, i3r4 – 09/10/2017
AD- 5	XML Schemas.zip – Zip file containing all the schemas used to represent the metadata	S3IPF PDS 009, i3r1 – 09/10/2017
AD- 6	Sentinel SAFE Control Book Volume 1 – Core Specifications	GAEL-P264-DOC-0001-01-01, i1r1, 05/06/2012
AD- 7	Auxiliary Data Format Specification – OLCI Level 2	S3IPF.PDS.007.2, i2r9 09/10/2017
AD-8	Product Data Format Specification – OLCI Level 2 Marine	S3IPF.PDS.004.3, Issue 2.2 09/10/2017

1.3.2 Reference documents

The following reference documents contain information supporting this document.

ID	Document	Reference
RD- 1	CCSDS 661.0-B-0 XFDU structure and construction rules	Issue Sept. 2008
RD- 2	Product Data Format Specification - Level 0	S3IPF.PDS.001, i1r8, 09/10/2017
RD- 3	Sentinel 3 Level 0, Level 1a/b/c Products Definition Part 2: Optical Products. Volume 1: Introduction, Conventions, and Common Structures (SY-4)	S3-RS-ACR-SY-00001, i8r0, 30/01/2015
RD- 4	Sentinel-3 Level 0, Level 1a/b/c Products Definition Part 2: Optical Products Volume 2: OLCI L0, L1b Products (SY-4)	S3-RS-ACR-SY-00004, i8r1, 17/04/2015
RD- 5	Sentinel-3 Optical products and Algorithm Definition: OLCI Product Definition	S3-L2-SD-05-C-ACR-PD, i2r5A, 25/09/2012
RD- 6	Sentinel-3 Optical products and Algorithm Definition: OLCI Level 2 Input Output Data Description	S3-L2-SD-08-C-ACR-IODD, i2r11.A, 07/02/2014

1.4 Terms, Definitions and Abbreviated Terms

Terms, Definitions and Abbreviated Terms are identified in the common volume of the product format specifications in [AD- 2].

1.5 Intellectual property rights for specific parts this document

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Section	IPR/Document Reference
Section 4.2.1 and sub-sections	Document Title: Sentinel-3 Optical products and Algorithm Definition: OLCI Product Definition Document Reference: S3-L2-SD-05-C-ACR-PD Issue: i2r5.A Date: 25/09/2012
Section 4.2.2 and sub-sections	
Section 7.1.1.3 and sub-sections	Document Title: Sentinel-3 Optical products and Algorithm Definition: OLCI Level 2 Input Output Data Description Document Reference: S3-L2-SD-08-C-ACR-IODD Issue: i2r10.A Date: 25/09/2012
Section 7.1.1.4 and sub-sections	

2. OVERVIEW OF THE INSTRUMENT: OLCI

The products specified in this document refer to the processed data coming from the OLCI instrument on-board Sentinel 3 satellite.

OLCI (Ocean and Land Colour Instrument) is a medium resolution push-broom imaging spectrometer of MERIS heritage, flown on Envisat, but with a slightly modified observation geometry: the FOV (Field of View) is tilted towards the west (~ 12° away from the sun), minimizing the sun-glint effect over the ocean and offering a wider effective swath (~ 1300 km, overall FOV of 68.5°). The sampling distance is 1.2 km over the open ocean and 0.3 km for coastal zone and land observations.

The FOV of OLCI is divided between five cameras on a common structure with the calibration assembly. Each camera has an optical grating to provide the minimum baseline of 16 spectral bands required by the mission together with the potential for optional bands for improved atmospheric corrections.

Each camera is constituted of a Scrambling Window Element to comply with the polarization requirement, a COS (Camera Optical Sub-Assembly) for the spectral splitting of the different wavelengths, a FPA (Focal Plane Assembly) with a CCD for the signal detection and a VAM (Video Acquisition Module) for the monitoring of the analog signal. The optical sub-assembly of each camera includes its own grating and provides the 21 spectral bands required by the mission.

A calibration assembly, including a rotation wheel with five different functions for normal viewing, dark current, spectral and radiometric calibrations insure the calibration of the instrument.

OLCI is equipped with on-board calibration hardware based on Sun diffusers. There are 3 Sun diffusers: 2 "white" diffusers dedicated to radiometric calibration, and one including spectral reflectance features dedicated to spectral calibration:

The OLCI calibration is undertaken in the region of the orbit between the observation phase and the eclipse period. Each calibration sequence begins with a dark current evaluation.

3. PRODUCT OVERVIEW

A graphical representation of the product tree for OLCI instrument is provided in Figure 3-1.

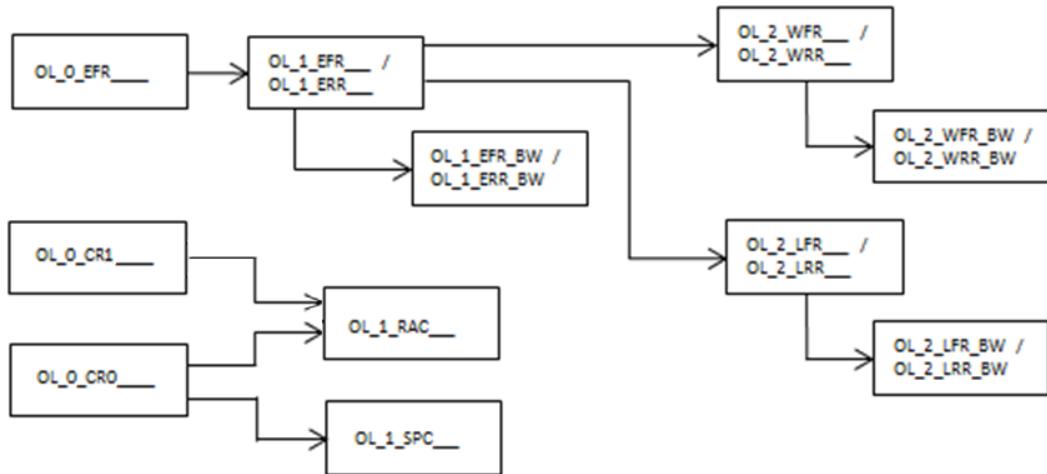


Figure 3-1: OLCI Product Tree

3.1 Product Tree

3.1.1 Science Products Tree

The S-3 OLCI products are summarized in Table 3-1:

Product type	Description	Level
OL_1_EFR____	Full Resolution top of atmosphere radiance	Level 1
OL_1_ERR____	Reduced Resolution top of atmosphere radiance	Level 1
OL_1_RAC____	Dark offset and gain coefficients from radiometric calibration	Level 1
OL_1_SPC____	Wavelength characterization from spectral calibration	Level 1
OL_2_WFR____	Full Resolution Water & Atmosphere geophysical products	Level 2 Marine
OL_2_LFR____	Full Resolution Land & Atmosphere geophysical products	Level 2 Land
OL_2_WRR____	Reduced Resolution Water & Atmosphere geophysical products	Level 2 Marine
OL_2_LRR____	Reduced Resolution Land & Atmosphere geophysical products	Level 2 Land

Table 3-1: OLCI products tree

3.1.2 Browse Products Tree

Browse Products are meant to support the user in the analysis of quality and suitability of the optical products only.

The OLCI Browse Products Tree is the following:

Product type	Description	Main Product	Subsampled Parameters
OL_1_EFR_BW	Quick Look of Full Resolution top of atmosphere	OL_1_EFR____	FR radiances
OL_1_ERR_BW	Quick Look of Reduced Resolution top of atmosphere	OL_1_ERR____	RR radiances
OL_2_WFR_BW	Quick Look of Full Resolution Water & Atmosphere geophysical products	OL_2_WFR____	<ul style="list-style-type: none"> • Total Backscattering coefficient • Total Absorption coefficient • Phytoplankton absorption coefficient • Algal Pigment Concentration • Total Suspended Matter Concentration
OL_2_WRR_BW	Quick Look of Reduced Resolution Water & Atmosphere geophysical products	OL_2_WRR____	<ul style="list-style-type: none"> • Total Backscattering coefficient • Total Absorption coefficient • Phytoplankton absorption coefficient • Algal Pigment Concentration • Total Suspended Matter Concentration
OL_2_LFR_BW	Quick Look of Full Resolution Land & Atmosphere geophysical products	OL_2_LFR____	<ul style="list-style-type: none"> • Green instantaneous FAPAR • Terrestrial Chlorophyll Index
OL_2_LRR_BW	Quick Look of Reduced Resolution Land & Atmosphere geophysical products	OL_2_LRR____	<ul style="list-style-type: none"> • Green instantaneous FAPAR • Terrestrial Chlorophyll Index

Table 3-2: OLCI Browse Products Tree

3.2 Product Naming Convention

The names of the OLCI products comply with the Sentinel 3 file naming convention, according to [AD- 1].

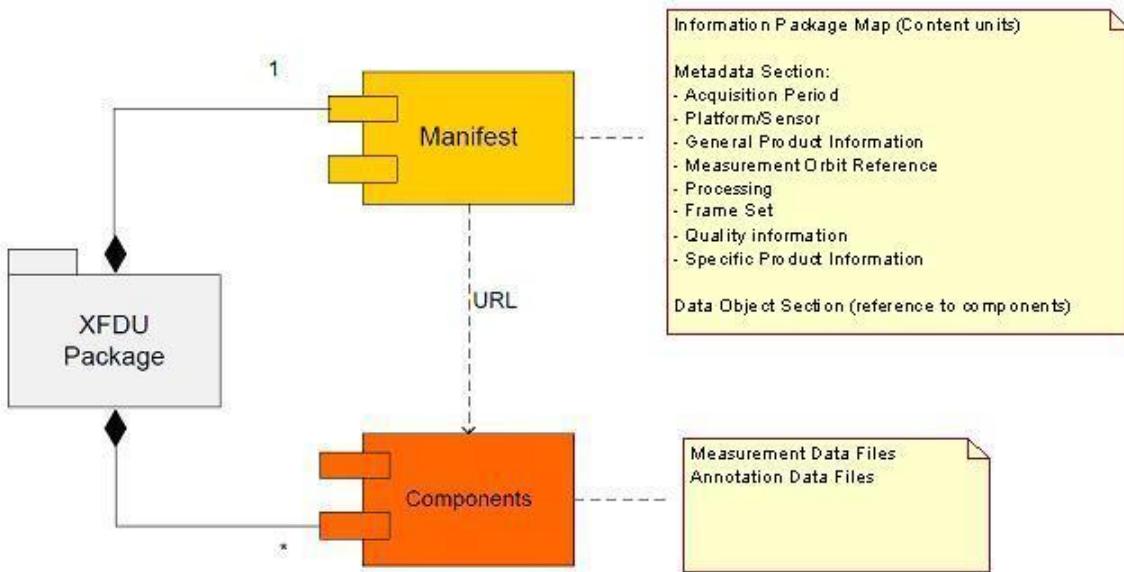
4. OLCI PRODUCT FORMAT SPECIFICATION: COMMON PART

4.1 General Product Structure

4.1.1 Package Layout

The format of every Sentinel 3 product is described in [AD- 2]. The Product Package is sketched in Figure 4-1.

Figure 4-1: XFDU package



In the following sections, the physical composition of each package is specified for the OLCI instrument.

The components of the package that are not part of the current operational production baseline are identified with a flag in the column N.O. (Not Operational). These components might be required to be generated at a later time during the mission lifecycle.

4.1.2 Manifest file

The manifest file is a set of metadata information related to the description of the product. It includes a common structure section, called primary metadata, and a specific section called secondary metadata.

4.1.2.1 Primary Metadata

The primary metadata is contained in various wrapped metadata units within the Sentinel-SAFE manifest: "acquisitionPeriod", "platform", "generalProductInformation", "orbitReference", "processing", "qualityInformation", "frameSet", and "olciProductInformation". The fields are described in [AD- 5].

4.1.2.2 Secondary Metadata

The secondary metadata section contains the information specific to the instrument, level or mode applied during the processing. The fields are described in [AD- 5].

4.1.3 Measurement Data Files and Annotation Data Files

The format of the measurement and annotation data files is NetCDF 4.

A NetCDF file contains dimensions, variables, and attributes, which all have both a name by which they are identified. These components can be used together to capture the meaning of data and relations among data fields in an array-oriented data set.

The global attributes defined for each netCDF file composing the products are fully defined in the common volume of the product data format specification documents named "Product structures" and referenced as [AD- 2].

4.1.3.1 Common additional global attributes

Additional global attributes common to all OLCI files are specifically defined. These attributes aims to ensure the self-containment of the dataset. There are defined in the following table and their value should be adapted according to the file.

Element name	Description	T	D
absolute_orbit_number	Absolute orbit number during which data contained within the product have been acquired	u32	1
start_time	Product start date and time (yyyy-mm-ddThh:mm:ss.ssssssZ)	S	1
stop_time	Product stop date and time (yyyy-mm-ddThh:mm:ss.ssssssZ)	S	1
comment	Miscellaneous extra information (empty)	S	1
resolution	Dataset resolution (across- and along-track) in meters unit function of the associated grid and view (except in Calibration modes)	S	1
ac_subsampling_factor	Across-track FR product pixel to Tie-point subsampling factor (except in Calibration modes)	i16	1
al_subsampling_factor	Along-track FR product pixel to Tie-point subsampling factor (except in Calibration modes)	i16	1

Table 3: Additional global attributes common to OLCI L1 and L2 products

4.2 Earth Observation Products

4.2.1 Common Measurement Files

The following file is common to both LAND and WATER Level 2 products.

4.2.1.1 Integrated Water Vapour

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
IWV	Integrated water vapour column above the current pixel		uc	rows columns
units	UDUNITS unit name	kg.m-2		1
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
IWV_unc	Uncertainty estimate for the Integrated water vapour column above the current pixel		uc	rows columns
units	UDUNITS unit name	kg.m-2		1
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1

Table 4-4: OL_2_WFR____/OL_2_WRR____/ OL_2_LFR____/OL_2_LRR IWV description

4.2.2 Common Annotation Files

In the following sections, the content of the common ADS (annotation datasets) is detailed.

4.2.2.1 Time Coordinates

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)		st	1
time_stamp	Measurement Time Stamp for each line of the product		sll	rows
standard_name	CF Standard name	time		1
units	UDUNITS unit name	"microseconds since 2000-01-01 00:00:00"		1
_FillValue	Default value for missing data	-1		

Table 4-5: Time annotation data file description

4.2.2.2 Geo Coordinates

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
longitude	DEM corrected longitude]-180; 180]	sl	rows columns
standard_name	CF Standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
latitude	DEM corrected geodetic latitude	[-90; 90]	sl	rows columns
standard_name	CF Standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
altitude	Surface elevation above reference ellipsoid	[-1000; 9000]	ss	rows columns
standard_name	CF Standard name	altitude		1
units	UDUNITS unit name	m		1

Table 4-6: Geo coordinates annotation data file description

4.2.2.3 Geo Coordinates Tie-Points

Element name	Description	Range or value	T	D
<code>tie_rows</code>	Number of tie point rows in the product			
<code>tie_columns</code>	Number of tie point columns in the product	77		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
longitude	longitude at tie points	[]-180; 180]	sl	tie_rows tie_columns
standard_name	CF Standard name	longitude		1
units	UDUNITS unit name	degrees_east		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
latitude	Geodetic latitude at tie points	[-90; 90]	sl	tie_rows tie_columns
standard_name	CF Standard name	latitude		1
units	UDUNITS unit name	degrees_north		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1

Table 4-7: Geo coordinates tie points annotation data file description

4.2.2.4 Geometries Tie-Points

Element name	Description	Range or value	T	D
tie_rows	Number of tie point rows in the product			
tie_columns	Number of tie point columns in the product	77		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
SZA	Sun Zenith Angle at tie points	[0; 180]	ul	tie_rows tie_columns
units	UDUNITS unit name	degrees		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		
SAA	Sun Azimuth Angle at tie points]180; 180]	sl	tie_rows tie_columns
units	UDUNITS unit name	degrees		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		
OZA	Observation (Viewing) Zenith Angle at tie points	[0; 180]	ul	tie_rows tie_columns
units	UDUNITS unit name	degrees		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		
OAA	Observation (Viewing) Azimuth Angle at tie points]180; 180]	sl	tie_rows tie_columns
units	UDUNITS unit name	degrees		1
scale_factor	Value to be multiplied to packed data to unpack it	1.e-6		1
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		

Table 4-8: Geometries tie points annotation data file description

4.2.2.5 Meteorology Tie-Points

Element name	Description	Range or value	T	D
<code>tie_rows</code>	Number of tie point rows in the product			
<code>tie_columns</code>	Number of tie point columns in the product	77		
<code>tie_pressure_levels</code>	Number of pressure levels in the temperature profile provided at Tie Points	25		
<code>wind_vectors</code>	Dimensions for wind vector	2		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
<code>horizontal_wind</code>	Horizontal wind vector at 10m altitude	[-100; 100]	fl	<code>tie_rows</code> <code>tie_columns</code> <code>wind_vectors</code>
units	UDUNITS unit name	m.s-1		1
_FillValue	Default value for missing data	9.96921e36		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1
<code>sea_level_pressure</code>	Mean sea level pressure	[0; 1500]	fl	<code>tie_rows</code> <code>tie_columns</code>
standard_name	CF Standard name	"air_pressure_at_sea_level"		1
units	UDUNITS unit name	hPa		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1
<code>total_ozone</code>	Total columnar ozone	[0; 100]	fl	<code>tie_rows</code> <code>tie_columns</code>
standard_name	CF Standard name	"atmosphere_mass_content_of_ozone"		1
units	UDUNITS unit name	Kg.m-2		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1

Element name	Description	Range or value	T	D
humidity	Relative humidity	[0; 100]	fl	tie_rows tie_columns
standard_name	CF Standard name	"relative_humidity"		1
units	UDUNITS unit name	%		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1
reference_pressure_level	Reference pressure levels	[0; 1500]	fl	tie_pressure_levels
standard_name	CF Standard name	"air_pressure"		1
units	UDUNITS unit name	hPa		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1
atmospheric_temperature_profile	Atmospheric temperature profile	[0; 400]	fl	tie_rows tie_columns tie_pressure_levels
standard_name	CF Standard name	"air_temperature"		1
units	UDUNITS unit name	K		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1
ancillary_variables	List of variables that are closely associated to this data	reference_pressure_level		1
total_column_water_vapour	Total column water vapor	[0; 100]	fl	tie_rows tie_columns
standard_name	CF Standard name	"atmosphere_water_vapor_content"		1
units	UDUNITS unit name	Kg.m-2		1
_FillValue	Default value for missing data	-1		
coordinates	List of auxiliary coordinates variables related to the variable	latitude longitude		1

Table 4-9: Meteorological tie points annotation data file description

Note: The atmospheric_temperature_profile variable is a 3 dimensional array. Information is provided at the tie point position and at different altitudes defined by pressure levels. Those levels are defined through the variable "reference pressure level"

4.2.2.6 Instrument Data

Element name	Description	Range or value	T	D
rows	Number of rows in the product			
columns	Number of columns in the product	FR: 4865 RR: 1217		
bands	Number of OLCI acquisition bands	21		
detectors	Number of detectors	3700		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
detector_index	Detector index	[0; 3699]	ss	rows columns
_FillValue	Default value for missing data	-1		1
frame_offset	Re-sampling along-track frame offset	[-15; 15]	ss	detectors
ancillary_variables	List of variables that are closely associated to this data	"detector_index"		
lambda0	OLCI pixels characterized central wavelength	[390; 1040]	fl	bands detectors
units	UDUNITS unit name	nm		1
_FillValue	Default value for missing data	-1		1
ancillary_variables	List of variables that are closely associated to this data	"detector_index FWHM"		
FWHM	OLCI bandwidths (Full Widths at Half Maximum)	[0; 650]	fl	bands detectors
units	UDUNITS unit name	nm		1
_FillValue	Default value for missing data	-1		1
ancillary_variables	List of variables that are closely associated to this data	"detector_index lambda0"		
solar_flux	In-band solar irradiance, seasonally corrected.	[500; 2500]	fl	bands detectors
units	UDUNITS unit name	mW.m-2.nm-1		1
_FillValue	Default value for missing data	-1		1

Element name	Description	Range or value	T	D
ancillary_variables	List of variables that are closely associated to this data	"detector_index lambda0"		
relative_spectral_covariance	Relative spectral covariance matrix		fI	bands bands
ancillary_variables	List of variables that are closely associated to this data	"detector_index lambda0"		

Table 4-10: Instrument data annotation data file description

5. MANIFEST FILE DESCRIPTION: COMMON PART

The purpose of this section is to describe in detail all the data sets that are included with any of the Sentinel-3 OLCI product. Most of the description are common to all products and are therefore described in [AD- 2].

Only the common parts are detailed in this section.

5.1 Metadata Section

See [AD- 2] for the metadata general description.

5.2 Data Object Section

The data object section of the manifest includes one data object per data object pointer. Each data object pointer is identified with its dataObjectID as defined in the dedicated information package map.

5.2.1 Common annotation Data Files

Each common annotations Data File constitutes a Data Object composed as follows:

Name				Description	Data type	Occ.	Value
Data Object	ID	byte Stream	ID	mimeType	size		
				This element references the Data Component included in the product.	U	1..*	
				Data Component ID	S	1	"timeCoordinatesData"
				Pointer to the data Component	U	1..*	
				Byte stream ID	S	0..1	
				MIME type for the referenced Data Component	E	1	"application/x-netcdf"
				Size of the Data Object File	L	1	

Name			Description	Data type	Occ.	Value
		fileLocation	Description of the location of the Data component file	U	1	
		locator Type	Type of the file location	URL	0..1	URL
		href	Relative path of the file (in the file system) containing the referenced Data Component	S		“time_coordinates.nc”
		textInfo	Textual description of the Data Component	S	0..1	
		checksum	Checksum for the Data Component	U	1	
		checksumName		E	1	MD5

Table 5-1: Time coordinates Metadata Object

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the product.	U	1..*	
	ID			Data Component ID	S	1	“geoCoordinatesData”
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		 size		Size of the Data Object File	L	1	
		 fileLocation		Description of the location of the Data component file	U	1	
			 locator Type	Type of the file location	URL	0..1	URL
			 href	Relative path of the file (in the file system) containing the referenced Data Component	S		“geo_coordinates.nc”
			 textInfo	Textual description of the Data Component	S	0..1	
		 checksum		Checksum for the Data Component	U	1	
			 checksumName		E	1	MD5

Table 5-2: Geo-coordinates Metadata Object

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the product.	U	1..*	
	ID			Data Component ID	S	1	"tieGeoCoordinatesData"
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		mimeType		MIME type for the referenced Data Component	E	1	"application/x-netcdf"
		size		Size of the Data Object File	L	1	
		fileLocation		Description of the location of the Data component file	U	1	
			locator Type	Type of the file location	URL	0..1	URL
			href	Relative path of the file (in the file system) containing the referenced Data Component	S		"tie_geo_coordinates.nc"
			textInfo	Textual description of the Data Component	S	0..1	
		checksum		Checksum for the Data Component	U	1	
			checksumName		E	1	MD5

Table 5-3: Tie geo-coordinates Metadata Object

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the product.	U	1..*	
	ID			Data Component ID	S	1	"tieGeometriesData"
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	"application/x-netcdf"
		 size		Size of the Data Object File	L	1	
		 fileLocation		Description of the location of the Data component file	U	1	
			 locator Type	Type of the file location	URL	0..1	URL
			 href	Relative path of the file (in the file system) containing the referenced Data Component	S		"tie_geometries.nc"
			 textInfo	Textual description of the Data Component	S	0..1	
		 checksum		Checksum for the Data Component	U	1	
			 checksumName		E	1	MD5

Table 5-4: Tie geometries Metadata Object

Name			Description	Data type	Occ.	Value
Data Object			This element references the Data Component included in the product.	U	1..*	
	ID		Data Component ID	S	1	“tieMeteoData”
	byte Stream		Pointer to the Data Component	U	1..*	
		ID	Byte stream ID	S	0..1	
		mimeType	MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		size	Size of the Data Object File	L	1	
		fileLocation	Description of the location of the Data component file	U	1	
		locator Type	Type of the file location	URL	0..1	URL
		href	Relative path of the file (in the file system) containing the referenced Data Component	S		“tie_meteo.nc”
		textInfo	Textual description of the Data Component	S	0..1	
		checksum	Checksum for the Data Component	U	1	
		checksumName		E	1	MD5

Table 5-5: Tie meteo Metadata Object

Name			Description	Data type	Occ.	Value
Data Object			This element references the Data Component included in the product.	U	1..*	
	ID		Data Component ID	S	1	“instrumentDataData”
	byte Stream		Pointer to the Data Component	U	1..*	
		ID	Byte stream ID	S	0..1	
		mimeType	MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		size	Size of the Data Object File	L	1	
		fileLocation	Description of the location of the Data component file	U	1	
		locator Type	Type of the file location	URL	0..1	URL
		href	Relative path of the file (in the file system) containing the referenced Data Component	S		“instrument_data.nc”
		textInfo	Textual description of the Data Component	S	0..1	
		checksum	Checksum for the Data Component	U	1	
		checksumName		E	1	MD5

Table 5-6: Instrument data Metadata Object

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the product.	U	1..*	
	ID			Data Component ID	S	1	"OLQCReport"
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	"application/octetstream"
		 size		Size of the Data Object File	L	1	
		 fileLocation		Description of the location of the data component file	U	1	
			 locator Type	Type of the file location	URL	0..1	URL
			 href	Relative path of the file (in the file system) containing the referenced Data Component	S		TBD
			 textInfo	Textual description of the Data Component	S	0..1	"On Line Quality Control Report"
		 checksum		Checksum for the Data Component	U	1	
			 checksumName		E	1	MD5

Table 5-73: OLQC annotation Metadata Object

6. XML SCHEMA

The xml schemas used to generate the product manifest are provided as separate files (see AD- 6).

7. OLCI PRODUCT FORMAT SPECIFICATION

7.1 Earth Observation Products

7.1.1 Level 2 Land Products: OL_2_LFR____/OL_2_LRR____

7.1.1.1 Package Description

An “OL_2_LFR____/OL_2_LRR____” product is composed by a 3 measurement files containing:

- Green Instantaneous FAPAR file
- Terrestrial Chlorophyll Index file
- Integrated Water Vapour (see section 4.2.1.1)

In the following sections the content of the files is reported.

7.1.1.1.1 OL_2_LFR____ / OL_2_LRR____ product summary

Product Package Type OL_2_LFR____, OL_2_LRR____		Description Land and atmospheric geophysical products at full spatial resolution / at reduced spatial resolution			
Product Level	Diss. Timeliness	Product Category	Application Domain	Spatial Resolution	
2	NRT NTC	Available to the user		LND ATM	300m/ 1Km
	Product Dissemination Unit Frame (OL_2_LFR____)/ Stripe (OL_2_LRR____)	Number of Package components	Number of Measurement Data Files	Number of Annotation Data Files	Number of Representation Information Files
		13 ¹	3	8	0
Product Package Structure					
Manifest file (see sections 7.1.1.2 and 8 for more details)					
File name		Composition			
xfdumanifest.xml		XML fields			
Measurement Data files (see section 7.1.1.3 for more details)					
File name		Composition			
gifapar.nc		GIFAPAR, GIFAPAR_unc			
otci.nc		OTCI, OTCI_unc, OTCI_QS			
iwv.nc		IWV, IWV_unc			
Annotation Data files (see section 7.1.1.4 and 4.2.2 for more details)					
File name		Composition			
rc_gifapar.nc		RC681, RC681_unc, RC865, RC865_unc			
lqsf.nc		LQSF			
time_coordinates.nc		time_stamp			
geo_coordinates.nc		longitude, latitude and altitude			
tie_geo_coordinates.nc		longitude, latitude			
tie_geometries.nc		SZA, SAA, OZA, OAA			

¹ Number of Package components includes the manifest and the OLQC Report.

<code>tie_meteo.nc</code>	horizontal_wind, sea_level_pressure, total_ozone, humidity, reference_pressure_level, atmospheric_temperature_profile, total_columnar_water_vapour	
<code>instrument_data.nc</code>	lambda0, FWHM, Solar Flux, detector_index, frame_offset, relative_spectral_covariance	
Representation Information Files		N.O
File name	Composition	
none		

Table 7-1: OLCI Level 2 Land product physical composition

7.1.1.2 Manifest File

The structure of the Manifest element is described in [AD- 2].

7.1.1.2.1 Wrapped Metadata

According to [AD- 2], Wrapped Metadata are grouped in Primary Metadata, common to all Sentinel 3 products and Secondary Metadata, specific for instrument and processing level.

Primary Metadata are described in [AD- 2].

Secondary Metadata for the OLCI instrument are reported in Table 7-2. Last columns of the table indicate the applicability of Metadata fields to the processing Level.

*< Complete secondary metadata is described in details in [AD- 4].
 The content of this table will be embedded in the document when it will be finalized>*

Table 7-2: Secondary Metadata for OLCI products

7.1.1.3 Measurement Data Files

7.1.1.3.1 Green Instantaneous FAPAR file

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
GIFAPAR	Green Instantaneous Fraction of Absorbed Photosynthetically Available Radiation (GIFAPAR) of the current land pixel		uc	rows columns
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
GIFAPAR_unc	Uncertainty estimate for the GIFAPAR of the current land pixel		uc	rows columns
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1

Table 7-3: OL_2_LFR____/OL_2_LRR____ **GIFAPAR** description

7.1.1.3.2 Terrestrial Chlorophyll Index file

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
OTCI	OLCI Terrestrial Chlorophyll Index of the current land pixel		uc	rows columns
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
OTCI_unc	Uncertainty estimate for the OLCI Terrestrial Chlorophyll Index of the current land pixel		uc	rows columns
_FillValue	Value indicating missing data	255		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
OTCI_quality_flags	OLCI Terrestrial Vegetation Index Quality Flags		uc	rows columns
flag_masks	List of bit fields describing boolean or enumerated flags		st	1
flag_meanings	List of flag meanings composing this variable		st	1
flag_descriptions	Further description of the flag meanings		st	1

Table 7-4: OL_2_LFR____/OL_2_LRR____ OTCI description

7.1.1.3.2.1 OTCI_quality_flags meanings

Bit	Flag Name	Flag Meaning
00 & 01	Soil status	Soil status: 3= good, 0 = poor. 2 & 1 not used
02 & 03	Reserved for future use	Both bits always set to 1 (value=12)
04 & 05	Acquisition geometry quality	Acquisition geometry quality: 48=best, 32=good, 16=fair, 0=poor
06 & 07	OTCI i/o range quality	OTCI i/o range quality: 192=good (i & o in range), 0=bad (i or o out of range)

7.1.1.4 Annotation Data Files

7.1.1.4.1 Land Products Quality & Science Flags file

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
LQSF	Classification flags, quality and science flags for Land products.		ul	rows columns
_FillValue	Value indicating missing data	TBD		1

Table 7-5: OL_2_LFR____/OL_2_LRR____ flags description

7.1.1.4.1.1 *Land Products Quality & Science Flags file meanings*

Bit	Flag Name	Flag Description	Applicability
Classification and Quality Flags			
00	INVALID	Invalid flag: instrument data missing or invalid	All
01	WATER	Clear sky water	All
02	LAND	Clear sky land	All
21	COASTLINE	Coastline pixel	All
03	CLOUD	Cloudy pixel.	All
23	CLOUD_AMBIGUOUS	Ambiguous cloudy pixel	ALL
24	CLOUD_MARGIN	Dilatation around (CLOUD+CLOUD_AMBIGUOUS)	ALL
04	SNOW_ICE	Possible sea ice or snow contamination	All
05	INLAND_WATER	Fresh inland waters flag: based on Level 1 land_water flag.	All
06	TIDAL	Pixel is in shallow water; based on Level 1 land_water flag.	All
07	COSMETIC	Cosmetic flag (from level-1b): Missing data filled in by interpolation.	All
08	SUSPECT	Suspect flag (from level-1b): Transmission errors means measurements may be unreliable.	All
09	HISOLZEN	High solar zenith; $\theta_s > 70$ degrees	All
10	SATURATED	Saturation flag; saturated within any band from 400 to 754 nm or in bands 779, 865, 885 and 1020 nm.	Band dependent
11	WV_FAIL	Suspect values derived for the Water Vapour over land; see ATBD SD-03-C02 for details. Set when the following internal flags are raised: ORINPWV_F or OROUTWV_F or L_WV_FAIL	IWV
12	GIFAPAR_FAIL	Suspect values derived for the GIFAPAR ; see ATBD SD-03-C13 for details. Set when the following internal flags are raised: ORINP1_F or OROUT1_F	GIFAPAR , RC681, RC865
13	OTCI_FAIL	Suspect values derived for the OTCI; see ATBD for SD-03-C14 details. Set when the following internal flags are raised: ORINP2_F (OTCI input out of range) or OROUT2_F (OTCI output out of range) or LRAYFAIL_F (problems deriving Rayleigh reflectance).	OTCI
Science Flags			
14	LRAYFAIL	Problems deriving the Rayleigh reflectance over the land. See ATBD SD-03-C15 for details.	
15	GIFAPAR_CLASS_BAD	Flag Bad data from GIFAPAR spectral tests	
16	GIFAPAR_CLASS_WS	Flag water or deep shadow from GIFAPAR spectral tests	
17	GIFAPAR_CLASS_CSI	Flag Cloud, snow or ice from GIFAPAR spectral tests	
18	GIFAPAR_CLASS_BRIGHT	Flag bright soils from GIFAPAR spectral tests	
19	GIFAPAR_CLASS_INVAL_REC	Flag invalid rectification	
20	OTCI_BAD_IN	Input data bad quality: (at least one of B12, B11, B10 is not Valid) or (B12-B11)<Threshold1 or (B11-B10)<Threshold2	
22	OTCI_CLASS_CLSN	Cloud and snow flag: Input data quality flag OK but Cloud shadow or partial snow detected	

25-31	SPARE	Reserved for future use
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Table 7-6: OL_2_LFR____/OL_2_LRR____ flags meaning

Note: the bit number nn means that value 2^{nn} is set to 1 in the flag register pertaining to a given pixel.

7.1.1.4.1.2 Land Products Quality & Science Flags file masks

The scope of the following table is to associate a quality flag to each of the geophysical parameter; it is therefore the reverse mapping wrt the above table.

Product Name	Quality Mask (set means missing data or degraded quality)
GIFAPAR	GIFAPAR_FAIL OR GIFAPAR_CLASS_BRIGHT
RC_681	
RC_865	GIFAPAR_FAIL
OTCI	OTCI_FAIL
IWV	WV_FAIL

Table 7-7: OL_2_LFR____/OL_2_LRR____ flags masks

7.1.1.4.2 Rectified Reflectance file

Element name	Description	Range or value	T	D
rows	Number of rows in the product image			
columns	Number of columns in the product image	FR: 4865 RR: 1217		
<common global attributes>	Common global attributes (including additional as defined in 4.1.3.1)			
RC681	Rectified reflectance for the band 010 on the current land pixel		us	rows columns
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1

Element name	Description	Range or value	T	D
_FillValue	Value indicating missing data	65535		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
RC681_unc	Uncertainty estimate for the Rectified reflectance for the band 010 on the current land pixel		us	rows columns
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
_FillValue	Value indicating missing data	65535		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
RC865	Rectified reflectance for the band 017 on the current land pixel		us	rows columns
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
_FillValue	Value indicating missing data	65535		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1
RC865_err	Uncertainty estimate for the Rectified reflectance for the band 017 on the current land pixel		us	rows columns
units	UDUNITS unit name	mW.m-2.sr-1.nm-1		1
_FillValue	Value indicating missing data	65535		1
scale_factor	Scaling factor used in decoding packed data			1
add_offset	Offset used to in decoding packed data			1

Table 7-8: OL_2_LFR____/OL_2_LRR____ rc_gifapar description

7.2 Browse Products

A browse product consists of a collection of metadata information gathered in the xfdumanifest.xml files and of one or more browse images. The images can represent one or several parameters or combination of parameters stored in one or several image formats.

7.2.1 Manifest File

The structure of the Manifest element is described in [AD- 2].

7.2.1.1 Wrapped Metadata

According to [AD- 2], Wrapped Metadata are grouped in Primary Metadata, common to all Sentinel 3 products.

Regarding the primary metadata: the fields are the same of the parent product, with different values for some fields (which are filled by the browse processor). There is no secondary metadata section for the browse products.

7.2.2 Level 2 products: OL_2_LFR_BW/OL_2_LRR_BW

7.2.2.1 Package Description

7.2.2.1.1 OL_2_LFR_BW/OL_2_LRR_BW product summary

Product Package Type OL_2_LFR_BW, OL_2_LRR_BW		Description OLCI Full/Reduced Resolution Browse L2 Product general structure			
Product Level	Diss. Timeliness	Product Category	Application Domain	Spatial Resolution	
2	(NRT) (NTC)	Not Available to the user			
Product Dissemination Unit N/A		Number of Package components	Number of Measurement Data Files	Number of Annotation Data Files	Number of Representation Information Files
		≥3 ²	≥1	0	0
Product Package Structure					
Manifest file (see section 7.2.1 and 8 for more details)					
File name		Composition			
xfdumanifest.xml		XML fields			
Measurement Data files (see section 7.2.2.2 for more details)					
File name		Composition			
<scientificData>_BrwImage.<ext>		Pseudo color image referred to the scientific data indicated into the component filename			
Annotation Data files					
File name		Composition			
none					
Representation Information Files					
File name		Composition			
none					

Table 7-9: OLCI Full/Reduced Resolution Browse L2 Product physical composition

7.2.2.2 Measurement Data Files

The Browse products contain one or more images corresponding respectively to one or more scientific data. The list of allowed parameters is provided in the processing control parameter file description, section 10.3.2 in AD- 7 ("scientific Fields" container, "Field" parameter). The number of fields to process is set through the 'count' attribute.

The product may contain one or several browse images representing one or several parameters in the allowed image formats (see list of accepted formats in AD- 2 for the list)

² Number of Package components includes the manifest and the OLQC Report.

8. MANIFEST FILE DESCRIPTION

The purpose of this section is to describe in detail all the data sets that are included with any of the Sentinel-3 OLCI product. Most of the description are common to all products and are therefore described in [AD- 2].

Only the IPF specific parts are detailed in this section.

8.1 InformationPackageMap

8.1.1 “OL_2_LFR____/OL_2_LRR____” Level 2 Products

The Information Package Map associated to the package of the OL_2_LFR____/OL_2_LRR____ products is reported in the next table.

Name			Description	Data Type	Value	Occ.
contentUnit			The information package map contains one content unit that includes the product data component included in the product.	Content Unit Type		1
	ID		Identifier of the package	S	“packageUnit”	0..1
	unitType		Describes the type of data referenced by this content unit	S	“Information Package”	0..1
	textInfo		Textual description of the content unit	S	“SENTINEL-3 OLCI Level 2 Land Product”	0..1
	pdiID		Identifier of the Preservation Description Information applicable to this content unit	S	“processing”	1
	dmdID		Identifier of the Metadata applicable to this content unit	S	In any order : "acquisitionPeriod" "platform" "orbitReference" "qualityInformation" "processing" "frameSet" "generalProductInformation" "olciProductInformation"	1
	contentUnit					0..16
		ID	Content unit ID	S	gifaparUnit	1
		unitType		S	“Measurement Data Unit”	1
		textInfo		S	Green Instantaneous FAPAR	0..1
		dmdID	Attribute: Description Metadata Identifier	S	In any order: ‘geoCoordinatesData’ ‘timeCoordinatesData’ ‘lqsfData’	0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
			dataObjectID	S	gifaparData	1
	contentUnit					0..1
		ID	Content unit ID	S	otciUnit	1
		unitType		S	“Measurement Data Unit”	1
		textInfo		S	“OLCI Terrestrial Chlorophyll Index”	0..1
		dmdID	Attribute: Description Metadata Identifier	S	In any order: ‘geoCoordinatesData’ ‘timeCoordinatesData’ ‘lqsfData’	0..1
		dataObject Pointer				1

Name			Description	Data Type	Value	Occ.
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“otciData”	1
	contentUnit					0..1
		ID	Content unit ID	S	iwvUnit	1
		unitType		S	“Measurement Data Unit”	1
		textInfo		S	“Integrated water vapour column”	0..1
		dmdID	Attribute: Description Metadata Identifier	S	In any order: ‘geoCoordinatesData’ ‘timeCoordinatesData’ “lqsfData”	0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“iwvData”	1
	contentUnit					0..1
		ID	Content unit ID	S	rcGifaparUnit	1
		unitType		S	“Annotation Data Unit”	1
		textInfo		S	“Rectified Reflectance”	0..1
		dmdID	Attribute: Description Metadata Identifier	S	In any order: ‘geoCoordinatesData’ ‘timeCoordinatesData’ “lqsfData”	0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“rcGifaparData”	1
	contentUnit					0..1
		ID	Content unit ID	S	lqsfUnit	1
		unitType		S	“Annotation Data Unit”	1
		textInfo		S	“Land Quality and Science Flags”	0..1
		dmdID	Attribute: Description Metadata Identifier	S	In any order: ‘geoCoordinatesData’ ‘timeCoordinatesData’	0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“lqsfData”	1
	contentUnit					1
		ID	Content unit ID	S	geoCoordinatesUnit	1
		unitType		S	“Annotation Data Unit”	1
		textInfo		S	“Geo Coordinates Annotations”	0..1
		dmdID	Attribute: Description Metadata Identifier	S		0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“geoCoordinatesData”	1
	contentUnit					1
		ID	Content unit ID	S	tieGeoCoordinatesUnit	1
		unitType		S	“Annotation Data Unit”	1
		textInfo		S	“Tie-Point Geo Coordinate Annotations”	0..1
		dmdID	Attribute: Description Metadata Identifier	S		0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“tieGeoCoordinatesData”	1
	contentUnit					1
		ID	Content unit ID	S	tieGeometriesUnit	1
		unitType		S	“Annotation Data Unit”	1

Name			Description	Data Type	Value	Occ.
		textInfo		S	“Tie-Point Geometries Annotations”	0..1
		dmdID	Attribute: Description Metadata Identifier	S		0..1
		dataObject Pointer				1
		ID	Data Object pointer ID	S		0..1
		dataObjectID	Data Object element ID	S	“tieGeometriesData”	1
contentUnit	ID		Content unit ID	S	tieMeteoUnit	1
	unitType			S	“Annotation Data Unit”	1
	textInfo			S	“Tie-Point Meteo Annotations”	0..1
	dmdID		Attribute: Description Metadata Identifier	S		0..1
	dataObject Pointer					1
	ID		Data Object pointer ID	S		0..1
	dataObjectID		Data Object element ID	S	“tieMeteoData”	1
contentUnit	ID		Content unit ID	S	timeCoordinatesUnit	1
	unitType			S	“Annotation Data Unit”	1
	textInfo			S	“Time Coordinates Annotations”	0..1
	dmdID		Attribute: Description Metadata Identifier	S		0..1
	dataObject Pointer					1
	ID		Data Object pointer ID	S		0..1
	dataObjectID		Data Object element ID	S	“timeCoordinatesData”	1
contentUnit	ID		Content unit ID	S	instrumentDataUnit	1
	unitType			S	“Annotation Data Unit”	1
	textInfo			S	“Instrument Annotations”	0..1
	dmdID		Attribute: Description Metadata Identifier	S		0..1
	dataObject Pointer					1
	ID		Data Object pointer ID	S		0..1
	dataObjectID		Data Object element ID	S	“instrumentDataData”	1

Table 8-1: Information Package Map for L2 OLCI Land products

8.1.2 “OL_2_LFR_BW/OL_2_LRR_BW” L2 Browse Products

The Information Package Map associated to the package of the OL_2_LFR_BW, OL_2_LRR_BW products is reported in the next table.

Note: The number of image files (N) depends on the configuration set for the execution on the IPF. According to this configuration, one or more scientific fields may be processed and generate images.

Name	Description			Data Type	Value	Occ
contentUnit				Content Unit Type		1
ID			Identifier of the package	S	“packageUnit”	0..1
unitType			Describes the type of data referenced by this content unit	S	“Information Package”	0..1
textInfo			Textual description of the content unit	S	“SENTINEL-3 OLCI Level 2 Browse Product”	0..1
pdiID			Identifier of the Preservation Description Information applicable to this content unit	S	“processing”	1
dmdID			Identifier of the Metadata applicable to this content unit	S	In any order : “acquisitionPeriod” “platform” “orbitReference” “generalInformation” “qualityInformation” “processing” “frameSet”	1
contentUnit						1
ID			Content unit ID	S	brwImageXXUnit, XX=01, ..., N	0..1
unitType				S	“Measurement Data Unit”	1
textInfo				S	“Pseudo Colour Image”	0..1
dmdID			Attribute: Description Metadata Identifier	S		0..1
dataObject Pointer						1
		ID	Data Object pointer ID	S		0..1
		dataObject ctID	Data Object element ID	S	brwImageXXData, XX=01, ..., N	1

Table 8-2: Information Package Map for L2 OLCI Browse Products

8.2 Metadata Section

See [AD- 2] for the metadata general description.

8.3 Data Object Section

The data object section of the manifest includes one data object per data object pointer. Each data object pointer is identified with its dataObjectID as defined in the information package map in section 8.1.

8.3.1 Measurement Data File

8.3.1.1 “OL_2_LFR/OL_2_LRR” Level 2 Products

Data Objects for OLCI OL_2_LFR and OL_2_LRR Level 2 products are listed in the next table.

Name				Description	Data type	Occ.	Value
Data Object	ID	byte Stream	ID	This element references the Data Component included in the L1 product.	U	1..*	
	ID			Data Component ID	S	1	“ gifaparData ”
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		Size		Size of the Data Object File	L	1	
		fileLocation		Description of the location of the data component file	U	1	
			locator Type	Type of the file location	URL	0..1	URL
			href	Relative path of the file (in the file system) containing the referenced Data Component	S		“ gifapar.nc ”
			textInfo	Textual description of the Data Component	S	0..1	
		Checksum		Checksum for the Data Component	U	1	

Name			Description	Data type	Occ.	Value
		checksumName		E	1	MD5
Data Object			This element references the Data Component included in the L1 product.	U	1..*	
	ID		Data Component ID	S	1	“otciData”
	byte Stream		Pointer to the Data Component	U	1..*	
		ID	Byte stream ID	S	0..1	
		 mimeType	MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		Size	Size of the Data Object File	L	1	
		fileLocation	Description of the location of the data component file	U	1	
		locator Type	Type of the file location	URL	0..1	URL
		href	Relative path of the file (in the file system) containing the referenced Data Component	S		“otci.nc”
		textInfo	Textual description of the Data Component	S	0..1	
		Checksum	Checksum for the Data Component	U	1	
		checksumName		E	1	MD5
Data Object			This element references the Data Component included in the L1 product.	U	1..*	
	ID		Data Component ID	S	1	“ivwData”
	byte Stream		Pointer to the Data Component	U	1..*	
		ID	Byte stream ID	S	0..1	
		 mimeType	MIME type for the referenced Data Component	E	1	“application/x-netcdf”
		Size	Size of the Data Object File	L	1	

Name			Description	Data type	Occ.	Value	
		fileLocation	Description of the location of the data component file	U	1		
			locator Type	Type of the file location	URL	0..1	URL
			href	Relative path of the file (in the file system) containing the referenced Data Component	S		“iwv.nc”
			textInfo	Textual description of the Data Component	S	0..1	
		Checksum		Checksum for the Data Component	U	1	
			checksumName		E	1	MD5

Table 8-3: OL_2_LFR/OL_2_LRR Level 2 Data Objects

8.3.1.3 OL_2_LFR_BW/OL_2_LRR_BW" L2 Browse Products

Object for OLCI Level 2 browse products is reported in the next table.

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the L1 product.	U	1..*	
	ID			Data Component ID	S	1	brwImageXXData, XX=01, ..., N
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	One value among: "image/jpeg" "image/tiff" "image/png" "image/jp2"
		size		Size of the Data Object File	L	1	
		fileLocation		Description of the location of the data component file	U	1	
			locator Type	Type of the file location	URL	0..1	URL
			 href	Relative path of the file (in the file system) containing the referenced Data Component	S		One value among: “<.scientificData>_BrwImage.jpeg“ “<.scientificData>_BrwImage.tiff“ “<.scientificData>_BrwImage.png“ “<.scientificData>_BrwImage.jp2“
			textInfo	Textual description of the Data Component	S	0..1	
		checksum		Checksum for the Data Component	U	1	
			checksumName		E	1	MD5

Table 8-4: OLCI Browse Level 2 Data Object

8.3.2 Specific Annotation Data File

Each Annotations Data File constitutes a Data Object composed as follows:

Name				Description	Data type	Occ.	Value
Data Object				This element references the Data Component included in the product.	U	1..*	
	ID			Data Component ID	S	1	"lqsfData"
	byte Stream			Pointer to the Data Component	U	1..*	
		ID		Byte stream ID	S	0..1	
		 mimeType		MIME type for the referenced Data Component	E	1	"application/x-netcdf"
		 size		Size of the Data Object File	L	1	
		 fileLocation		Description of the location of the Data component file	U	1	
			 locator Type	Type of the file location	URL	0..1	URL
			 href	Relative path of the file (in the file system) containing the referenced Data Component	S		"lqsf.nc"
			 textInfo	Textual description of the Data Component	S	0..1	
		 checksum		Checksum for the Data Component	U	1	
			 checksumName		E	1	MD5

Table 8-5: Lqsf Metadata Object

Name			Description	Data type	Occ.	Value	
Data Object			This element references the Data Component included in the product.	U	1..*		
	ID		Data Component ID	S	1	"rcGifaparData"	
	byte Stream		Pointer to the Data Component	U	1..*		
		ID	Byte stream ID	S	0..1		
		mimeType	MIME type for the referenced Data Component	E	1	"application/x-netcdf"	
		size	Size of the Data Object File	L	1		
		fileLocation	Description of the location of the Data component file	U	1		
			locator Type	Type of the file location	URL	0..1	URL
			href	Relative path of the file (in the file system) containing the referenced Data Component	S		"rc_gifapar.nc"
			textInfo	Textual description of the Data Component	S	0..1	
		checksum		Checksum for the Data Component	U	1	
			checksumName		E	1	MD5

Table 8-6: Rc gifapar Metadata Object

9. PRODUCT SIZE

In the following table the approximate size of each OLCI file composing the Level 2 Land products is given.

The sizes computation have been based on a full OLCI acquisition (FR) orbit which corresponds approximately to 60 000 frames (44 minutes). The RR product is based on 15 000 frames.

No file compression is applied.

9.1 OLCI Level 2

9.1.1 Land product (OL_2_LFR____/OL_2_LRR____)

Element name	Description	Size in FR mode in GBytes	Size in RR mode in GBytes
xfdumanifest.xml	Sentinel-SAFE product manifest		
gifapar.nc	OLCI Green Instantaneous FAPAR	0,5437	0,0340
otci.nc	OLCI Terrestrial Chlorophyll Index	0,8155	0,051
iwv.nc	Integrated water vapour column	0,5437	0,0340
rc_gifapar.nc	Rectified Reflectance	2,1748	0,1360
time_coordinates.nc	Time stamp annotations	0,00045	0,00011
geo_coordinates.nc	High resolution georeferencing data	2,7185	0,1700
lqsf.nc	Land Quality and Science Flags	1,0874	0,0680
tie_geo_coordinates.nc	Low resolution georeferencing data	0,0344	0,0086
tie_geometries.nc	Sun and View angles	0,0688	0,0172
tie_meteo.nc	ECMWF meteorology data	0,5335	0,1334
instrument_data.nc	Instrument data	0,5446	0,0349
Total		8,7937	0,6702

Table 9-1: OL_2_LFR____/OL_2_LRR____ product size

9.2 Browse products

Due to the type and level of compression and the format of the image used in the processing, the size of the browse products cannot be accurately defined. Compared to the volume of data of the measurement/annotation, this size may be considered negligible.

End of the document