



GMES Space Component
Sentinel-3 Payload Data Ground Segment
Products Definition Document

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1 INTRODUCTION

1.1 Scope and Purpose

This document is intended to provide the description of the Sentinel-3 products that will be generated within the Sentinel-3 Payload Data Ground Segment by the Sentinel-3 Instrument Processing Facilities (IPFs). It is meant as Sentinel-3 internal reference and it will be maintained within the PDGS project frame.

This document is not intended to be the user reference handbook; it is designed to provide high level information concerning the Sentinel-3 mission, the instruments and the Sentinel-3 data and can be considered as applicable user documentation.

The focus is on the Sentinel-3 products that will be made available to the GMES users, the so called “Users’ Products”. Only a brief overview of the Sentinel-3 mission, instruments and operational modes is provided.

1.2 Background – The Sentinel-3 Mission Context

The Global Monitoring for Environment and Security programme (GMES) is a European initiative for the implementation of information services dealing with environment and security. It is based on observation data received from Earth Observation satellites and ground based information.

Within the GMES programme, the GMES Service Component is in charge of providing value-added data and services to the GMES final users, while the GMES Space Component (GSC) is responsible for providing to the GMES Service Component the necessary EO data and services.

As part of the GMES Space Component Programme, ESA is responsible for developing a fully operational space-based capability to feed the GMES Service Component with satellite data. This capability will be achieved with the implementation of GMES dedicated Earth Observation Missions, the Sentinels missions, under development by ESA. The Sentinel-3 mission is the third of this series of dedicated GMES EO missions, scheduled for launch by mid- 2014.

Access to EO data and services by the GMES Service Component shall however be ensured before the Sentinels era thanks to the GMES Space Component Data Access system (GSCDA) operating different elements.

One of these elements is a set of EO missions capable of satisfying the data requirements from the GMES Service Component. These missions contributing to the GMES Space Component are generically referred to as GMES Contributing Missions (GCMs).

Another element is the Coordinated Data access System (CDS) which is the pre-operational infrastructure being developed by ESA allowing the GMES Service Component to access the GSC data and services before the GMES Sentinels are launched. Although the CDS is initially implemented for the GMES pre-operations phase, it is however designed to support the successive operational phase with the Sentinels. The GSCDA data and services offer is accessible through a portfolio of DataSets (DSs). These DSs are derived from the GMES Services requirements, after trade-off with system capacity and are captured in the GSC Data Access Portfolio (DAP). The DAP

Data Sets are pre-defined collections of coherent multi-mission products responding to specific different users' needs and therefore with different characteristics.

The CDS interfaces with the GMES Service Component for gathering data requests and providing coordinated data access and services, and with the Ground Segment of the GCM's and the Sentinel missions for coordinating the data provision from the GCM's in response to the requests.

The Sentinel missions, as dedicated GSC missions, will be integrated with the CDS to contribute to the overall data provision to the GMES Service Component. The Sentinel missions will interface with the CDS through the Sentinel Ground Segment (**GS**) and particularly through the Payload Data Ground Segment (**PDGS**).

1.3 Sentinel-3 Payload Data Ground Segment

The Sentinel-3 PDGS is the component of the Sentinel-3 system responsible for:

- receiving and processing the Sentinel-3 instrument payload data, including HKTM data;
- ensuring that satellite tasking is performed according to the overall GMES user needs and satellite capabilities;
- guaranteeing that suitable Sentinel-3 products meeting the expected quality and data delay constraints are available to the GMES Users.

The Sentinel-3 PDGS required capabilities are specified in the SRD [RD-1].

The operations concepts of the Sentinel-3 PDGS are defined in the OCD [RD-2].

2 DOCUMENTATION AND DEFINITIONS

2.1 Reference Documents

	TITLE	REF.
[RD-1]	GMES Space Component, Sentinel-3 PDGS System Requirements Document (SRD)	EUM/LEO-SEN3/REQ/09/0002 GMES-GSEG-EOPG-RD-08-0024
[RD-2]	GMES Space Component, Sentinel-3 PDGS Operations Concept Document (OCD)	EUM/LEO-SEN3/TEN/09/0007 GMES-GSEG-EOPG-TN-09-0040
[RD-3]	Product Data Format Specification - SRAL/MWR Level 1 & 2 Instrument Product	S3IPF.PDS.003
[RD-4]	Product Data Format Specification - OLCI Level 1 & 2 Instrument Product	S3IPF.PDS.004
[RD-5]	Product Data Format Specification - SLSTR Level 1 & 2 Instrument Product	S3IPF.PDS.005
[RD-6]	Product Data Format Specification - SYNERGY Level 1 & 2 Instrument Product	S3IPF.PDS.006

2.2 Acronyms

ACRONYM	DESCRIPTION
AATSR	Advanced Along-Track Scanning Radiometer
ADF	Auxiliary Data File
BOA	Bottom of Atmosphere
CDS	Coordinated Data Access System
DAP	Data Access Portfolio
DEM	Digital Elevation Model
DORIS	Doppler Orbitography and Radiopositioning Integrated by Satellite
DS	Data Set
EU	European Union
GIM	Global Ionosphere Map
GMES	Global Monitoring for Environment and Security

GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GS	Ground Segment
GSC	GMES Space Component as federation of Earth Observation Missions
GSCDA	GMES Space Component Data Access system
GSP	GMES Service Projects
HKTM	House-Keeping TeleMetry data
HW	Hardware
IOCR	In-Orbit Commissioning Review
IPF	Instrument Processing Facility
ISP	Instrument Source Packet
L1B	Level-1 B
L2	Level-2
LRM	Low Resolution Mode
LRR	Laser Retro Reflector
MERIS	Medium Resolution Imaging Spectrometer
MWR	Microwave Radiometer
NRT	Near Real Time
OLCI	Ocean and Land Colour Instrument
OLTC	Open Loop Tracking Commands table
OPT	OPTical
PDGS	Payload Data Ground Segment
PF	Platform
POD	Precise Orbit Determination
PRLM	Pseudo Low Resolution Mode
RA-2	Radar Altimeter 2
SALP	Service d'Altimétrie et Localisation Précise (<i>eng.: altimetry and precise positioning service</i>)
SLSTR	Sea and Land Surface Temperature Radiometer

SRAL	SAR Radar Altimeter
SRD	System Requirements Document
SSALTO	Segment-Sol multi-missions d'ALTimétrie, Orbitographie et localisation précise (eng.: <i>multi-mission altimetry, orbit determination and location ground segment</i>)
SSH	Sea Surface Height
SST	Sea Surface Temperature
STC	Short Time Critical
STM	Surface Topography Mission
SWH	Significant wave height
SYN	Synergy product
TOA	Top of Atmosphere
USO	Ultra Stable Oscillator
VGT	VeGeTation

2.3 Document Overview

The present document is divided into the following parts:

Section 1: Introduction, gives scope and purpose and provides background information

Section 2 (this section): Documentation, provides the list of applicable and reference documents, the list of acronyms and a view of the overall document structure

Section 3: Sentinel-3 Mission Overview, provides high level description of the Sentinel-3 mission

Section 4: Sentinel-3 PDGS User Products, provides a view of the Sentinel-3 user products organization and generation approach, together with the list and description of the products.

APPENDIX A: provides the list of the spectral bands used for the Optical Mission products generation.

APPENDIX B: provides the complete list of the Topography Mission geophysical products.

3 SENTINEL-3 MISSION OVERVIEW

3.1 Sentinel-3 Mission Objectives

The objectives for a series of satellites comprising the GMES Sentinel-3 mission encompass the commitment to consistent, long-term collection of remotely sensed marine and land data, of uniform quality, for operational ocean state analysis, forecasting and service provision, in the context of Global Monitoring for Environment and Security.

A comprehensive measurement system facilitating global ocean and land observations is required to provide input data for advanced numerical forecasting models.

The Sentinel-3 mission objectives include the **operational provision of data**, with adequate revisit frequency, coverage, timeliness and reliability, for the following broad applications:

- Open Ocean and Ice Monitoring,
- Global Land Monitoring Applications,
- Coastal Zones Monitoring,
- Atmospheric Weather Forecasting,
- Global and Climate Change.

The following characteristics have been established for the remote sensing variables:

- Sea surface topography (SSH) and, significant wave height (SWH) over the global ocean to an accuracy and precision exceeding that of Envisat RA-2,
- Sea surface temperature (SST) determined globally to an equivalent accuracy and precision as that presently achieved by A/ATSR (i.e. <0.3 K), at a spatial resolution of 1 km,
- Visible and Thermal Infrared radiances (“Ocean Colour”) for oceanic and coastal waters, determined to an equivalent level of accuracy and precision as MERIS data with complete Earth coverage in 2 to 3 days, and co-registered with SST measurements,
- Visible, Near Infrared, Short-Wave Infrared, and Thermal Infrared radiances (“Land Colour”) for land surface, with complete Earth coverage in 1 to 2 days, with products equivalent to those derived from MERIS, A/ATSR, together with those from their combination.

Sentinel-3 mission objectives and operational capabilities require sufficient spacecraft and ground segment resources in terms of:

- High inclination polar orbit, to achieve near-complete global coverage,
- Optical instrumentation with a sun-synchronous orbit with a descending node equatorial crossing time to complement existing platform observations, and to mitigate sun glint, morning haze and cloud-cover impact,
- Complete global coverage from optical instrumentation every 1 to 3 days,
- Near-real-time data processing and delivery of all processed products for operational users,

- Continuous flow of data of at least the same quality as delivered by Envisat, for programme duration of 20 years,

The operational character of the Sentinel-3 mission implies the *“provision of services in a routine, long-term and continuous fashion, with a consistent quality and a very high level of availability”*.

3.2 Mission Characteristics

3.2.1 Sentinel-3 Constellation

In order to satisfy the large coverage and high revisit conditions, the Sentinel-3 mission is designed as a constellation of (at least) two identical satellites, Sentinel-3A and Sentinel-3B.

Each satellite will operate in a reference orbit with a repeat cycle of 27 days for the overall duration of the mission. The Sentinel-3A orbit characteristics are summarised in the following table.

Sentinel-3 Orbit characteristics	
Type	Near-Polar Sun-Synchronous
Mean Local Solar Time at ascending node	22:00 h
Repeat Cycle	27 days
Cycle Length	385 orbits
Orbits per day	14.259
Semi-Major axis	7177.926540 Km
Eccentricity	0.001148
Inclination	98.645589°
Argument of Perigee	90°

Table 1 - Sentinel-3 Orbit Characteristics

The current baseline configuration of the 2-S/C Sentinel-3 constellation foresees a 180-deg in-plane separation between the two S/C.

This configuration guarantees that after each orbit the track of the 2nd S/C falls in the middle of the gap left by the track of the first, thus optimising the coverage performances for instruments measuring in the visible.

After a complete repeat cycle the combined tracks of the two S/Cs provide an optimised grid for altimetry NTC purposes.

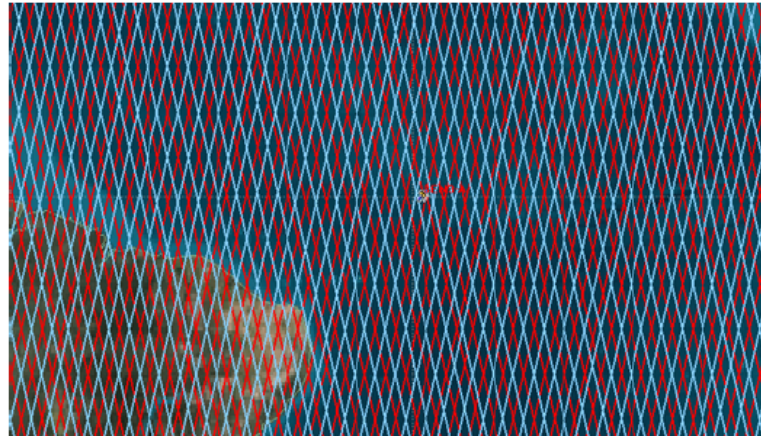


Figure 1: Ground tracks after 27 days of the first Sentinel-3 S/C and of the second S/C in the baseline configuration (180-deg spacing).

3.2.2 Sentinel-3 Instrument Characteristics and Modes

The satellite embarks the following instruments:

- The Ocean and Land Colour Instrument (**OLCI**), a spectrometer imaging in push-broom mode with an across-track electronic scan, strongly inherited from the Alcatel Alenia Space flight-proven MERIS of Envisat, with same class of performance in the visible bands, associated with a larger coverage accounting for Sun glint.
- The Sea and Land Surface Temperature Radiometer (**SLSTR**), a conical imaging radiometer with a dual view (near-nadir and inclined) capability, presenting design heritage from the AATSR of Envisat with same class of performance, associated with a larger coverage.
- The SAR Radar ALtimeter (**SRAL**) instrument, a dual-frequency altimeter, derived from the Alcatel Alenia Space line of products such as SIRAL of Cryosat, and Poseidon-3 of Jason-2, providing Low Resolution Sea surface measurements in the continuity of the RA-2 ones of Envisat, and sea-ice, land-ice and inland water monitoring in Nadir SAR mode.
- A Microwave Radiometer (**MWR**), which supports the SRAL to achieve the overall altimeter mission performance by providing the wet atmosphere correction.
- A **GNSS** Assembly, suitable for the Precise Orbit Determination (POD) processed on ground to achieve the overall altimeter mission performance. Real time navigation and dating information from this equipment will provide spacecraft navigation and dating functions as well as the control of the Radar Altimeter open-loop tracking function.
- A **DORIS** Assembly as a Customer Furnished Item, which constitutes a complementary POD data provider for the Ground Segment as well as a potential (TBC) backup to the GNSS Assembly for the specific commanding of the SRAL Open Loop tracking mode.
- A Laser retro-reflector (**LRR**).

3.2.2.1 Sentinel-3 OLCI Instrument Characteristics and Mode

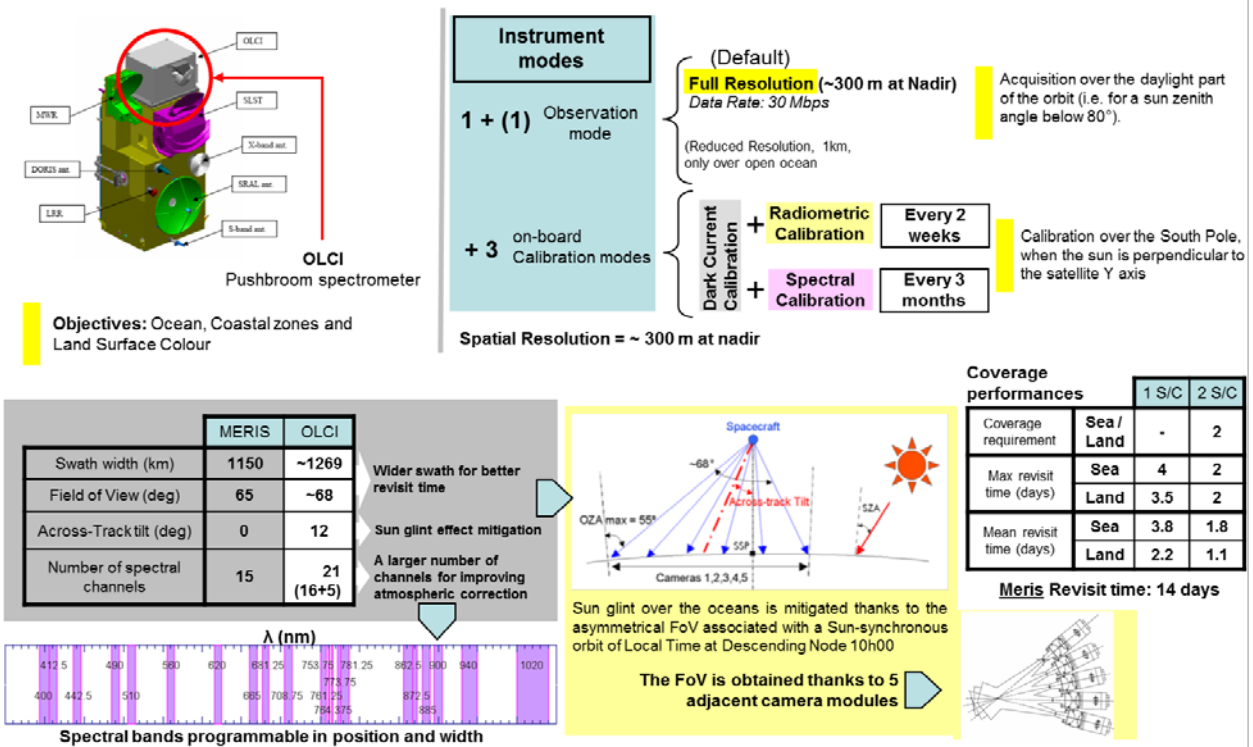


Figure 2 - OLCI instrument characteristics and modes

The OLCI instrument baseline is basically the follow-up of MERIS on-board ENVISAT with additional spectral channels, different camera arrangements and simplified on-board processing.

It is a push-broom instrument with 5 camera modules sharing the field-of-view as follows:

- The five cameras field of view are arranged in a fan-shaped configuration in the vertical plane perpendicular to the platform velocity,
- Each camera has an individual field of view of 14.2 degrees with a 0.6 degree overlap with its neighbours,
- The whole field-of-view is shifted across-track by 12.58 degrees away from the Sun to minimise the Sun glint impact.

OLCI measures top of atmosphere (TOA) radiances at 21 wavelengths. However, the instrument principle – an imaging spectrometer – and design allows the redefinition of these bands, in both location and width, thanks to the programmable acquisition.

Time window for Earth Observation data acquisition, for a given orbit, is triggered by the Sun Zenith Angle at SSP: SZA must be lower than 80 degrees.

Acquisition time step is 44 ms, corresponding to a mean along-track distance of about 260m. Instrument across-track spatial sampling is about 260 m at SSP.

This “native” acquisition resolution is referred to as the Full Resolution (**FR**).

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:

- **Radiometric calibration**, using the nominal “white” diffuser and including dark signal calibration (with shutter on) on a regular basis, typically every 2 to 4 weeks. The second radiometric “white” diffuser is used the same way but much less frequently, typically every 3 months), allowing monitoring of their relative evolution.
- **Spectral calibration** using successively the nominal “white” diffuser and the spectral one, with specific band sets focussed, at the highest possible spectral resolution, on the spectral features of the spectral diffuser. Comparison of their respective response in almost identical illumination conditions allows accurately locating the spectral diffuser features onto the CCD and hence deriving spectral calibration information. These modes shall be operated with a typical time period of 3 months.

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.

- **Dark current calibration.** It is performed before the ecliptic south pole, since the orientation with respect to the sun appears a bit more favourable, before the Earth panel is illuminated by the sun. This sequence lasts 45 seconds which allows the acquisition of 1024 measurement frames. This number of measurements is required in order to reduce the noise and accurately derive the signal produced under dark conditions after averaging, performed on-ground.

3.2.2.2 Sentinel-3 SLTSTR: instruments Characteristics and Modes

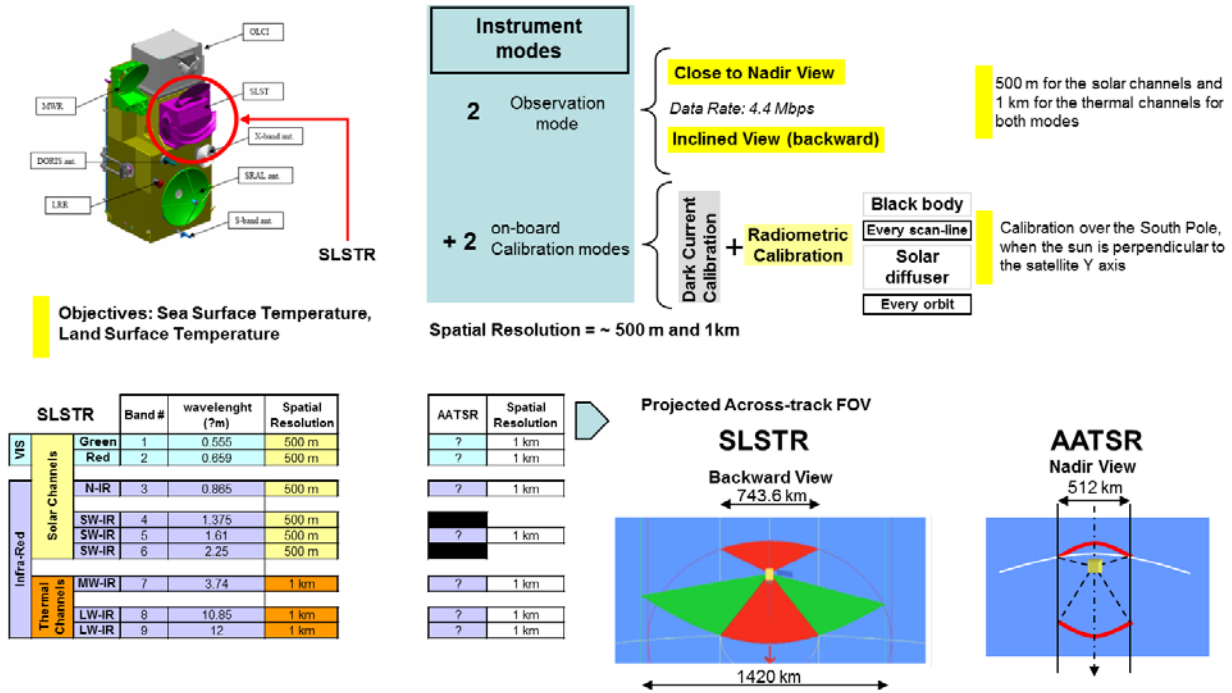


Figure 3 – SLSTR instrument characteristics and modes

The main objective of the Sentinel SLSTR instrument mission is to maintain continuity with the (A)ATSR series of instruments, and the proposed design supports this by incorporating the basic functionality of AATSR, with the addition of some new, more advanced, features. These include a wider swath, new channels, and higher spatial resolution in some channels.

The proposed instrument will include the set of channels used by ATSR-2 and AATSR, thus ensuring continuity of data, together with two new channels at wavelengths of 2.25 and 1.375 microns in support of cloud clearing for SST retrieval. In total the instrument will have eleven channels as follows:

- 3 thermal infra-red channels at 3.7, 10.8 and 12 micron wavelengths;
- 2 fire channels at 3.7, and 10.8 micron wavelengths;
- 6 short-wave and visible channels at 2.25, 1.6, 1.375, 0.87, 0.67 and 0.55 micron wavelengths.

The Sentinel SLSTR instrument will measure a nadir and a backward scan, each of which will also intersect the calibration black bodies and the visible calibration unit. The wider nadir swath and enhanced resolution in coastal regions, implies that the number of instrument pixels to be measured per scan will exceed the corresponding figure for AATSR.

AATSR scans at a rate of 400 scans per minute, corresponding to the along track resolution of 1 km. The SLSTR instrument will use two independent scan mirrors each scanning at 200 scans per minute, but each scan will measure 2 along-track pixels of 1 km (and 8 pixels at 500 m resolution) simultaneously. This configuration increases the swath width in both views, as well as providing 500 metre resolution in the reflectance channels.

Each scan mirror is mounted at an oblique angle to its axis of rotation, and directs radiation into a telescope assembly the optical axis of which is aligned parallel to the rotation axis. As the scan mirror rotates, the line of sight traces out a cone whose intersection with the Earth traces out the measurement swath of the instrument. The scan cone will intersect the Earth view, the two calibration black bodies, and the Visible Calibration (VISCAL) Unit, so that the line of sight will encounter each of these once during a complete rotation.

Radiation incident along the line of sight enters the focal plane assembly, where it is split into frequency bands corresponding to the different channels. Radiation in each channel is focussed onto a small array of detector elements which correspond to pixels.

3.2.2.3 Sentinel-3 Surface Topography Mission (STM) Payload: Instruments Characteristics and Modes

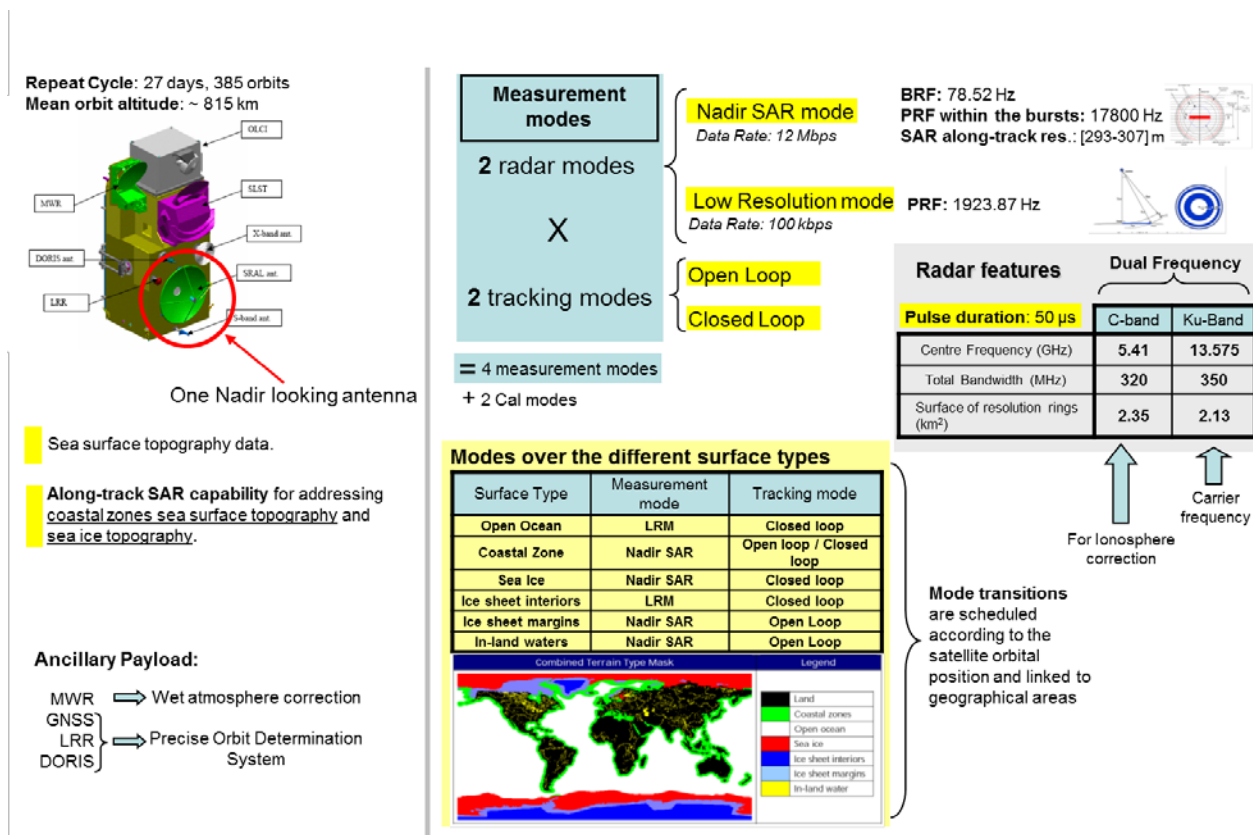


Figure 4 - SRAL instrument characteristics and modes

SAR Radar Altimeter (SRAL)

SRAL altimeter measurements are performed either in Low Resolution Mode (LRM) or in Synthetic Aperture Radar (SAR) mode. LRM mode is the conventional altimeter pulse limited mode with interleaved Ku-band and C-band pulses, while SAR mode is the high along track resolution mode based on Synthetic Aperture Radar processing.

- In LRM mode, pulses are transmitted at the Pulse Repetition Frequency (PRF about 1924 Hz) rhythm, following a typical pattern of 3 Ku-band pulses / 1 C-band pulse / 3 Ku-band pulses. These pulses are processed and averaged on-board to provide a power waveform (128 I+Q2 samples) about every 50.9 ms, corresponding to the averaging of 84 Ku-band pulses and of 14 C-band pulses. This measurement is called an elementary measurement or a 20-Hz measurement. It contains Ku-band and C-band waveforms and associated parameters.
- In SAR mode, the Pulse Repetition Frequency (PRF) is about 17 800 Hz. Pulses are transmitted by a series of 66 (1 C-band pulse / 64 Ku-band pulses / 1 C-band pulses), called a burst, corresponding to a duration of about 12.74 ms. A burst corresponds thus to a 80-Hz measurement, and contains 64 Ku-band and 2 C-band waveforms (128 I and Q samples for each of them).

For both LRM and SAR modes, the tracking function may be a closed loop or an open loop function. “Closed loop” means that the range tracking parameters are computed by the tracking algorithm, while in “Open loop” means that these parameters are computed directly from altitude values read from a one-dimensional OLTC file stored in the instrument coupled with the position/velocity coordinates of the navigation bulletin sent every second to the platform by the GPS receiver.

Microwave Radiometer (MWR)

MWR radiometer is a dual frequency, single polarization and fully redounded radiometer. The centre frequencies of each channel are 23.8 GHz and 36.5 GHz, with a channel bandwidth of 200 MHz.

MWR is a Noise Injection Radiometer (NIR). The noise injection operation consists of adding noise to the antenna branch in order to equal the temperature of the internal load noise temperature. This balanced condition takes places at a common plane for all involved temperatures, which has been defined at the output of the Dicke switch. The amount of injected noise allows the retrieval of the brightness temperature.

There are three main operational states: observation, monitoring, and calibration.

During observation, the radiometer is looking through the main antenna towards the Earth and, in case of a brightness temperature lower than the reference temperature, the noise injection pulse is used to retrieve this brightness temperature.

4 SENTINEL-3 PDGS USER PRODUCTS

The specifications for the Sentinel-3 users products are provided in the following paragraphs.

A general description of the processing levels, products classification, timeliness, generation and dissemination approach is provided first, in order to give an overview of the products characteristics and the operational scenario which will be put in place for the operational provision of the S33 data.

The Sentinel-3 user products are then described in more detail, providing information on products organisation, contents and formats.

4.1 Processing Levels

The raw data acquired by the Sentinel-3 satellites will be processed by the Sentinel-3 PDGS according to *Levels* of data processing. Level-0, Level-1 and Level-2 products will be generated, in detail:

- from OLCI data the PDGS shall generate products at Level-0 (*not disseminated to the users*), Level-1B (full and reduced resolution) and Level-2 (full and reduced resolution),
- from SLSTR data the PDGS shall generate products at Level-0 (*not disseminated to the users*), Level-1B and Level-2 and Level-2P,
- from SRAL data the PDGS shall generate products at Level-0 (*not disseminated to the users*), Level-1A, Level-1B, Level-1B-S and Level-2,
- from MWR data the PDGS shall generate products at Level-0 (*not disseminated to the users*), Level-1B (*not disseminated to the users*) and L2. The MWR Level-2 information is part of the SRAL Altimeter product,
- from the combination of OLCI and SLSTR products the PDGS shall generate the Level-1c synergy products (*not disseminated to the users*), the Level-2 synergy products and the Level-2 vegetation-like products.

The following definitions of product levels is applied:

For the optical payload:

Level-0 product (*not disseminated to the users*): reconstructed and time sorted ISP, at full space-time resolution. All communications artefacts (e.g. synchronization frames, communications headers and duplicate data) and invalid packets are removed.

Level-1 product: under this category fall the Level-1B and 1C products. The L1B product includes TOA radiometric measurements, radiometrically corrected, calibrated and spectrally characterised. Quality controlled and ortho-geolocated (Lat & Lon coordinates, Altitude), annotated with satellite position and pointing, landmarks and preliminary pixel classification (e.g. land/water/cloud masks). The Level-1c product is derived from OLCI and SLSTR L1B products. It will include the correspondence/collocation grids between OLCI/SLSTR L1B grids and Level-2 synergy product reference grid.

Level-2 product: geo-located geophysical products. Level-2 products consist of geophysical quantities derived from the processing of the measurements data provided into the Level-1 product. More than one Level-2 products can be generated from the same Level-1 product.

For the surface topography mission payload:

Level-0 product (*not disseminated to the users*): reconstructed and time sorted ISP at full space-time resolution. Invalid ISP, time overlaps, and communication artefacts are removed.

Level-1 product:

- SRAL L1A products contain the unpacked L0 complex echoes, sorted and calibrated
- SRAL L1B products include the LRM/SAR averaged measurements (20Hz)
- SRAL L1B-S products include the regular Level 1B product, enriched with SAR expert information (complex I&Q echoes after slant range correction, without the multi-looking being performed, ...)
- MWR L1b geo-located, radiometrically and geometrically corrected brightness temperature measurements (at each of the antenna frequencies).

Level-2 product: altimeter range, orbital altitude, time, water vapour from the MWR and geophysical corrections, along with significant wave height and wind-speed information.

4.2 Level 2 Products classification

In order to better serve the GSPs user community with products having manageable size and geophysical information content tailored to their needs, the water, land and atmosphere geophysical parameters generated at Level-2 are partitioned into two main categories of Level-2 products:

- Water (for OPT) or Marine (for STM) L2 products
- Land L2 products.

OLCI and SLSTR Level-2 optical products

The Optical Mission makes use of different masks in order to classify the different surface types. The land/water mask allows to distinguish land and any water surface (marine and in-land water).

The Level-2 optical products are split in water and land products, as follows:

- the OLCI Level-2 water products will include the open sea, atmosphere information¹ and the coastal area up to the coastline.²;
- the OLCI Level-2 land products will include the information sensed over land and atmosphere parameters (1);

¹The Atmosphere information relevant for the atmosphere application domain is included in both Water and Land products since it is relevant for the water and land application domains.

Some of the Atmosphere geophysical parameters are processed over sea and over land with specific algorithms/LUTs and then complementary merged to be identically contained in both water and land products (this is the case for the OLCI Integrated Water Vapour).

Other atmosphere geophysical parameters, such as the aerosols optical depths and coefficients, are processed over water only and included in the corresponding water product type.

² The in-land waters are currently not included in the products baseline, it is planned to include them in the water products in the future.

- the SLSTR Level-2 water products will include the open sea, the coastal area up to the coastline and the in-land waters, processed with the SST algorithm;
- the SLSTR Level-2 land products will include the information sensed over land and the in-land waters, processed with the LST algorithm.³

For the optical payload, the pixels falling over the coastline (consider that the highest optical spatial resolution Sentinel-3 is about 300 m) have radiometric values affected by the presence of land and water signal. These are flagged with quality flags for taking into account of adjacency and stray light effects. The user is then free to decide to keep or discard the information processed from these pixels for their applications.

OLCI Level 2 Products: The Land and Water split

Examples extracted by a simulation of 3 minutes frame for OLCI Level 2 Full Resolution products

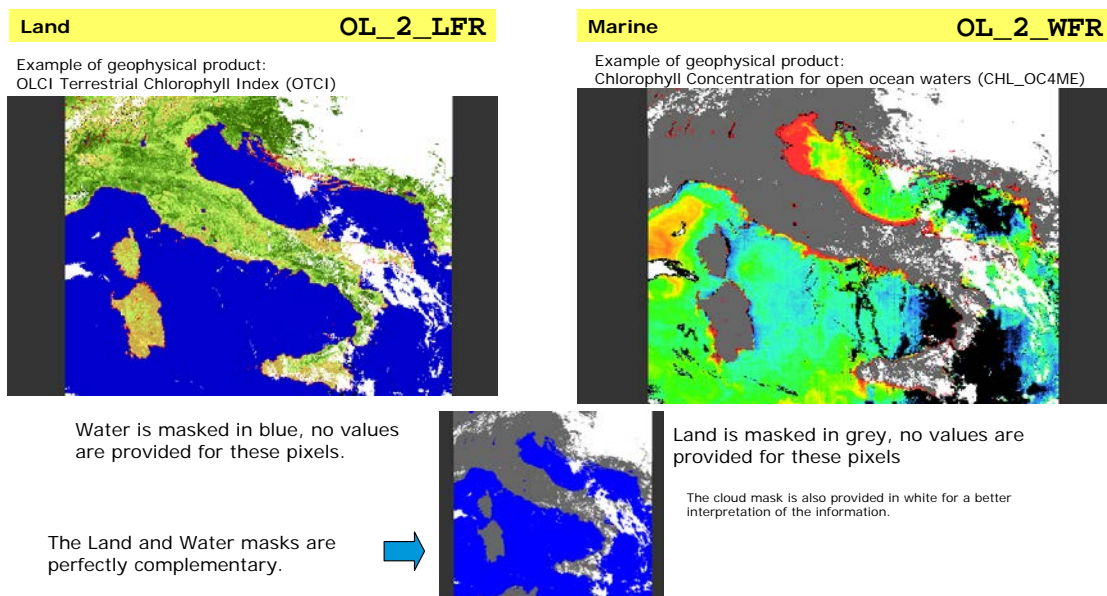


Figure 5 - OLCI Level-2 products: the land and water split

SRAL Level-2 products

SRAL Level-2 products are split in marine and land products, as follows:

- the SRAL Level-2 marine products will contain the information sensed over open ocean, coastal areas, sea-ice and over part of land within a certain distance from the coastline

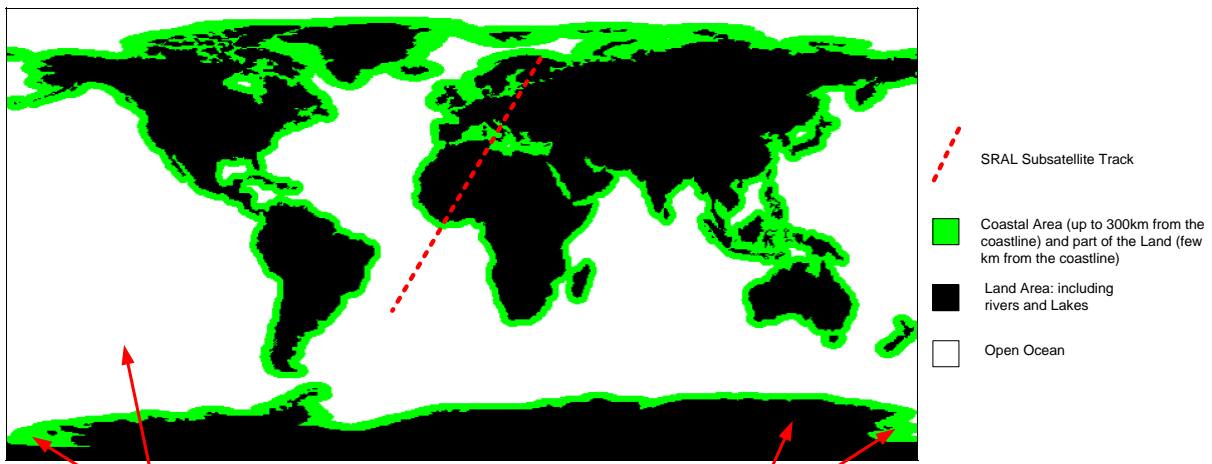
³It is planned to generate the following two L2 products, based on SLSTR data:

- Global Aerosol L2 products over land and over water, in Near-Real-Time (ref. section 4.3),
- Fire L2 product over land, extended to include coastal areas, in NearReal-Time (ref. section 4.3)

- the SRAL Level-2 land products will contain the information sensed over land, coastal areas, land ice and inland water.

The measurements over the coastal areas and over part of the land within a certain distance from the coastline are contained both in the land and marine products in order to ensure the analysis of transition and meaningful continuity of segments.

SRAL Level 2 Marine and Land Products are split according to the figure below



SRAL Level 2 **Marine** Products will contain information sensed over the white area (Open Ocean and Sea-Ice) and the green area (Coastal zones and part of the land within a certain distance from the coastline)

SRAL Level 2 **Land** Products will contain information sensed over the black area (Land) and the green area (Coastal zones and part of the land within a certain distance from the coastline)

Both Products will contain the measurements over the coastal areas (up to 300 Km offshore) and part of the Land within a few km from the coastline

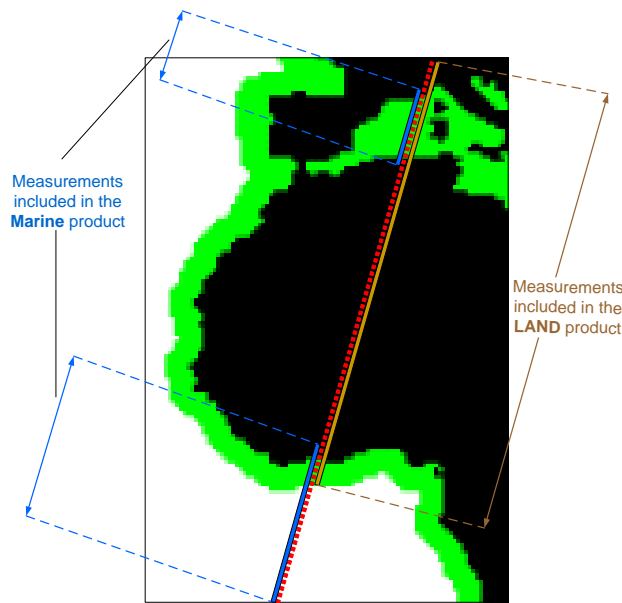


Figure 6 - SRAL Level-2 products: marine and land split

Synergy Level-2 and VGT-like products

The Level-2 synergy products are part of the Land processing as well as the vegetation-like product which are generated as continuation of the SPOT VGT products.⁴

4.3 Products Timeliness

To satisfy the various timeliness needs from the GMES Services, the Sentinel-3 PDGS shall be able to provide the Sentinel-3 products within the following timeliness:

- *Near Real Time (NRT)*: products are available in less than 3 hours from sensing.
- *Short Time Critical (STC)*: products (only for SRAL) are available in less than 48 hours from sensing.
- *Non Time Critical (NTC)*: products are available in less than 1 month from sensing.

As soon as the most updated auxiliary data and last necessary input data are available, the products are generated in a data driven mode and made available for dissemination in the shortest time possible.

4.4 Products generation concepts

4.4.1 Systematic products generation

The systematic processing approach allows the systematic generation of Level-0 products and of a pre-defined set of Level-1/Level-2 products after acquisition. No ordering from users is required for each product to be generated.

The set of products to be systematically generated responds to the different requirements of the GMES services and allows generating land and water Level-2 products including different geophysical parameters from the same Level-1 input data. This systematic processing approach is also used in case of a reprocessing campaign, to update the Level-1 or higher level products archive, after major processing algorithm changes to ensure a long-term harmonised data set.

The systematic processing relies on the two main processing timeliness drivers, described in section 4.3:

- The Near-Real-Time (**NRT**) processing: for the whole payload
- The Offline Processing which encompasses:
 - Short-Time-Critical (**STC**) processing only for the STM payload
 - Non-Time-Critical (**NTC**) processing for the whole payload.

4.4.2 NRT Processing Concept

The NRT processing shall ensure generation and dissemination of Level-1 and Level-2 products within 3 hours from sensing, as requested by the GMES core services.

⁴ A Global Aerosol L2 user products will be generated off-line (ref. section 4.3 and 4.4) by the SYN approach.

The NRT processing scenario envisages a data driven mode, i.e. as soon as a new Level-0 product is available, it is immediately processed into higher level products and disseminated to the users.

4.4.3 Offline Processing Concept

The offline processing shall ensure generation and dissemination of Level-1 and Level-2 products in less than 48 hours from sensing for the STC SRAL products and in less than 1 month from sensing for the NTC of all Sentinel-3 products.

These values shall be considered as maximum limits, the actual generation shall occur within the limits and it can be different for each product type according to the different processing needs.

The offline processing scenario envisages a data driven mode. This means that for any product type as soon as the new set of inputs data is available (i.e. consolidated auxiliary Data or full set of images for mosaic products), the processing and the dissemination of the higher level products shall start immediately. When all the necessary input data is available the generation of the products can occur well in advance with respect to the STC and NTC timeliness upper limit.

When there is a total or partial unavailability of the needed input data before the end of the timeliness limit, a quality degraded processing scenario shall occur, configured per product type on a case by case basis.

The offline OLCI, SLSTR and SRAL is performed for achieving a higher quality of the products based on a consolidated set of auxiliary data.

The offline processing of the Level-2 Synergy product is performed for achieving a higher quality of the products based on a consolidated set of auxiliary data and on the availability of all the necessary input data for performing the data compositing as for the case of the Vegetation-like 1 day and 10 days synthesis products.

4.5 User Products Tree

This section presents the Sentinel-3 User products in both graphical and text views.

The graphical presentation shows an overall view of the Sentinel-3 user products; the text presentation is provided as tables listing the user products type for each instrument/branch, the processing level, a short description and the products size.

The size is provided in GByte/orbit for each product type; for the composite vegetation products the size pertains to the whole globe. The reported values are uncompressed.

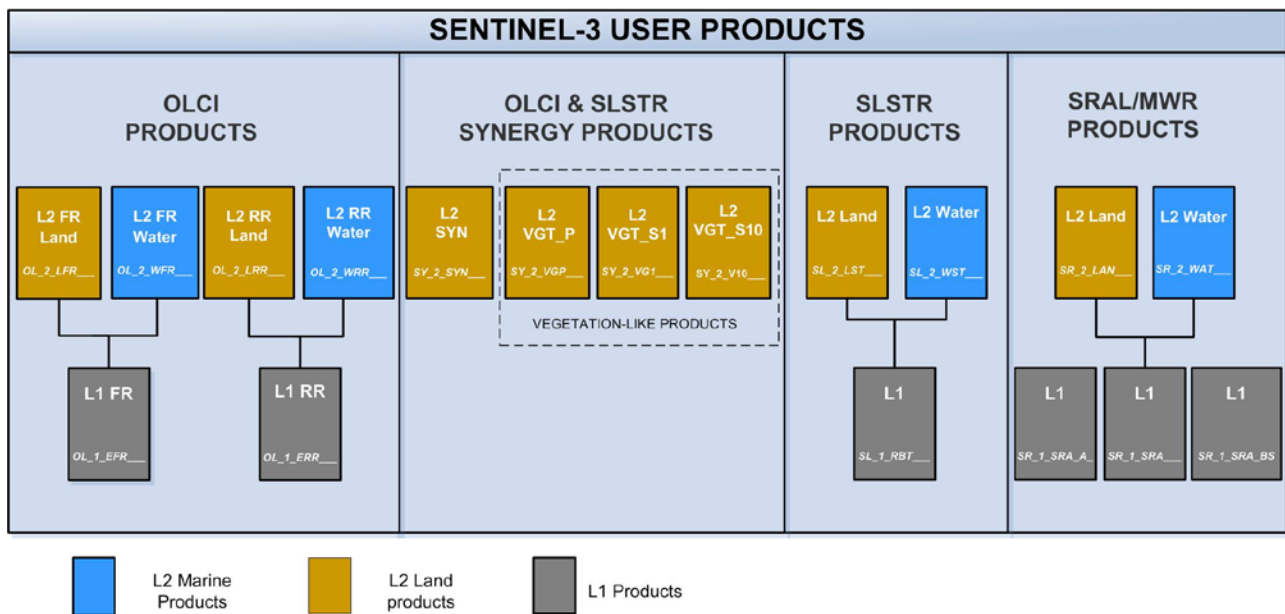


Figure 7 - Sentinel-3 User Products Tree

Table 2 - OLCI User Products list

PRODUCT TYPE	LEVEL	DESCRIPTION	SIZE (GBYTE/ORBIT)
OL_1_EFR___	1	Full Resolution top of atmosphere	28.55
OL_2_WFR___	2	Full Resolution Water & atmosphere parameters	28.36
OL_2_LFR___	2	Full Resolution Land and Atmosphere parameters	8.8
OL_1_ERR___	1	Reduced Resolution top of atmosphere	1.86
OL_2_WRR___	2	Reduced Resolution Water & atmosphere parameters	1.9
OL_2_LRR___	2	Reduced Resolution Land and Atmosphere parameters	0.67

Table 3 - SLSTR User Products list

PRODUCT TYPE	LEVEL	DESCRIPTION	SIZE (GBYTE/ORBIT)
SL_1_RBT___	1	Brightness temperatures and radiances	50.40
SL_2_WST___	2	Level-2P Sea Surface Temperature (GHRSSST like)	2.2
SL_2_LST___	2	Land Surface Temperature Parameters	5.35

Table 4 - SYN User Products list

PRODUCT TYPE	LEVEL	DESCRIPTION	SIZE
SY_2_SYN___	2	Surface Reflectances and Aerosol measurements over Land	41.43 (GB/orbit)
SY_2_VGP___	2	1 km VEGETATION Like product (~VGT-P) - TOA Reflectances	0.39 (GB/orbit)
SY_2_VG1___	2	1 km VEGETATION Like product (~VGT-S1) 1day synthesis surface reflectances and NDVI	11.58 (GB – whole globe)
SY_2_V10___	2	1 km VEGETATION Like product (~VGT-S10) 10days synthesis surface reflectances and NDVI	11.58 (GB – whole globe)

Table 5: SRAL L1 User Products list

PRODUCT TYPE	LEVEL	DESCRIPTION	SIZE ⁵ (GBYTE/ORBIT)
SR_1_SRA___	1	Echos parameters for LRM, PLRM and SAR mode (resolution 20Hz)	0.068 (LRM) 0.28 (SAR)
SR_1_SRA_A_	1	Echos parameters for PLRM and SAR mode (resolution 80Hz)	17.5
SR_1_SRA_BS	1	Echos parameters for LRM, PLRM and SAR mode (resolution 20Hz), completed with SAR expert information	18.1

Table 6 - SRAL L2 User Products list

PRODUCT TYPE	LEVEL	DESCRIPTION	SIZE (GBYTE/ORBIT)
SR_2_LAN___	2	1Hz and 20Hz Ku and C bands parameters (LRM/SAR/PLRM), waveforms. Over land, coastal areas, land ice and inland water.	0.2
SR_2_WAT___	2	1Hz and 20Hz Ku and C bands parameters (LRM/SAR/PLRM), waveforms. Over open ocean, coastal areas, sea-ice and part of land within a certain distance from the coastline	0.2

4.6 Products format and organization

The S3 Products are organized in packages. In order to implement a packaging concept suited to archiving and dissemination to users, a restriction of XFDU specific for the Sentinel-3 mission is adopted.

A Product Package is defined as a physical collection of Components that are gathered together, using a defined packaging scheme, into a single container.

A package component could be:

- Annotation Data file: it is a file that contains data other than instrument measurements. The information contained in this file can be common to several measurements data files contained in the same package. It is encoded in NetCDF-4 format.
- Measurement Data file: this file contains information (also called geophysical product or scientific data) which cause the existence of the product package itself. In other words a

⁵Different approaches are under evaluation, allowing to reduce the size of the SR_1_SRA_A and SR_1_SRA_BS. The selected approach will be applied to operational users products after IOCR.

Measurement data file is part of the core of a product around which all the other information is embedded. A measurement Data can be organized in a single file or in a set of physical files, encoded in NetCDF-4 format.

- **Manifest file:** it contains product metadata, and the Information Package Map describing the hierarchic structure of the product. This information is stored as a Component of the Product Package, using an XML language.
- **Representation Information file:** this file describes the structure of a measurement data file or annotation file which has not been implemented in a well-known standard format. In case of S3 PDGS these files are used for Level-0 products only.
- **Quality report:** it contains the results of quality checks performed by a quality control processor integrated in the processing chain, as soon as the products has been generated. Depending on the PDGS configuration the quality report can be embedded in the Product Package as ad additional component. The format is XML, HTML or PDF.

The high level physical structure of the Sentinel-3 product package is reported the figure below.

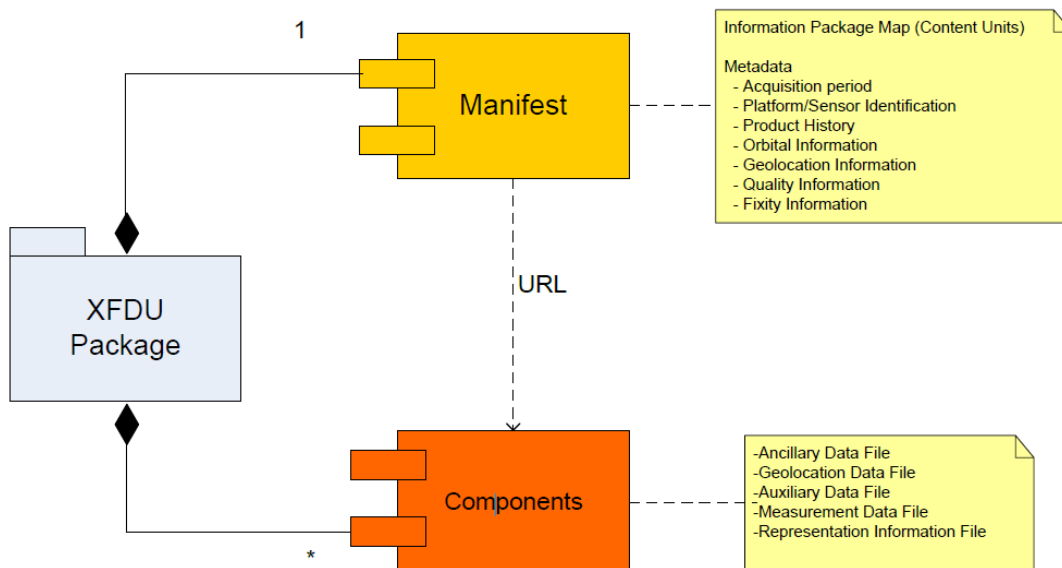


Figure 8 - XFDU package physical structure

4.7 User Products Dissemination Concepts

The Sentinel-3 User Product is a Product Package which is generated for the operational dissemination to the Sentinel-3 users according to the timeliness specified in section 4.3, via subscription or Catalogue.

The Sentinel-3 User Products are disseminated in Product Dissemination Units (PDU), in order to ease the online dissemination and data handling for the users.

The dissemination to the users will be performed according to one of the following mechanisms:

- Via ground network, through user pick-up points. The pick-up point is defined per each subscription and provides an access point for users to the products related to each subscription.
- Via dedicated high speed satellite communication links, possibly used for subscriptions with limited data volume and near real time timeliness.
- Via direct download through the data catalogue.

The PDU is a portion of data and is defined per product type.

Three kinds of PDUs - “frame”, “stripe” and “tile” - are foreseen (the PDUs initial configuration is reported in section 4.7.1):

Case 1 - Frames and stripes

This is the case of all the Sentinel-3 Products with the exception of the map projected products. In this case the Product Dissemination Unit consists of an along track portion of data of a defined length (configurable).

The PDU length may coincide, depending on the instrument and product type, with the length of the whole dump or with part of it (e.g. ascending orbit, descending orbit, enlighten part of the orbit, tracks, frames).

A PDU may have the length of a *frame*:

A *frame* is identified by means of a fixed reference system based on *along track coordinate* and *along orbit cycle coordinate*:

The *along track coordinate* identifies the product frame start point with respect to a fixed orbit position (e.g. ANX). Each frame is stepped by a constant time interval along the orbit track.

The *along orbit cycle coordinate* identifies the relative orbit number within the orbit cycle.

A PDU may have the length of a *stripe*:

A *stripe* coincides either with the acquisition dump or with a defined acquisition time segment whose length may differ according to the instrument type and or processing/dissemination constraints (e.g. full orbit pole to pole, half orbit, etc.).

A special case of stripe is provided by the Vegetation-like product (VGT-P) where the stripe is mapped on a Plate Carrée geographical projection (see Figure 11).

As an example Figure 9 compares two different approaches for the dissemination of the OLCI L1B products in Reduced and Full resolution using different PDUs.

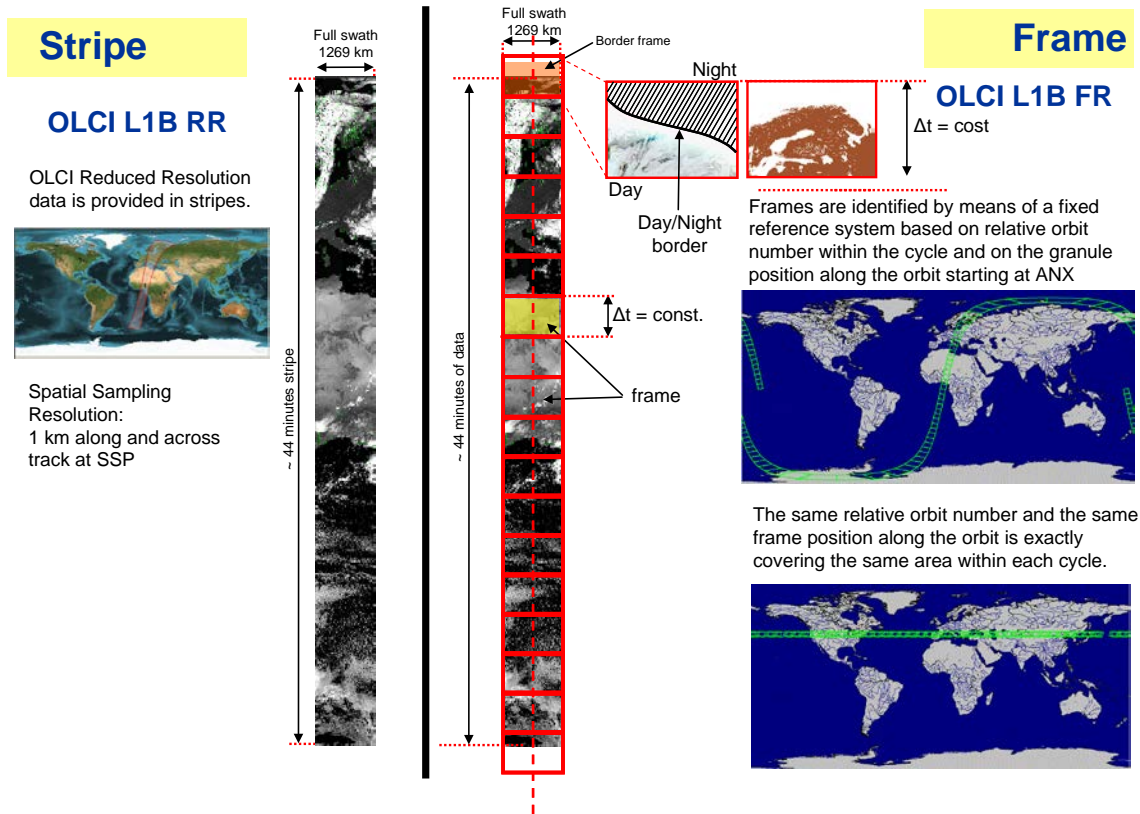
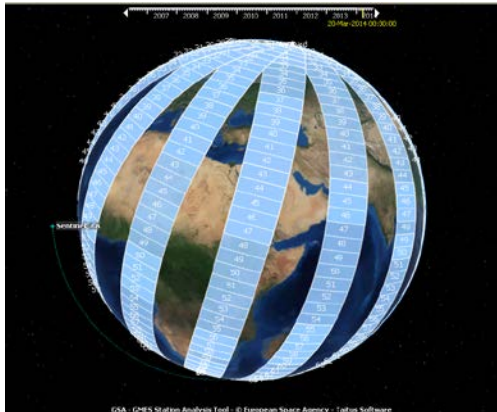


Figure 9 - Example of PDUs for OLCI L1B products: stripe and frame concept

The length of the *frames* within the fixed reference system is defined at the current date as 3 minutes. As example the following figure provides an overview of possible framing solutions evaluated by the PDGS, and the corresponding geographical coverage.

Example of framing based on a 1 minute interval



Example of framing based on a 5 minutes interval

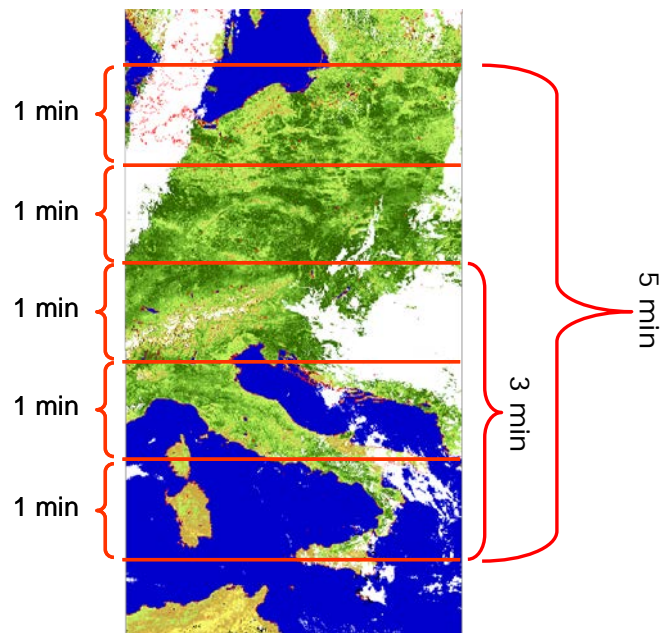
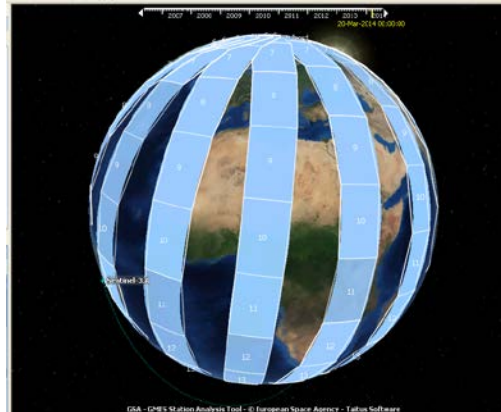


Figure 10 - Examples of different framing solutions with corresponding geographical coverage

Case 2 - Tiles

This is the case for the Vegetation-like 1 or 10 days synthesis products:

- “VGT S1” - like product (SY_2_VG1), BOA1 day synthesis
- “VGT S10” - like product (SY_2_V10), BOA 10 day synthesis

The Vegetation-like synthesis products are provided on a Plate Carrée map projection.

The PDU is a “tile”. A tile corresponds to a geographical subset of the synthesis image mapped on the Plate Carrée projection.

The number of tiles, their geographical coverage and the tile gridding logic have been defined as a trade-off between PDGS system design, dissemination performances and users data handling capability.

VGT-P like product A)



PDU → Stripe: single pass map projected

VGT-S1 and VGT-S10 like products B)

PDU → Tile

Example of Tile

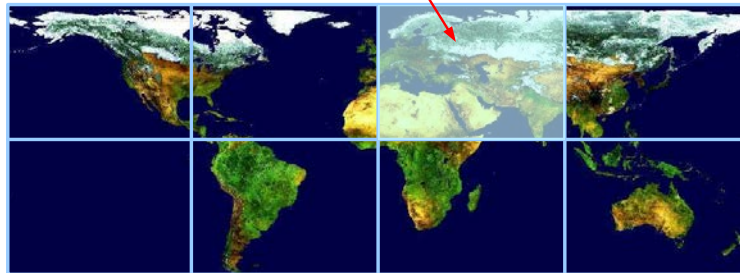


Figure 11 - Example of PDUs for Vegetation-like products

4.7.1 PDU Initial Configuration

The initial configuration for the cut of the “user products” in PDU is reported in the tables below. This configuration might change during the commissioning phase for meeting the required performances.

Table 7: OLCI Level-1 and Level-2 product units

INSTRUMENT	LEVEL	PRODUCT TYPE	PDU LENGTH CUT FOR THE	
			NRT PRODUCTION CHAIN	OFFLINE PRODUCTION CHAIN
OLCI	1	OL_1_EFR___	Frame [3 min]	Frame [3 min]
OLCI	1	OL_1_ERR___	Full orbit: daylight [2666 sec]	Full orbit: daylight [2666 sec]
OLCI	2	OL_2_WFR___	Frame [3 min]	Frame [3 min]
OLCI	2	OL_2_LFR___	Frame [3 min]	Frame [3 min]
OLCI	2	OL_2_WRR___	Full orbit: daylight [2666 sec]	Full orbit: daylight [2666 sec]
OLCI	2	OL_2_LRR___	Full orbit: daylight [2666 sec]	Full orbit: daylight [2666 sec]

Table 8: SLSTR Level-1 and Level-2 product units

INSTRUMENT	LEVEL	PRODUCT TYPE	PDU LENGTH CUT FOR THE	
			NRT PRODUCTION CHAIN	OFFLINE PRODUCTION CHAIN
SLSTR	1	SL_1_RBT___	Frame [3 min]	Frame [3 min]
SLSTR	2	SL_2_WST___	Frame [3 min]	Full orbit: South Pole to South Pole
SLSTR	2	SL_2_LST___	Frame [3 min]	Full orbit: North Pole to North Pole

Table 9: SRAL Level-1 and Level-2 product units

INSTRUMENT	LEVEL	PRODUCT TYPE	PDU LENGTH CUT FOR THE	
			NRT PRODUCTION CHAIN	OFFLINE PRODUCTION CHAIN
SRAL	1	SR_1_SRA___	Stripe [10 min] Full-orbit: dump	Half orbit: Pole to Pole (Ascending/Descending)
SRAL	1	SR_1_SRA_A_	Not applicable	Half orbit: Pole to Pole (Ascending/Descending)
SRAL	1	SR_1_SRA_BS	Not applicable	Half orbit: Pole to Pole (Ascending/Descending)
SRAL	2	SR_2_LAN___	Stripe [10 min] Full-orbit: dump	Half orbit: Pole to Pole (Ascending/Descending)
SRAL	2	SR_2_WAT___	Stripe [10 min] Full-orbit: dump	Half orbit: Pole to Pole (Ascending/Descending)

Table 10: Synergy Level-2 product units

INSTRUMENT	LEVEL	PRODUCT TYPE	PDU LENGTH CUT FOR THE	
			NRT PRODUCTION CHAIN	OFFLINE PRODUCTION CHAIN
SYN	2	SY_2_SYN___	Not applicable	Frame [3 min]
SYN	2	SY_2_VGP___	Not applicable	Full orbit: daylight - Mapped
SYN	2	SY_2_VG1___	Not applicable	Tiles as from VITO predefined ROI
SYN	2	SY_2_V10___	Not applicable	Tiles as from VITO predefined ROI

4.8 Products description

In the following sections the description of the optical and topography missions' products is provided. It includes:

- a general description of the mission products,
- the packages description,
- the description of the geophysical product/s included in the Measurement Data file components.

4.8.1 Optical Mission Products

The optical mission user products are distributed according to different levels of spatial resolution and timeliness.

OLCI products are generated and distributed according to the following timeliness and spatial resolution:

- processing timeliness:
 - Near Real Time
 - Non Time Critical,
- spatial resolution:
 - Full Resolution (FR), with a ground pixel of about 300 m at SSP
 - Reduced Resolution (RR), with a ground pixel of about 1 km at SSP.

SLSTR products are generated and distributed in the resolution appropriate to the channel and according to two level of timeliness:

- processing timeliness:
 - Near Real Time
 - Non Time Critical,
- spatial resolution: 1km for the thermal IR channels, 0.5km for the reflectance channels.

The synergy Level-2 products are generated and distributed only in NTC with a spatial resolution of 300m.

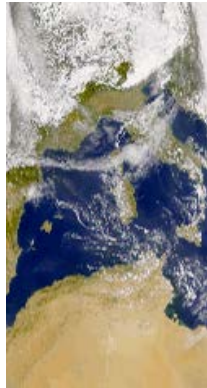
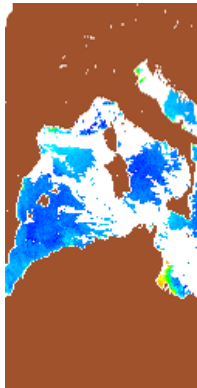


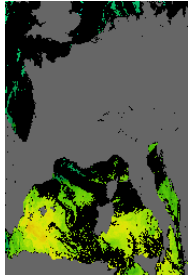
The Vegetation-like synthesis products are generated and distributed in NTC on a Plate Carrée map projection, with a spatial resolution of 1 km.

Each optical products has a browse image associated. Two types of browse images are foreseen:

- pseudo-colour images (supported by either monochromatic or multicolour palettes),
- true-colour images.

The browse images are intended to support queries made to the catalogue and to supply prospective users with a visual indication of the quality of the full image products.

Table 11: Example of browse images

OL_1_EFR_BW	OL_2_WFR_BW	OL_1_ERR_BW	OL_2_WRR_BW	SL_2_WST_BR
True colour	Pseudo colour	True colour	Pseudo colour	Pseudo colour
RGB combination	Chlorophyll+cloud mask + land mask	RGB combination	Chlorophyll+cloud mask + land mask	SST+cloud mask+land mask
PDU: frame (see section 5.2 for details)	PDU: frame (see section 5.2 for details)	PDU: stripe (see section 5.2 for details)	PDU: stripe (see section 5.2 for details)	PDU: stripe (see section 5.2 for details)
				<p>The example shows only a fragment of a stripe whose length will be defined at a later stage, and shall be configurable. Possible lengths are:</p> <ul style="list-style-type: none"> • full orbit (dump or from ANX) • night part of the orbit • day part of the orbit • ascending • descending 

4.8.1.1 Packages description

The following tables provide a generic description of the package in terms of product type, dissemination timeliness, application domain, product dissemination unit, total number of elements composing the package and number of elements for each component. The components that today are not part of the operational production baseline are flagged in the column N.O. of the tables (Not Operational).

In addition, for each product package, a table is provided with the description of the geophysical products included in the package.

The detailed description of the products content and format is provided in the Products Data Format Specification documents [RD-3], [RD-4], [RD-5], [RD-6].

4.8.1.1.1 OL_1_EFR

Source Instrument

OLCI

1 of 2

Product Package Type
OL_1_EFR
Description

OLCI Level 1 Product at full resolution

Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution
1	NRT - NTC	User	LND MRT	300m
Product Dissemination Unit		Number of Package components:	Number of Measurement Data files:	Number of Annotation Data files:
Frame		30	22	7
Number of Representation Information Files:				0

Product Package Structure

Manifest file

xfdumanifest.xml

Measurement Data files

Foot Note#	File name	Variables contained in the file	N.O.
1	Oa01_radiance.nc	Oa01_radiance, Oa01_radiance_err	
1	Oa02_radiance.nc	Oa02_radiance, Oa02_radiance_err	
1	Oa03_radiance.nc	Oa03_radiance, Oa03_radiance_err	
1	Oa04_radiance.nc	Oa04_radiance, Oa04_radiance_err	
1	Oa05_radiance.nc	Oa05_radiance, Oa05_radiance_err	
1	Oa06_radiance.nc	Oa06_radiance, Oa06_radiance_err	
1	Oa07_radiance.nc	Oa07_radiance, Oa07_radiance_err	
1	Oa08_radiance.nc	Oa08_radiance, Oa08_radiance_err	
1	Oa09_radiance.nc	Oa09_radiance, Oa09_radiance_err	
1	Oa10_radiance.nc	Oa10_radiance, Oa10_radiance_err	
	...continue	...continue	

Annotation Data files

Foot Note#	File name	Variables contained in the file	N.O.
	time_coordinates.nc	time_stamp	
	geo_coordinates.nc	altitude, latitude, longitude	
	qualityFlags.nc	quality_flags	
3	tie_geo_coordinates.nc	latitude, longitude	
3	tie_geometries.nc	OAA, OZA, SAA, SZA	
3	tie_meteo.nc	horizontal_wind, sea_level_pressure, total_ozone, humidity, reference_pressure_level, atmospheric_temperature_profile, total_column_water_vapour	
	instrument_data.nc	detector_index, frame_offset, lambda0, FWHM, solar Flux, relative_spectral_covariance	

Notes:

¹ The error estimation field is reported as palceholder. It might be not included in the final product

Product Package Type			
OL_1_EFR		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
1	Oa11_radiance.nc	Oa11_radiance, Oa11_radiance_err	
1	Oa12_radiance.nc	Oa12_radiance, Oa12_radiance_err	
1	Oa13_radiance.nc	Oa13_radiance, Oa13_radiance_err	
1	Oa14_radiance.nc	Oa14_radiance, Oa14_radiance_err	
1	Oa15_radiance.nc	Oa15_radiance, Oa15_radiance_err	
1	Oa16_radiance.nc	Oa16_radiance, Oa16_radiance_err	
1	Oa17_radiance.nc	Oa17_radiance, Oa17_radiance_err	
1	Oa18_radiance.nc	Oa18_radiance, Oa18_radiance_err	
1	Oa19_radiance.nc	Oa19_radiance, Oa19_radiance_err	
1	Oa20_radiance.nc	Oa20_radiance, Oa20_radiance_err	
1	Oa21_radiance.nc	Oa21_radiance, Oa21_radiance_err	
	removed_pixels.nc	Oa01_radiance, Oa01_radiance_err, Oa02_radiance, Oa02_radiance_errOa21_radiance, Oa21_radiance_err, latitude, longitude, altitude, SZA, detector_index, quality_flags	
Representation Information Files			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
	none		
Notes:			
1 see previous page			

4.8.1.1.2 OL_1_ERR

Source Instrument OLCI		1 of 2			
Product Package Type OL_1_ERR		<i>Description</i> OLCI Level 1 Product at reduced resolution			
Product Level 1	Diss. Timeliness NRT - NTC	PDGS Prod. Category User	Application Domain LND MRT	Spatial Resolution 1000m	
Product Dissemination Unit Stripe		Number of Package components: 29	Number of Measurement Data files: 21	Number of Annotation Data files: 7	
Number of Representation Information Files:				0	
Product Package Structure					
Manifest file					
	xfdumanifest.xml				
Measurement Data files					
<i>Foot Note#</i>	File name	Variables contained in the file			N.O.
1	Oa01_radiance.nc	Oa01_radiance, Oa01_radiance_err			
1	Oa02_radiance.nc	Oa02_radiance, Oa02_radiance_err			
1	Oa03_radiance.nc	Oa03_radiance, Oa03_radiance_err			
1	Oa04_radiance.nc	Oa04_radiance, Oa04_radiance_err			
1	Oa05_radiance.nc	Oa05_radiance, Oa05_radiance_err			
1	Oa06_radiance.nc	Oa06_radiance, Oa06_radiance_err			
1	Oa07_radiance.nc	Oa07_radiance, Oa07_radiance_err			
1	Oa08_radiance.nc	Oa08_radiance, Oa08_radiance_err			
1	Oa09_radiance.nc	Oa09_radiance, Oa09_radiance_err			
1	Oa10_radiance.nc	Oa10_radiance, Oa10_radiance_err			
	...continue	...continue			
Annotation Data files					
<i>Foot Note#</i>	File name	Variables contained in the file			N.O.
	time_coordinates.nc	time_stamp			
	geo_coordinates.nc	Altitude, Latitude, longitude			
	qualityFlags.nc	quality_flags			
3	tie_geo_coordinates.nc	latitude, longitude			
3	tie_geometries.nc	OAA, OZA, SAA,SZA			
3	tie_meteo.nc	horizontal_wind, sea_level_pressure, total_ozone, humidity, reference_pressure_level, atmospheric_temperature_profile, total_column_water_vapour			
	instrument_data.nc	detector_index, frame_offset, lambda0, FWHM, solar Flux, relative_spectral_covariance			
Notes:					
1 The error estimation field is reported as palceholder. It might be not included in the final product					

Product Package Type			
OL_1_ERR		(Cont'd)	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
Foot Note#	File name	Variables contained in the file	N.O.
1	Oa11_radiance.nc	Oa11_radiance, Oa11_radiance_err	
1	Oa12_radiance.nc	Oa12_radiance, Oa12_radiance_err	
1	Oa13_radiance.nc	Oa13_radiance, Oa13_radiance_err	
1	Oa14_radiance.nc	Oa14_radiance, Oa14_radiance_err	
1	Oa15_radiance.nc	Oa15_radiance, Oa15_radiance_err	
1	Oa16_radiance.nc	Oa16_radiance, Oa16_radiance_err	
1	Oa17_radiance.nc	Oa17_radiance, Oa17_radiance_err	
1	Oa18_radiance.nc	Oa18_radiance, Oa18_radiance_err	
1	Oa19_radiance.nc	Oa19_radiance, Oa19_radiance_err	
1	Oa20_radiance.nc	Oa20_radiance, Oa20_radiance_err	
1	Oa21_radiance.nc	Oa21_radiance, Oa21_radiance_err	
Representation Information Files			
Foot Note#	File name	Variables contained in the file	N.O.
	none		
Notes:			
1 see previous page			

4.8.1.1.2.1 OL_1_EFR & OL_1_ERR geophysical product description

Table 12 - L1 OLCI TOA radiance description

GEOPHYSICAL PRODUCT NAME: Top Of Atmosphere up-welling spectral radiance	
ID	Oaxx_radiance (where xx represents the OLCI band index, from 01 to 21)
LEVEL	1
DESCRIPTION	<p>Calibrated Top Of Atmosphere radiance values in the OLCI spectral bands, computed from the instrument digital counts applying the radiometric processing (non-linearity correction, dark signal correction, smear correction, absolute gain calibration) and the stray-light effect correction.</p> <p>The product is ortho-geolocated and spatially re-sampled on the product grid, covering the entire swath of the instrument.</p>

GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	$\text{mW}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}\cdot\text{nm}^{-1}$
ACCURACY	Radiometric accuracy 2% Geometric accuracy < 1 SSD rms
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa01 (400nm) to Oa21 (1020nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea, Land
PACKAGE/S	OL_1_EFR / OL_1_ERR

4.8.1.1.3 OL_2_WFR / OL_2_WRR

Source Instrument OLCI		1 of 2			
Product Package Type OL_2_WFR / OL_2_WRR		<i>Description</i> Water and atmospheric geophysical products at full spatial resolution / at reduced spatial resolution			
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain		Spatial Resolution
2	NRT NTC	USER	MRT	ATM	300 m / 1 km
Product Dissemination Unit		Number of Package components:	32	Number of Measurement Data files:	24
Frame (OL_2_WFR) / Stripe (OL_2_WRR)		Number of Representation Information Files:		7	
				0	
Product Package Structure					
Manifest file					
		xfdumanifest.xml			
Measurement Data files					
<i>Foot Note#</i>	File name	Variables contained in the file			N.O.
1	Oa01_reflectance.nc	Oa01_reflectance, Oa01_reflectance_err (calculated via BAC) or Oa01_reflectance, Oa01_reflectance_err (calculated via AAC)			X
1	Oa02_reflectance.nc	Oa02_reflectance, Oa02_reflectance_err (calculated via BAC) or Oa02_reflectance, Oa02_reflectance_err (calculated via AAC)			X
1	Oa03_reflectance.nc	Oa03_reflectance, Oa03_reflectance_err (calculated via BAC) or Oa03_reflectance, Oa03_reflectance_err (calculated via AAC)			X
1	Oa04_reflectance.nc	Oa04_reflectance, Oa04_reflectance_err (calculated via BAC) or Oa04_reflectance, Oa04_reflectance_err (calculated via AAC)			X
1	Oa05_reflectance.nc	Oa05_reflectance, Oa05_reflectance_err (calculated via BAC) or Oa05_reflectance, Oa05_reflectance_err (calculated via AAC)			X
1	Oa06_reflectance.nc	Oa06_reflectance, Oa06_reflectance_err (calculated via BAC) or Oa06_reflectance, Oa06_reflectance_err (calculated via AAC)			X
1	Oa07_reflectance.nc	Oa07_reflectance, Oa07_reflectance_err (calculated via BAC) or Oa07_reflectance, Oa07_reflectance_err (calculated via AAC)			X
1	Oa08_reflectance.nc	Oa08_reflectance, Oa08_reflectance_err (calculated via BAC) or Oa08_reflectance, Oa08_reflectance_err (calculated via AAC)			X
1	Oa09_reflectance.nc	Oa09_reflectance, Oa09_reflectance_err (calculated via BAC) or Oa09_reflectance, Oa09_reflectance_err (calculated via AAC)			X
1	Oa10_reflectance.nc	Oa10_reflectance, Oa10_reflectance_err (calculated via BAC) or Oa10_reflectance, Oa10_reflectance_err (calculated via AAC)			X
	...continue	...continue			
Notes:					
1 "BAC" stands for "Baseline Atmospheric Correction" and it is a Meris heritage; "AAC" stands for "Alternative Atmospheric Correction" and is based on a Neural Network procedure. BAC is used for the operational output of the reflectances of this product package, however switches are present in the processor allowing to change, if needed, during the operational lifetime of the mission, the output into reflectances computed with the AAC.					

2 of 2

Product Package Type			
OL_2_WFR / OL_2_WRR		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
1	Oa11_reflectance.nc	Oa11_reflectance, Oa11_reflectance_err (calculated via BAC) or Oa11_reflectance, Oa11_reflectance_err (calculated via AAC)	X
1	Oa12_reflectance.nc	Oa12_reflectance, Oa12_reflectance_err (calculated via BAC) or Oa12_reflectance, Oa12_reflectance_err (calculated via AAC)	X
1	Oa16_reflectance.nc	Oa16_reflectance, Oa16_reflectance_err (calculated via BAC) or Oa16_reflectance, Oa16_reflectance_err (calculated via AAC)	X
1	Oa17_reflectance.nc	Oa17_reflectance, Oa17_reflectance_err (calculated via BAC) or Oa17_reflectance, Oa17_reflectance_err (calculated via AAC)	X
1	Oa18_reflectance.nc	Oa18_reflectance, Oa18_reflectance_err (calculated via BAC) or Oa18_reflectance, Oa18_reflectance_err (calculated via AAC)	X
1	Oa21_reflectance.nc	Oa21_reflectance, Oa21_reflectance_err (calculated via BAC) or Oa21_reflectance, Oa21_reflectance_err (calculated via AAC)	X
	chl_oc4me.nc	CHL_OC4ME, CHL_OC4ME_err	
	chl_nn.nc	CHL_NN, CHL_NN_err	
	tsm_nn.nc	TSM_NN, TSM_NN_err	
	trsp.nc	KD490_M07, KD490_M07_er	
	iop_nn.nc	ADG_443_NN, ADG_443_NN_er	
	par.nc	PAR, PAR_er	
	w_aer.nc	T865, T865_er, A865, A865_er	
2	iwv.nc	IWV, IWV_er	
Annotation Data Files			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	wqsf.nc	WQSF	
	geo_coordinates.nc	longitude, latitude, altitude	
	tie_geo_coordinates.nc	longitude, latitude	
	tie_geometries.nc	SZA, SAA, OZA, OAA	
	tie_meteo.nc	horizontal_wind, sea_level_pressure, total_ozone, humidity, reference_pressure_level, atmospheric_temperature_profile, total_column_water_vapour	
	time_coordinates.nc	time_stamp	
	instrument_data.nc	detector_index, frame_offset, lambda0, FWHM, solar Flux, relative_spectral_covariance	
Representation Information Files			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	none		
Notes:			
1 see previous page			
2 The dataset will include also the information over the land pixels.			

4.8.1.1.3.1 OL 2 WFR/OL 2 WRR geophysical product description

Table 13 - L2 OLCI Water-leaving Reflectance description

GEOPHYSICAL PRODUCT NAME: Water-leaving Reflectance	
ID	Oaxx_reflectance (where xx represents the OLCI channels index)
LEVEL	2
DESCRIPTION	Surface directional reflectance, corrected for atmosphere and Sun specular reflection, at all OLCI channels except those dedicated to atmosphere absorption measurements.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	Dimensionless
ACCURACY	5% in the 400nm domain
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	All OLCI bands except Oa13 (761.25nm), Oa14 (764.375nm), Oa15 (767.5nm), Oa19 (900nm), and Oa20 (940nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 14 - L2 OLCI Algal Pigment concentration description

GEOPHYSICAL PRODUCT NAME: Algal pigment	
ID	1. CHL_OC4ME 2. CHL_NN
LEVEL	2
DESCRIPTION	Chlorophyll-a concentration computed using two different algorithms: <ol style="list-style-type: none"> the "OC4Me" maximum-band-ratio (MBR) semi-analytical algorithm developed by Morel et al. (2007a) from the phytoplankton pigments absorption coefficient obtained as output from an artificial Neural Network (NN) as a multiple non-linear regression technique. The coefficients of the NN are determined by a training process based on the usage of a radiative transfer model including a bio-optical model describing the water IOPs.

GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	mg.m ⁻³
ACCURACY	30% (open ocean) 70% (coastal areas)
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	1. OC4Me: Oa03 (443nm) to Oa06 (560nm) 2. NN: Oa01 (400nm) – Oa12 (753.5nm), Oa16 (778.75nm), Oa17 (865nm), Oa21 (1020nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 15 - L2 OLCI Total Suspended Matter concentration description

GEOPHYSICAL PRODUCT NAME: Total Suspended Matter	
ID	TSM_NN
LEVEL	2
DESCRIPTION	Total Suspended Matter concentration computed using the total backscattering coefficient obtained as output from an artificial Neural Network (NN) as a multiple non-linear regression technique. The coefficients of the NN are determined by the training process based on the usage of a radiative transfer model including a bio-optical model describing the water Inherent Optical Properties (IOPs).
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	g.m ⁻³
ACCURACY	30% (open ocean) 70% (coastal areas)
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa01 (400nm) – Oa12 (753.5nm), Oa16 (778.75nm), Oa17 (865nm), Oa21 (1020nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 16 - L2 OLCI Diffuse Attenuation Coefficient description

GEOPHYSICAL PRODUCT NAME: Diffuse Attenuation Coefficient	
ID	KD490_M07
LEVEL	2
DESCRIPTION	Diffuse attenuation coefficient for down-welling irradiance at 490 nm computed using the "OK2-560" algorithm proposed by Morel et al. (2007).
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	m ⁻¹
ACCURACY	5%
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa04 (490nm) and Oa06 (560nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 17 - L2 OLCI Coloured Dissolved Matter Absorption description

GEOPHYSICAL PRODUCT NAME: Coloured Dissolved Matter Absorption	
ID	ADG_443_NN
LEVEL	2
DESCRIPTION	Absorption coefficient due to matter transported by rivers into the coastal sea, computed at 443 nm via an artificial Neural Network (NN) as a multiple non-linear regression technique. It comprises non-living particulate organic material, living particles such as bacteria, inorganic minerals and bubbles.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	m ⁻¹
ACCURACY	50% (open ocean) 70% (coastal areas)
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa01 (400nm) – Oa12 (753.5nm), Oa16 (778.75nm), Oa17 (865nm), Oa21 (1020nm)

DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 18 - L2 OLCI Photosynthetically Active Radiation description

GEOPHYSICAL PRODUCT NAME: Photosynthetically Active Radiation	
ID	PAR
LEVEL	2
DESCRIPTION	Quantum energy flux from the Sun in the spectral range 400-700 nm. The provided geophysical product is an instantaneous PAR (iPAR) derived from the irradiance above each water pixels, under a tabulated relationship (same algorithms used in Envisat-MERIS).
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	$\mu\text{Einstein.m}^{-2}.\text{s}^{-1}$
ACCURACY	5%
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 19 - L2 OLCI Aerosol Optical Depth description

GEOPHYSICAL PRODUCT NAME: Aerosol Optical Depth	
ID	T865
LEVEL	2
DESCRIPTION	Aerosol load, expressed in optical depth at 865 nm wavelength.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	dimensionless
ACCURACY	N/A

ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa05 (510nm), Oa16 (779nm), Oa17 (865nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	ATM
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 20 - L2 OLCI Aerosol Angstrom Exponent description

GEOPHYSICAL PRODUCT NAME: Aerosol Angstrom Exponent	
ID	A865
LEVEL	2
DESCRIPTION	Spectral dependency of the aerosol optical depth, between 779 and 865 nm.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	Dimensionless
ACCURACY	N/A
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa05 (510nm), Oa16 (779nm), Oa17 (865nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	ATM
PACKAGE/S	OL_2_WFR / OL_2_WRR

Table 21 - L2 OLCI Integrated Water Vapour description

GEOPHYSICAL PRODUCT NAME: Integrated Water Vapour	
ID	IWV
LEVEL	2
DESCRIPTION	Total amount of atmospheric water vapour content over clear sky pixels. The algorithm for the retrieval of TCWV from measurements of OLCI is based on the exploitation of the pronounced water vapour absorption band around 950 nm using the differential absorption of water vapour. The inversion of the OLCI measurements is carried out by one-dimensional variational analysis (1D-Var), instead of relying on e.g. non-linear regression approaches such as artificial neural networks.

GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	Kg.m ⁻²
ACCURACY	TBC
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa18 (885nm), Oa19 (900nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	ATM
PACKAGE/S	OL_2_WFR / OL_2_WRR OL_2_LFR / OL_2_LRR

4.8.1.1.4 OL_2_LFR / OL_2_LRR

Source Instrument						1 of 1	
OLCI							
Product Package Type OL_2_LFR / OL_2_LRR		<i>Description</i> Land and Atmospheric geophysical products at full spatial resolution					
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain		Spatial Resolution		
2	NRT - NTC	USER	LND - ATM		300 m / 1km		
Product Dissemination Unit Frame (OL_2_LFR) / Stripe (OL_2_LRR)		Number of Package components:	12	Number of Measurement Data files:	3	Number of Annotation Data files:	8
Number of Representation Information Files:						0	
Product Package Structure							
Manifest file							
	xfdumanifest.xml						
Measurement Data files							
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.	
	ogvi.nc	OGVI, OGVI_err					
	otci.nc	OTCI, OTCI_err					
1	iwv.nc	IWV, IWV_err					
Annotation Data files							
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.	
	rc_ogvi.nc	RC681, RC681_err, RC865, RC865_err					
	lqsf.nc	LQSF					
	geo_coordinates.nc	longitude, latitude, altitude					
	tie_geo_coordinates.nc	longitude, latitude					
	tie_geometries.nc	SZA, SAA, OZA, OAA					
	tie_meteo.nc	horizontal_wind, sea_level_pressure, total_ozone, humidity, reference_pressure_level, atmospheric_temperature_profile, total_column_water_vapour					
	time_coordinates.nc	time_stamp					
	instrument_data.nc	detector_index, frame_offset, lambda0, FWHM, solar Flux, relative_spectral_covariance					
Representation Information Files							
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.	
	none						
Notes:							
1 The dataset will include also the information over the land pixels.							

4.8.1.1.4.1 OL 2 LFR/OL 2 LRR geophysical product description

Table 22 - L2 OLCI FAPAR description

GEOPHYSICAL PRODUCT NAME: OLCI Global Vegetation Index or Fraction of Absorbed Photosynthetically Active Radiation (FAPAR)	
ID	OGVI
LEVEL	2
DESCRIPTION	Fraction of Photosynthetically Active Radiation (PAR) absorbed by the plant canopy.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	dimensionless
ACCURACY	< 5% at FR / <10% at RR
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa03 (443nm), Oa10 (681nm), Oa17 (865nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	LND
PACKAGE/S	OL_2_LFR / OL_2_LRR

Table 23 - L2 OLCI Terrestrial Chlorophyll Index description

GEOPHYSICAL PRODUCT NAME: OLCI Terrestrial Chlorophyll Index	
ID	OTCI
LEVEL	2
DESCRIPTION	Estimates of the Chlorophyll content in terrestrial vegetation from Rayleigh corrected reflectance.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	Dimensionless
ACCURACY	< 5% at FR / <10% at RR
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa10 (681.25nm), Oa11 (708.75nm), Oa12 (753.75nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	LND
PACKAGE/S	OL_2_LFR / OL_2_LRR

Table 24 - L2 OLCI RC681 and RC865

GEOPHYSICAL PRODUCT NAME: OLCI Terrestrial Chlorophyll Index	
ID	RC861/RC865
LEVEL	2
DESCRIPTION	By-products of the OGVI, the so-called red and NIR rectified reflectances, are virtual reflectance largely decontaminated from atmospheric and angular effects, and good proxy to Top of Canopy reflectances.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Frame (FR), Stripe (RR)
SPATIAL RESOLUTION	FR (300 m), RR (1 km)
UNITS	Dimensionless
ACCURACY	
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	Oa10 (681.25nm), Oa11 (708.75nm), Oa12 (753.75nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	LND
PACKAGE/S	OL_2_LFR / OL_2_LRR

4.8.1.1.5 SL_1_RBT

Source Instrument SLSTR		1 of 7					
Product Package Type SL_1_RBT		Description Brightness temperatures and radiances					
Product Level 1	Diss. Timeliness NRT - NTC	PDGS Prod. Category User		Application Domain LND MRT		Spatial Resolution 500m, 1Km	
Product Dissemination Unit Stripe		Number of Package components: 91 (111)	Number of Measurement Data files: 28 (34)	Number of Annotation Data files: 63 (76)		Number of Representation Information Files: 0	
Product Package Structure							
Manifest file							
		xfdumanifest.xml					
Measurement Data files							
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.
1	s1_radiance_an.nc	("a"-det) nadir S1_radiance_an, S1_exception_an, S1_radiance_orphan_an , S1_exception_Orphan_an, S1_radiance_an_er, S1_radiance_orphan_an_er					
1	s1_radiance_ao.nc	("a"-det) oblique S1_radiance_ao, S1_exception_ao, S1_radiance_orphan_ao , S1_exception_Orphan_ao, S1_radiance_ao_er, S1_radiance_orphan_ao_er					
1	s2_radiance_an.nc	("a"-det) nadir S2_radiance_an, S2_exception_an, S2_radiance_orphan_an , S2_exception_Orphan_an, S2_radiance_an_er, S2_radiance_orphan_an_er					
1	s2_radiance_ao.nc	("a"-det) oblique S2_radiance_ao, S2_exception_ao, S2_radiance_orphan_a0, S2_exception_Orphan_ao, S2_radiance_ao_er, S2_radiance_orphan_ao_er					
	...continue	...continue					
Annotation Data files							
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.
	s1_quality_an.nc	S1_dL_BB_an, S1_dL_VISCAL_an, [...]					
	s1_quality_ao.nc	S1_dL_BB_ao, S1_dL_VISCAL_ao, [...]					
	s2_quality_an.nc	S2_dL_BB_an, S2_dL_VISCAL_an, [...]					
	s2_quality_ao.nc	S2_dL_BB_ao, S2_dL_VISCAL_ao, [...]					
	s3_quality_an.nc	S3_dL_BB_an, S2_dL_VISCAL_an, [...]					
	s3_quality_ao.nc	S3_dL_BB_ao, S2_dL_VISCAL_ao, [...]					
	...continue	...continue					
Notes:							
¹ The error estimation field is reported as palceholder. It might be not included in the final product							

Product Package Type			
SL_1_RBT		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
Foot Note#	File name	Variables contained in the file	N.O.
1	S3_radiance_an.nc	("a"-det) nadir S3_radiance_an, S3_exception_an, S3_radiance_orphan_an , S3_exception_Orphan_an, S3_radiance_an_er, S3_radiance_orphan_an_er	
1	S3_radiance_ao.nc	("a"-det) oblique S3_radiance_ao, S3_exception_ao, S3_radiance_orphan_ao and S3_exception_Orphan_ao, S3_radiance_ao_er, S1_radiance_orphan_ao_er	
1	S4_radiance_an.nc	("a"-det) nadir S4_radiance_an, S4_exception_an, S4_radiance_orphan_an , S4_exception_Orphan_an, S4_radiance_an_er, S4_radiance_orphan_an_er	
1	S4_radiance_ao.nc	("a"-det) oblique S4_radiance_ao, S4_exception_ao, S4_radiance_orphan_ao and S4_exception_Orphan_ao, S4_radiance_ao_er, S4_radiance_orphan_ao_er	
1	S4_radiance_bn.nc	("b"-det) nadir S4_radiance_bn, S4_exception_bn, S4_radiance_orphan_bn , S4_exception_Orphan_bn, S4_radiancer_bn_er, S4_radiance_orphan_bn_er	
1	S4_radiance_bo.nc	("b"-det) oblique S4_radiance_bo, S4_exception_bo, S4_radiance_orphan_bo , S4_exception_Orphan_bo, S4_radiance_bo_er, S4_radiance_orphan_bo_er	
1,2	S4_radiance_cn.nc	(TDI) nadir S4_radiance_cn, S4_exception_cn, S4_radiance_orphan_cn , S4_exception_Orphan_cn, S4_radiance_cn_er, S4_radiance_orphan_cn_er	X
1,2	S4_radiance_co.nc	(TDI) oblique S4_radiance_co, S4_exception_co, S4_radiance_orphan_co , S4_exception_Orphan_co, S4_radiance_co_er, S4_radiance_orphan_co_er	X
	...continue	...continue	
Annotation Data files (cont'd)			
Foot Note#	File name	Variables contained in the file	N.O.
1	S4_quality_an.nc	S4_dL_BB_an, S4_dL_VISCAL_an, [...]	
1	S4_quality_ao.nc	S4_dL_BB_ao, S4_dL_VISCAL_ao, [...]	
1	S4_quality_bn.nc	S4_dL_BB_bn, S4_dL_VISCAL_bn, [...]	
1	S4_quality_bo.nc	S4_dL_BB_bo, S4_dL_VISCAL_bo, [...]	
1,2	S4_quality_cn.nc	S4_dL_BB_cn, S4_dL_VISCAL_cn, [...]	X
1,2	S4_quality_co.nc	S4_dL_BB_co, S4_dL_VISCAL_co, [...]	X
	...continue	...continue	
Notes:			
¹ see previous page ² The current operational baseline is to baseline is to consider A and B stripe in the operational output (TDI not present). However the presence of each channel is linked to the switch mechanism implemented in the IPF			

Product Package Type			
SL_1_RBT		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
1	s5_radiance_an.nc	("a"-det) nadir S5_radiance_an, S5_exception_an, S5_radiance_orphan_an , S5_exception_Orphan_an, S5_radiance_an_er, S5_radiance_orphan_an_er	
1	s5_radiance_ao.nc	("a"-det) oblique S5_radiance_ao, S5_exception_ao, S5_radiance_orphan_ao and S5_exception_Orphan_ao, S5_radiance_ao_er, S5_radiance_orphan_ao_er	
1	s5_radiance_bn.nc	("b"-det) nadir S5_radiance_bn, S5_exception_bn, S5_radiance_orphan_bn , S5_exception_Orphan_bn, S5_radiance_er_bn, S5_radiance_orphan_er_bn	
1	s5_radiance_bo.nc	("b"-det) oblique S5_radiance_bo, S5_exception_bo, S5_radiance_orphan_bo , S5_exception_Orphan_bo, S5_radiance_bo_er, S5_radiance_orphan_bo_er	
1,2	s5_radiance_cn.nc	(TDI) nadir S5_radiance_cn, S5_exception_cn, S5_radiance_orphan_cn , S5_exception_Orphan_cn, S5_radiance_cn_er, S5_radiance_orphan_cn_er	X
1,2	s5_radiance_co.nc	(TDI) oblique S5_radiance_co, S5_exception_co, S5_radiance_orphan_co , S5_exception_Orphan_co, S5_radiance_co_er, S5_radiance_orphan_co_er	X
1	s6_radiance_an.nc	("a"-det) nadir S6_radiance_an, S6_exception_an, S6_radiance_orphan_an , S6_exception_Orphan_an, S6_radiance_an_er, S6_radiance_orphan_an_er	
	...continue	...continue	
Annotation Data files (cont'd)			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
1	s5_quality_an.nc	S5_dL_BB_an, S5_dL_VISCAL_an, [...]	
1	s5_quality_ao.nc	S5_dL_BB_ao, S5_dL_VISCAL_ao, [...]	
1	s5_quality_bn.nc	S5_dL_BB_bn, S5_dL_VISCAL_bn, [...]	
1	s5_quality_bo.nc	S5_dL_BB_bo, S5_dL_VISCAL_bo, [...]	
1,2	s5_quality_cn.nc	S5_dL_BB_cn, S5_dL_VISCAL_cn, [...]	X
1,2	s5_quality_co.nc	S5_dL_BB_co, S5_dL_VISCAL_co, [...]	X
1	s6_quality_an.nc	S6_dL_BB_an, S6_dL_VISCAL_an, [...]	
	...continue	...continue	
Notes:			
1 see previous pages 2 see previous pages			

Product Package Type			
SL_1_RBT		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
1	S6_radiance_ao.nc	("a"-det) oblique S6_radiance_ao, S6_exception_ao, S6_radiance_orphan_ao and S6_exception_Orphan_ao, S6_radiance_ao_er, S6_radiance_orphan_ao_er	
1	S6_radiance_bn.nc	("b"-det) nadir S6_radiance_bn, S6_exception_bn, S6_radiance_orphan_bn , S6_exception_Orphan_bn, S6_radiance_bn_er, S6_radiance_orphan_bn_er	
1	S6_radiance_bo.nc	("b"-det) oblique S6_radiance_bo, S6_exception_bo, S6_radiance_orphan_bo , S6_exception_Orphan_bo, S6_radiance_bo_er, S6_radiance_orphan_bo_er	
1,2	S6_radiance_cn.nc	(TDI) nadir S6_radiance_cn, S6_exception_cn, S6_radiance_orphan_cn , S6_exception_Orphan_cn, S6_radiance_cn_er, S6_radiance_orphan_cn_er	X
1,2	S6_radiance_co.nc	(TDI) oblique S6_radiance_co, S6_exception_co, S6_radiance_orphan_co , S6_exception_Orphan_co, S6_radiance_co_er, S6_radiance_orphan_co_er	X
1	S7_BT_in.nc	1 Km nadir, S7_BT_in, S7_exception_in, S7_BT_orphan_in , S7_exception_Orphan_in, S7_BT_in_er, S7_BT_orphan_in_er	
1	S7_BT_io.nc	1 Km oblique S7_BT_io, S7_exception_io, S7_BT_orphan_io, S7_exception_Orphan_io, S7_BT_io_er, S7_BT_orphan_io_er	
	...continue	...continue	
Annotation Data files (cont'd)			
<i>Foot Note#</i>	File name	Variables contained in the file	N.O.
1	S6_quality_ao.nc	S6_dL_BB_ao, S6_dL_VISCAL_ao, [...]	
1	S6_quality_bn.nc	S6_dL_BB_bn, S6_dL_VISCAL_bn, [...]	
1	S6_quality_bo.nc	S6_dL_BB_bo, S6_dL_VISCAL_bo, [...]	
1,2	S6_quality_cn.nc	S6_dL_BB_cn, S6_dL_VISCAL_cn, [...]	X
1,2	S6_quality_co.nc	S6_dL_BB_co, S6_dL_VISCAL_co, [...]	X
	S7_quality_in.nc	S7_dT_BB1_in, S7_dT_BB2_in,, [...]	
	S7_quality_io.nc	S7_dT_BB1_io, S7_dT_BB2_io,[...]	
	...continue	...continue	
Notes:			
¹ see previous pages ² see previous pages			

Product Package Type			
SL_1_RBT		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
1	S8_BT_in.nc	1 Km nadir, S8_BT_in, S8_exception_in, S8_BT_orphan_in , S8_exception_Orphan_in, S8_BT_in_er, S8_BT_orphan_in_er	
1	S8_BT_io.nc	1 Km oblique S8_BT_io, S8_exception_io, S8_BT_orphan_io, S8_exception_Orphan_io, S8_BT_io_er, S8_BT_orphan_io_er	
1	S9_BT_in.nc	1 Km nadir, S9_BT_in, S9_exception_in, S9_BT_orphan_in , S9_exception_Orphan_in, S9_BT_in_er, S9_BT_orphan_in_er	
1	S9_BT_io.nc	1 Km oblique S9_BT_io, S9_exception_io, S9_BT_orphan_io, S9_exception_Orphan_io, S9_BT_io_er, S9_BT_orphan_io_er	
1	F1_BT_in.nc	1 Km nadir, F1_BT_in, F1_exception_in, F1_BT_orphan_in , F1_exception_Orphan_in, F1_BT_in_er, F1_BT_orphan_in_er	
1	F1_BT_io.nc	1 Km oblique F1_BT_io, F1_exception_io, F1_BT_orphan_io, F1_exception_Orphan_io, F1_BT_io_er, F1_BT_orphan_io_er	
1	F2_BT_in.nc	1 Km nadir, F2_BT_in, F2_exception_in, F2_BT_orphan_in , F2_exception_Orphan_in, F2_BT_in_er, F2_BT_orphan_in_er	
1	F2_BT_io.nc	1 Km oblique F2_BT_io, F2_exception_io, F2_BT_orphan_io, F2_exception_Orphan_io, F2_BT_io_er, F2_BT_orphan_io_er	
Annotation Data files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	S8_quality_in.nc	S8_dT_BB1_in, S8_dT_BB2_in,[...]	
	S8_quality_io.nc	S8_dT_BB1_io, S8_dT_BB2_io,[...]	
	S9_quality_in.nc	S9_dT_BB1_in, S9_dT_BB2_in,[...]	
	S9_quality_io.nc	S9_dT_BB1_io, S9_dT_BB2_io,[...]	
	F1_quality_in.nc	F1_dT_BB1_in, F1_dT_BB2_in,[...]	
	F1_quality_io.nc	F1_dT_BB1_io, F1_dT_BB2_io,[...]	
	F2_quality_in.nc	F2_dT_BB1_in, F2_dT_BB2_in,[...]	
	F2_quality_io.nc	F2_dT_BB1_io, F2_dT_BB2_io,[...]	
	flags_an.nc	cloud_an, bayes_an, pointing_an, confidence_an, [...]	
	flags_ao.nc	cloud_ao, bayes_ao, pointing_ao, confidence_ao, [...]	
	...continue	...continue	

Product Package Type			
SL_1_RBT		<i>(Cont'd)</i>	
Product Package Structure (Cont'd)			
Annotation Data files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	flags_bn.nc	cloud_bn, bayes_bn, pointing_bn, confidence_bn, [...]	
	flags_bo.nc	cloud_bo, bayes_bo, pointing_bo, confidence_bo, [...]	
²	flags_cn.nc	cloud_cn, bayes_cn, pointing_cn, confidence_cn, [...]	X
²	flags_co.nc	cloud_co, bayes_co, pointing_co, confidence_co, [...]	X
	flags_in.nc	cloud_in, bayes_in, pointing_in, confidence_in, [...]	
	flags_io.nc	cloud_io, bayes_io, pointing_io, confidence_io, [...]	
	indices_an.nc	scan_an, pixel_an, detector_an, Scan_orphan_an, [...]	
	indices_ao.nc	scan_ao, pixel_ao, detector_ao, Scan_orphan_ao, [...]	
	indices_bn.nc	scan_bn, pixel_bn, detector_bn, Scan_orphan_bn, [...]	
	indices_bo.nc	scan_bo, pixel_bo, detector_bo, Scan_orphan_bo, [...]	
²	indices_cn.nc	scan_an, pixel_cn, detector_cn, Scan_orphan_cn, [...]	X
²	indices_co.nc	scan_an, pixel_co, detector_co, Scan_orphan_co, [...]	X
	indices_in.nc	scan_an, pixel_in, detector_in, Scan_orphan_in, [...]	
	indices_io.nc	scan_io, pixel_io, detector_io, Scan_orphan_io, [...]	
	geodetic_an.nc	latitute_an, longitude_an, elevation_an	
	geodetic_ao.nc	latitute_ao, longitude_ao, elevation_ao	
	geodetic_bn.nc	latitute_bn, longitude_bn, elevation_bn	
	geodetic_bo.nc	latitute_bo, longitude_bo, elevation_bo	
²	geodetic_cn.nc	latitute_cn, longitude_cn, elevation_cn	X
²	geodetic_co.nc	latitute_co, longitude_co, elevation_co	X
	geodetic_in.nc	latitute_in, longitude_in, elevation_in	
	geodetic_io.nc	latitute_io, longitude_io, elevation_io	
	geodetic_tx.nc	latitute_tx, longitude_tx, elevation_tx	
	cartesian_an.nc	x_an, y_an	
	cartesian_ao.nc	x_ao, y_ao	
	cartesian_bn.nc	x_bn, y_bn	
	cartesian_bo.nc	x_bo, y_bo	
²	cartesian_cn.nc	x_cn, y_cn	X
²	cartesian_co.nc	x_co, y_co	X
	cartesian_in.nc	x_in, y_in	
	cartesian_io.nc	x_io, y_io	
	cartesian_tx.nc	x_ix, y_ix	
	...continue	...continue	
Notes:			
² see previous pages			

Product Package Type			
SL_1_RBT		(Cont'd)	
Product Package Structure (Cont'd)			
Annotation Data files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	time_an.nc	time_stamp_a, first_scan_an, first_scan_ao, [...]	
	time_bn.nc	time_stamp_b, first_scan_bn, first_scan_bo, [...]	
²	time_cn.nc	time_stamp_c, first_scan_cn, first_scan_co, [...]	X
	time_in.nc	time_stamp_i, first_scan_in, first_scan_io, [...]	
	geometry_tn.nc	solar_zenith_tn, solar_azimuth_tn, solar_path_tn, sat_zenith_tn, sat_azimuth_tn, sat_path_tn	
	geometry_to.nc	solar_zenith_to, solar_azimuth_to, solar_path_to, sat_zenith_to, sat_azimuth_to, sat_path_to	
	viscal.nc	Visible Calibration Coefficients	
	met_tx.nc	t_forecast, t_single, t_series, t_bound, z_wind, z_atmos, z_soil, z_bound, p_atmos, sea_surface_temperature_tx, sea_ice_fraction_tx, u_wind_tx, v_wind_tx, sensible_heat_tx, latent_heat_tx, solar_radiation_tx, thermal_radiation_tx, temperature_profile_tx, specific_humidity_tx, total_column_water_vapour_tx, surface_pressure_tx, east_west_stress_tx, north_south_stress_tx, cloud_fraction_tx, soil_wetness_tx, temperature_tx, dew_point_tx, skin_temperature_tx, snow_depth_tx	
Representation Information Files			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	none		
Notes:			
² see previous pages			

4.8.1.1.5.1 SL 1 RBT geophysical product description

Table 25 - L1 SLSTR radiance description

GEOPHYSICAL PRODUCT NAME: Gridded pixel Radiances	
ID	xx_radiance_yz (where: <ul style="list-style-type: none"> - xx represents the SLSTR solar channels index - y assumes one the following values: “a” to indicate the A-stripe detector, “b” to indicate the B-stripe detector and “c” to indicate “A” and “B” combined detectors (TDI) - z assumes one the following values: “n” to indicate the nadir view, “o” to indicate the oblique view)
LEVEL	1
DESCRIPTION	Calibrated and geolocated radiances computed from instrument source packets in the short wave and visible channels.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	500 m
UNITS	dimensionless
ACCURACY	Radiometric accuracy: < 2% (BOL), < 5% (EOL) Geometric accuracy < 1 SSD rms
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	From S1 (555nm) to S6 (2250nm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea, Land
PACKAGE/S	SL_1_RBT

Table 26 - L1 SLSTR brightness temperature description

GEOPHYSICAL PRODUCT NAME: Gridded pixel Brightness Temperature	
ID	xx_BT_iz (where: <ul style="list-style-type: none"> - xx represents the SLSTR thermal infrared channels index - i indicates the infrared detectors - z assumes one the following values: “n” to indicate the nadir view, “o” to indicate the oblique view)

LEVEL	1
DESCRIPTION	Calibrated and geolocated brightness temperatures computed from instrument source packets in the thermal channels.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	1 km
UNITS	K
ACCURACY	< 0.2K (0.1K goal) Geometric accuracy < 1 SSD rms
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	S7 (3.74 μm), S8 (10.85 μm), S9 (12 μm), F1 (3.74 μm), F2 (10.85 μm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea, Land
PACKAGE/S	SL_1_RBT

4.8.1.1.6 SL_2_WST

Source Instrument SLSTR		1 of 1		
Product Package Type SL_2_WST		<i>Description</i> Single SST field which is composited from the best-performing single-coefficient SST field plus a number of supporting data fields.		
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution
2	NRT NTC	User	MRT	1 km
Product Dissemination Unit Stripe		Number of Package components:	Number of Measurement Data files:	Number of Annotation Data files:
		2	1	0
		Number of Representation Information Files:		0
Product Package Structure				
Manifest file				
	xfdumanifest.xml			
Measurement Data files				
<small>Foot Note#</small>	File name	Variables contained in the file		N.O.
	L2P.nc	lat, lon, time, channel, SST, SST_dtime, sses_bias, sses_standard_deviation, dt_analysis, wind_speed, wind_speed_dtime_from_sst, sea_ice_fraction, sea_ice_fraction_dtime_from_sst, aerosol_dynamic_indicator, adi_dtime_from_sst, l2p_flags, quality_level, satellite_zenith_angle, brightness_temperature, nedt, sst_theoretical_error		
Annotation Data files				
<small>Foot Note#</small>	File name	Variables contained in the file		N.O.
	none			
Representation Information Files				
<small>Foot Note#</small>	File name	Variables contained in the file		N.O.
	none			

4.8.1.1.6.1 SL 2 WST geophysical product description

Table 27 - L2 SLSTR GHRSSST Sea Surface Temperature description

GEOPHYSICAL PRODUCT NAME: SLSTR GHRSSST L2P	
ID	SST
LEVEL	2
DESCRIPTION	Product conforming to the GHRSSST L2P specification, containing a single Sea Surface Temperature (SST) field which is composite from the best-performing single-coefficient SST field. The SST retrieval is based on combinations of brightness temperatures weighted by coefficients which can be defined using radiative transfer (RT) modelled radiances followed by regression to an equation whose form accounts for view-geometric and other factors.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	1 km
UNITS	K
ACCURACY	< 0.3 K
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	S7 (3.74 μm), S8 (10.85 μm), S9 (12 μm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Sea
PACKAGE/S	SL_2_WST

4.8.1.1.7 SL_2_LST

Source Instrument SLSTR		1 of 2			
Product Package Type SL_2_LST		Description Land Surface parameters			
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution	
2	NRT - NTC	User	LND	1 km	
Product Dissemination Unit stripe		Number of Package components:	12	Number of Measurement Data files:	1
		Number of Representation Information Files:		0	
Product Package Structure					
Manifest file					
	xfdumanifest.xml				
Measurement Data files					
^{Foot Note#}	File name	Variables contained in the file			
	LST_in.nc	LST, LST_uncertainty, LST_orphan, LST_uncertainty_orphan, exception, exception_orphan			
Annotation Data files					
^{Foot Note#}	File name	Variables contained in the file			
	LST_ancillary_ds.nc	NDVI, NDVI_orphan, biome, biome_orphan, fraction, fraction_orphan, TCWV, validation			
	flags_in.nc	cloud_in, bayes_in, pointing_in, confidence_in, cloud_orphan_in, bayes_orphan_in, pointing_orphan_in, confidence_orphan_in			
	indices_in.nc	scan_in, pixel_in, detector_in, scan_orphan_in, pixel_orphan_in, detector_orphan_in			
	time_in.nc	scan_time_in, pixel_time_in			
	geodetic_in.nc	latitude_in, longitude_in, elevation_in			
	cartesian_in.nc	x_in, y_in			
	geometry_tn.nc	solar_zenith_tn, solar_azimuth_tn, solar_path_tn, sat_zenith_tn, sat_azimuth_tn, sat_path_tn			
	geodetic_tx.nc	latitude_tx, longitude_tx			
	cartesian_tx.nc	x_tx, y_tx			
	met_tx.nc	t_forecast, t_single, t_series, t_bound, z_wind, z_atmos, z_soil, z_bound, p_atmos, SST, sea_ice_fraction, [...] (refer to [R-D] for the complete list of variables)			

4.8.1.1.7.1 SL 2 LST geophysical product description

Table 28 - L2 SLSTR Land Surface Temperature description

GEOPHYSICAL PRODUCT NAME: Land Surface Temperature	
ID	LST
LEVEL	2
DESCRIPTION	Single view, two channels effective radiometric temperature of the Earth surface “skin” in the instrument field of view. “Skin” temperature here refers to the temperature of the top surface in bare soil conditions and to the effective emitting temperature of vegetation “canopies” as determined from a view of the top of a canopy.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	1 km
UNITS	K
ACCURACY	< 1 K
ADDITIONAL INFORMATION	
INPUTS INSTRUMENT BANDS	S8 (10.85 μm), S9 (12 μm)
DISSEMINATION TIMELINESS	NRT, NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SL_2_LST

4.8.1.1.8 SY_2_SYN

Source Instrument SYN branch		1 of 2			
Product Package Type SY_2_SYN		<i>Description</i> Land surface reflectance and aerosol geophysical parameters			
Product Level 2	Diss. Timeliness NTC	PDGS Prod. Category User	Application Domain LND	Spatial Resolution 300 m	
Product Dissemination Unit Stripe		Number of Package components: 43	Number of Measurement Data files: 33	Number of Annotation Data files: 9	
Number of Representation Information Files:				0	
Product Package Structure					
Manifest file					
	xfdumanifest.xml				
Measurement Data files					
<small>Foot Note#</small>	File name	Variables contained in the file			N.O.
	Syn01_reflectance.nc	SDR_01, SDR_01_err			
	Syn02_reflectance.nc	SDR_02, SDR_02_err			
	Syn03_reflectance.nc	SDR_03, SDR_03_err			
	Syn04_reflectance.nc	SDR_04, SDR_04_err			
	Syn05_reflectance.nc	SDR_05, SDR_05_err			
	Syn06_reflectance.nc	SDR_06, SDR_06_err			
	Syn07_reflectance.nc	SDR_07, SDR_07_err			
	Syn08_reflectance.nc	SDR_08, SDR_08_err			
	Syn09_reflectance.nc	SDR_09, SDR_09_err			
	Syn10_reflectance.nc	SDR_10, SDR_10_err			
	...continue	...continue			
Annotation Data files					
<small>Foot Note#</small>	File name	Variables contained in the file			N.O.
	tiepoints_olci.nc	OLC_TP_lat, OLC_TP_lon, SAA, SZA, OLC_VAA, OLC_VZA			
	tiepoints_slstr_n.nc	SLN_TP_lat, SLN_TP_lon, SLN_VAA, SLN_VZA			
	tiepoints_slstr_o.nc	SLO_TP_lat, SLO_TP_lon, SLO_VAA, SLO_VZA			
	geolocation.nc	lat, lon, altitude			
	time.nc	time			
	tiepoints_meteo.nc	air_pressure, ozone, water vapour,			
	Syn_annot_rem.nc	Annotations parameters associated with removed pixel			
	flags.nc	SYN_flags, OLC_flags, SLN_flags, SLO_flags			

Product Package Type			
SY_2_SYN		(Cont'd)	
Product Package Structure (Cont'd)			
Measurement Data Files (cont'd)			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	Syn11_reflectance.nc	SDR_11, SDR_11_err	
	Syn12_reflectance.nc	SDR_12, SDR_12_err	
	Syn13_reflectance.nc	SDR_13, SDR_13_err	
	Syn14_reflectance.nc	SDR_14, SDR_14_err	
	Syn15_reflectance.nc	SDR_15, SDR_15_err	
	Syn16_reflectance.nc	SDR_16, SDR_16_err	
	Syn17_reflectance.nc	SDR_17, SDR_17_err	
	Syn18_reflectance.nc	SDR_18, SDR_18_err	
	Syn19_reflectance.nc	SDR_19, SDR_19_err	
	Syn20_reflectance.nc	SDR_20, SDR_20_err	
	Syn21_reflectance.nc	SDR_21, SDR_21_err	
	Syn22_reflectance.nc	SDR_22, SDR_22_err	
	Syn23_reflectance.nc	SDR_23, SDR_23_err	
	Syn24_reflectance.nc	SDR_24, SDR_24_err	
	Syn25_reflectance.nc	SDR_25, SDR_25_err	
	Syn26_reflectance.nc	SDR_26, SDR_26_err	
	Syn27_reflectance.nc	SDR_27, SDR_27_err	
	Syn28_reflectance.nc	SDR_28, SDR_28_err	
	Syn29_reflectance.nc	SDR_29, SDR_29_err	
	Syn30_reflectance.nc	SDR_30, SDR_30_err	
	Syn_AOT550.nc	T550, T550_err	
	Syn_Angstrom_exp550.nc	A550	
	Syn_SDR_removed_pixel.nc	SDR, SDR_err, T550, T550_err, A550	
Annotation Data Files			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
1,2	Syn_AMIN.nc	AMIN	
Representation Information Files			
<small>Foot Note#</small>	File name	Variables contained in the file	N.O.
	none		

4.8.1.1.8.1 SY 2 SYN geophysical product description

Table 29 - L2 Synergy land Surface Reflectance description

GEOPHYSICAL PRODUCT NAME: OLCI/SLSTR Synergy Surface Directional Reflectance	
ID	SDR
LEVEL	2
DESCRIPTION	Atmospherically corrected land surface reflectance at all OLCI and SLSTR wavebands (both nadir and oblique views), other than within gaseous absorption bands (O ₂ , H ₂ O).
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	300 m
UNITS	dimensionless
ACCURACY	TBC
ADDITIONAL INFORMATION	
INPUTS SYNERGY BANDS	Syn01 to Syn30
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_SYN

Table 30 - L2 Synergy Aerosol Optical Thickness description

GEOPHYSICAL PRODUCT NAME: OLCI/SLSTR Synergy Aerosol Optical Thickness	
ID	T550
LEVEL	2
DESCRIPTION	Aerosol load, expressed in optical depth at a given wavelength (550 nm).
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	300 m
UNITS	dimensionless
ACCURACY	Validation results using AERONET: <ul style="list-style-type: none"> - mean absolute error 0.04 and bias <.005 over Dark Dense Vegetation - mean absolute error 0.08 and bias -0.02 global.

ADDITIONAL INFORMATION	
INPUTS SYNERGY BANDS	Syn01 to Syn30
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_SYN

Table 31 - L2 Synergy Aerosol Angstrom Exponent description

GEOPHYSICAL PRODUCT NAME: OLCI/SLSTR Synergy Aerosol Angstrom Exponent	
ID	A550
LEVEL	2
DESCRIPTION	Spectral dependency of the SYN Aerosol Optical Depth derived from 40 aerosol models computed with OPAC package.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
SPATIAL RESOLUTION	300 m
UNITS	dimensionless
ACCURACY	TBC
ADDITIONAL INFORMATION	
INPUTS SYNERGY BANDS	Syn01 to Syn30
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_SYN

4.8.1.1.9 SY_2_VGP

Source Instrument						1 of 1		
SYN branch								
Product Package Type		<i>Description</i>						
SY_2_VGP		SPOT VGT-P continuity products						
Product Level	Diss. Timeliness	PDGS Prod. Category		Application Domain		Spatial Resolution		
2	NTC	User		LND		1 km		
Product Dissemination Unit		Number of Package components:	13	Number of Measurement Data files:	4	Number of Annotation Data files:	8	
Stripe*								
* only for this product the stripe is mapped on a Plate Carrée projection		Number of Representation Information Files:				0		
Product Package Structure								
Manifest file								
		xfdumanifest.xml						
Measurement Data files								
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.	
	B0.nc	B0						
	B2.nc	B2						
	B3.nc	B3						
	MIR.nc	MIR						
Annotation Data files								
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.	
	vaa.nc	VAA						
	vza.nc	VZA						
	saa.nc	SAA						
	sza.nc	SZA						
	ag.nc	ag						
	og.nc	og						
	wvg.nc	WVG						
	sm.nc	SM						
Representation Information Files								
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.	
	none							

4.8.1.1.9.1 SY 2 VGP geophysical product description

Table 32 - L2 Synergy SPOT VGT-P like TOA Reflectance description

GEOPHYSICAL PRODUCT NAME: SPOT VGT-P like TOA Reflectance	
ID	B0, B2, B3, MIR
LEVEL	2
DESCRIPTION	Top of Atmosphere Reflectance product provided for the continuity of the SPOT VGT-P product. Generated from OLCI and SLSTR channels interpolated to VGT bands.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe mapped on a Plate Carrée projection
SPATIAL RESOLUTION	1 km
UNITS	dimensionless
ACCURACY	3 to 5 %
ADDITIONAL INFORMATION	
INPUTS SYNERGY BANDS	Syn01 to Syn30
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_VGP

4.8.1.1.10 SY_2_VG1/SY_2_V10

Source Instrument					1 of 1	
SYN branch						
Product Package Type		Description				
SY_2_VG1/SY_2_V10		VG1: Single 'best' value for TOA reflectance at the four VGT channels over 1 day period . V10: Maximum value composite over a 10 day period at the four VGT channels.				
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution		
2	NTC	User	LND	1 km		
Product Dissemination Unit		Number of Package components:	15	Number of Measurement Data files:	5	Number of Annotation Data files:
tiles						9
		Number of Representation Information Files:		0		
Product Package Structure						
Manifest file						
		xfdumanifest.xml				
Measurement Data files						
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.
	B0.nc	B0				
	B2.nc	B2				
	B3.nc	B3				
	MIR.nc	MIR				
	NDVI.nc	NDVI				
Annotation Data files						
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.
	vaa.nc	VAA				
	vza.nc	VZA				
	saa.nc	SAA				
	sza.nc	SZA				
	ag.nc	AG				
	og.nc	OG				
	wvg.nc	WVG				
	tg.nc	TG				
	sm.nc	SM				
Representation Information Files						
<small>Foot Note#</small>	File name	Variables contained in the file				N.O.
	none					

4.8.1.1.10.1 SY 2 VG1/SY 2 V10 geophysical product description

Table 33 - L2 Synergy SPOT VGT like Surface Reflectance description

GEOPHYSICAL PRODUCT NAME: SPOT VGT-like Surface Reflectance	
ID	B0, B2, B3, MIR
LEVEL	2
DESCRIPTION	Daily/“ten days composite” fully atmosphere-corrected Surface Reflectance for the four SPOT channels, synthesised from OLCI and SLSTR channels (nadir view only). This is a SPOT VGT continuation product.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Tiles
SPATIAL RESOLUTION	1 km
UNITS	dimensionless
ACCURACY	TBC
ADDITIONAL INFORMATION	
INPUTS SYNERGY BANDS	Syn01 to Syn30
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_VG1/SY_2_V10

Table 34 - L2 Synergy SPOT VGT like NDVI description

GEOPHYSICAL PRODUCT NAME: SPOT VGT-like Normalised Difference Vegetation Index	
ID	NDVI
LEVEL	2
DESCRIPTION	Daily/“ten days” composite Normalised Difference Vegetation Index derived from for the four SPOT channels synthesised from OLCI and SLSTR channels (nadir view only). This is a SPOT VGT continuation product.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Tiles
SPATIAL RESOLUTION	1 km
UNITS	dimensionless
ACCURACY	TBC
ADDITIONAL INFORMATION	
INPUTS SPOT-LIKE BANDS	B2 (645nm), B3 (835nm)
DISSEMINATION TIMELINESS	NTC
APPLICATION DOMAIN	Land
PACKAGE/S	SY_2_VG1/SY_2_V10

4.8.2 Surface Topography Mission Products

The SRAL L1B products are produced and distributed to users in two different timeliness: NRT and STC.

The SRAL L1A and L1BS products are produced and distributed to users only offline (STC and NTC).

The SRAL/MWR L2 products are produced and distributed to users in three different timeliness: NRT, STC and NTC.

Whatever the delivery delay is, the content and format of the products is the same.

The accuracy of the parameters within the products increases with the latency (from NRT to NTC) due to the use of different auxiliary files (environmental/geophysical corrections) and more accurate orbital data.

The SRAL L1 and SRAL/MWR L2 products will be generated using precise orbit products which will rely on the ground processing of the GNSS and DORIS instruments data. The table below provides an overview of the orbit accuracy expected within the NRT, STC and NTC SRAL/MWR L2 Products.

SRAL/MWR L2 Products timeliness	Orbit Product	Orbit accuracy
NRT	NRT Restituted Orbit	better than 10 cm (RMS)
STC	Preliminary Orbit	better than 4 cm (RMS)
NTC	Precise Orbit	better than 3 cm (RMS)

For what regards the contents:

The SRAL L1B product contains one "measurement data file" containing the L1b measurements parameters:

- ECHO_LRM: L1b Tracking measurements in LRM mode (20 Hz – Ku and C bands)
- ECHO_SAR_Ku: L1b Tracking measurements in SAR mode - Ku band (20-Hz)
- ECHO_PLRM: L1b Tracking measurements in pseudo-LRM mode - (20 Hz – Ku and C bands)

The SRAL L1A product contains one "measurement data file" containing the L1a measurements parameters (sorted and calibrated):

- ECHO_SAR_Ku: L1A Tracking measurements in SAR mode - Ku band (80-Hz)
- ECHO_PLRM: L1b Tracking measurements in pseudo-LRM mode - – Ku and C bands (80 Hz)

The SRAL L1B-S product contains one "measurement data file" containing the L1b measurements parameters:

- ECHO_SAR_Ku: L1b Tracking measurements in SAR mode - Ku band (20-Hz) as defined in the L1b MEAS product completed with SAR expert information
- ECHO_PLRM: L1b Tracking measurements in pseudo-LRM mode - (20 Hz – Ku and C bands) as defined in the L1b MEAS product.

The SRAL/MWR L2 complete product contains three measurement data files:

- One "reduced" (Red) data file, containing a subset of the main 1-Hz Ku band parameters;
- One "standard" (Std) data file, containing the standard 1-Hz and 20-Hz Ku and C bands parameters;
- One "enhanced" (Enh) data file, containing the standard 1-Hz and 20-Hz Ku and C bands parameters, the waveforms and the associated parameters necessary to reprocess the data.

Each one of these three files contains one or more data sets among the following:

- **"20-Hz LRM/SAR_Ku" data set:** Set of 20-Hz Ku band parameters issued from SRAL tracking measurements performed in LRM and SAR modes (vectors depending on the time of 20-Hz Ku band measurements), i.e.:
 - 20-Hz Ku band LRM mode parameters,
 - 20-Hz Ku band SAR mode parameters;
- **"20-Hz LRM_C/PLRM" data set:** Set of 20-Hz C band parameters issued from SRAL tracking measurements performed in LRM and SAR modes (pseudo-LRM) modes, and Ku band parameters issued from SRAL tracking measurements performed in SAR mode (pseudo-LRM) (vectors depending on the time of 20-Hz C band measurements), i.e.:
 - 20-Hz C band LRM mode parameters,
 - 20-Hz C band PLRM mode parameters,
 - 20-Hz Ku band PLRM mode parameters;
- **"1-Hz LRM/SAR_Ku/PLRM" data set:** Set of 1-Hz Ku/C bands parameters issued from SRAL tracking measurements performed in LRM and SAR mode, i.e. :
 - 1-Hz Ku band LRM mode parameters,
 - 1-Hz C band LRM mode parameters.
 - 1-Hz Ku band SAR mode parameters
 - 1-Hz Ku band PLRM mode parameters
 - 1-Hz C band PLRM mode parameters.

Each one of these three data sets contains specific parameters depending on the processed band and on the measurement rhythm.

The figure below summarizes the contents of each measurement data file.

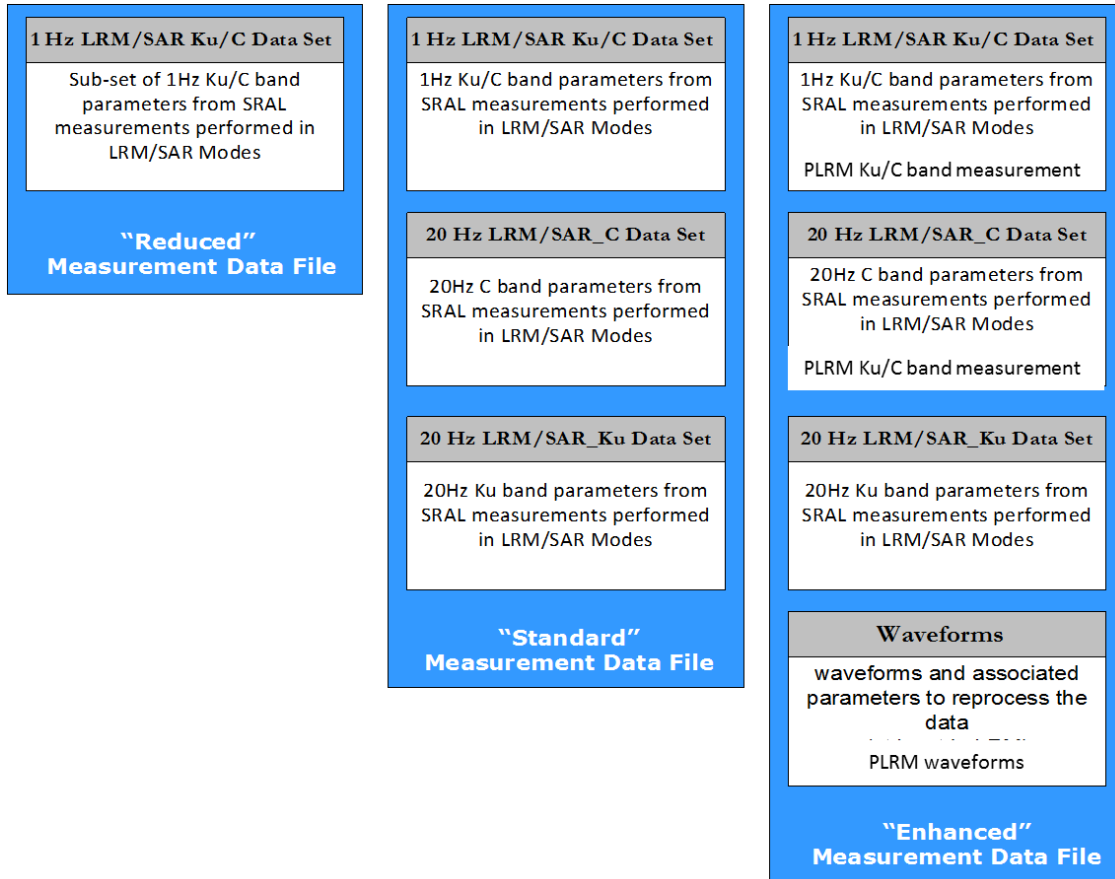


Figure 12 - Contents of each Measurement data file available within a SRAL/MWR L2 Product

All L2 SRAL/MWR products and all measurement data files contain the typical altimetry parameters, like the altimeter range, the sea surface height, the wind speed, significant wave height and all required geophysical corrections.

The altimeter estimates are obtained using different retrackers (waveform data are fully processed in the ground processor to extract the geophysical parameters) in LRM and in SAR mode. The retrackers are continuously run in parallel over all types of surface (ocean, ice, sea-ice, etc.). Different altimeter estimates are therefore available in the L2 products as a result of the different retrackers.

A summary of the physical parameters produced as a function of the surface type and SRAL operation mode is reported in the figure below.

Parameter	Ocean (LRM)	Ocean / Coastal (SAR)	Ice Sheet (LRM)	Ice Margin (SAR)	Sea-Ice (SAR)
HEIGHT	•	•	•	•	•
RANGE	•	•	•	•	•
BACKSCATTER	•	•	•	•	•
FREEBOARD					•
WIND	•	•			
SWH	•	•			
MISPOINTING	•	•			

In addition to the altimeter estimates, the L2 SRAL/MWR products contain the radiometer water content and the radiometer liquid content computed from the MWR brightness temperatures.

All parameters are available in the “Standard” and “Enhanced” Measurement data files. The subset of 1Hz parameters available in the “Reduced” Measurement data file is provided in Table 47.

4.8.2.1 Packages description

The following tables provide a generic description of the package in terms of product type, dissemination timeliness, application domain, product dissemination unit, total number of elements composing the package and number of elements for each component.

In addition, for each product package, a table is provided with the description of the geophysical products included in the package.

4.8.2.1.1 SR_1_SRA

Source Instrument SRAL						1 of 1
Product Package Type SR_1_SRA		<i>Description</i> L1b Echos parameters for LRM, SAR and pseudo-LRM mode (20 Hz)				
Product Level		Diss. Timeliness	PDGS Prod. Category	Application Domain		Spatial Resolution
1		NRT, STC, NTC	User	LND	MRT	
Product Dissemination Unit		Number of Package components:	2	Number of Measurement Data files:	1	Number of Annotation Data files:
Stripe						
Product Package Structure						
Manifest file						
	xfdumani fest .xml					
Measurement Data files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
	MeasurementData.nc	L1b Tracking measurements: ECHO_LRM, ECHO_SAR_Ku, ECHO_PLRM				
Annotation Data files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
1	none					
Representation Information Files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
	none					
Notes:						
¹ annotation information are included in the Measurement data						

4.8.2.1.1.1 SR_1_SRA product description

Table 35: SRAL L1B product description

PRODUCT NAME:	
ID	--
LEVEL	1
DESCRIPTION	<p>A Level 1 SRAL product contains one "measurement data file" containing the L1b measurements parameters:</p> <ul style="list-style-type: none"> • ECHO_LRM: L1b Tracking measurements in LRM mode (20 Hz – Ku and C bands) • ECHO_SAR_Ku: L1b Tracking measurements in SAR mode - Ku band (20-Hz) • ECHO_PLRM: L1b Tracking measurements in pseudo-LRM mode - (20 Hz – Ku and C bands)
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	<u>Stripe</u>
ACQUISITION BAND	Ku, C
PRODUCT FREQUENCY	20 Hz
UNITS	--
ACCURACY	--
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, <u>NTC</u>
INSTR. OPERATION MODE	LRM, SAR
COMMENTS	--
PACKAGE/S	SR_1_SRA

4.8.2.1.2 SR_1_SRA_A_

Source Instrument						1 of 1
SRAL						
Product Package Type		<i>Description</i>				
SR_1_SRA_A_		L1A Echos parameters for SAR mode (80 Hz)				
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution		
1	STC, NTC	User				
Product Dissemination Unit		Number of Package components:	Number of Measurement Data files:	Number of Annotation Data files:		
Stripe		2	1	0		
Number of Representation Information Files:				0		
Product Package Structure						
Manifest file						
	xfdumanifest.xml					
Measurement Data files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
	Measurement_11a.nc	L1A Tracking measurements (sorted and calibrated): ECHO_SAR_Ku, ECHO_PLRM				
Annotation Data files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
1	none					
Representation Information Files						
<i>Foot Note#</i>	File name	Variables contained in the file				N.O.
	none					
Notes:						
¹ annotation information are included in the Measurement data						

4.8.2.1.2.1 SR_1_SRA_A product description

Table 36: SRAL L1A product description

PRODUCT NAME:	
ID	--
LEVEL	1
DESCRIPTION	<p>A Level 1A SRAL product contains one "measurement data file" containing the L1A measurements parameters:</p> <ul style="list-style-type: none"> • ECHO_SAR_Ku: L1A Tracking measurements (sorted and calibrated) in SAR mode - Ku band (80-Hz) • ECHO_PLRM: L1A Tracking measurements (sorted and calibrated) in pseudo-LRM mode - (80 Hz – Ku and C bands)
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku, C
PRODUCT FREQUENCY	80 Hz
UNITS	--
ACCURACY	--
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	STC, NTC
INSTR. OPERATION MODE	SAR, PLRM
COMMENTS	--
PACKAGE/S	SR_1_SRA_A_

4.8.2.1.3 SR_1_SRA_BS

Source Instrument SRAL		1 of 1			
Product Package Type SR_1_SRA_BS		Description L1B-S Echos parameters for SAR mode (20 Hz)			
Product Level 1	Diss. Timeliness STC, NTC	PDGS Prod. Category User	Application Domain	Spatial Resolution	
Product Dissemination Unit Stripe		Number of Package components: 2	Number of Measurement Data files: 1	Number of Annotation Data files: 0	0
		Number of Representation Information Files:		0	
Product Package Structure					
Manifest file					
	xfdumanifest.xml				
Measurement Data files					
Foot Note#	File name	Variables contained in the file			N.O.
	Measurement_11bs.nc	L1B-S Tracking measurements: ECHO_SAR_Ku, ECHO_PLRM			
Annotation Data files					
Foot Note#	File name	Variables contained in the file			N.O.
1	none				
Representation Information Files					
Foot Note#	File name	Variables contained in the file			N.O.
	none				
Notes:					
1 annotation information are included in the Measurement data					

SR 1 SRA BS product description

Table 37: SRAL L1B-S product description

PRODUCT NAME:	
ID	--
LEVEL	1
DESCRIPTION	<p>A Level 1B-S SRAL product contains one "measurement data file" containing the L1B measurements parameters:</p> <ul style="list-style-type: none"> • ECHO_SAR_Ku: L1b Tracking measurements in SAR mode - Ku band (20-Hz) as defined in the L1B meas. product completed with SAR expert information • ECHO_PLRM: L1b Tracking measurements in pseudo-LRM mode - (20 Hz – Ku and C bands) as defined in the L1B meas. product
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku, C
PRODUCT FREQUENCY	20 Hz
UNITS	--
ACCURACY	--
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	STC, NTC
INSTR. OPERATION MODE	PLRM, SAR
COMMENTS	--
PACKAGE/S	SR_1_SRA_BS

4.8.2.1.4 SR_2_WAT

Source Instrument						1 of 1	
SRAL							
Product Package Type		<i>Description</i>					
SR_2_WAT		1-Hz and 20-Hz Ku and C bands parameters (LRM/SAR), waveforms Over Water					
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain		Spatial Resolution		
1	NRT STC NTC	User	MRT				
Product Dissemination Unit		Number of Package components:	4	Number of Measurement Data files:	3	Number of Annotation Data files:	0
Stripe		Number of Representation Information Files:			0		
Product Package Structure							
Manifest file							
		xfdumaniest.xml					
Measurement Data files							
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.
	enhanced_measurement.nc	One "enhanced" (Enh) data file containing additional information to the standard 1-Hz and 20-Hz Ku and C bands parameters, the waveforms and the associated parameters necessary to reprocess the data					
	standard_measurement.nc	One "standard" (Std) data file containing the standard 1-Hz and 20-Hz Ku and C bands parameters					
	reduced_mesurement.nc	One "reduced" (Red) data file, containing a subset of the main 1-Hz Ku band parameters					
Annotation Data files							
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.
1	none						
Representation Information Files							
<small>Foot Note#</small>	File name	Variables contained in the file					N.O.
	none						

4.8.2.1.5 SR_2_LAN

Source Instrument SRAL		1 of 1			
Product Package Type SR_2_LAN		Description 1-Hz and 20-Hz Ku and C bands parameters (LRM/SAR), waveforms Over Land			
Product Level	Diss. Timeliness	PDGS Prod. Category	Application Domain	Spatial Resolution	
2	NRT STC NTC	User	LND		
Product Dissemination Unit Stripe		Number of Package components:	4	Number of Measurement Data files:	3
		Number of Annotation Data files:			0
		Number of Representation Information Files:		0	
Product Package Structure					
Manifest file					
	xfdumanifest.xml				
Measurement Data files					
<small>Foot Note#</small>	File name	Variables contained in the file			N.O.
	enhanced_measurement.nc	One "enhanced" (Enh) data file containing additional information to the standard 1-Hz and 20-Hz Ku and C bands parameters, the waveforms and the associated parameters necessary to reprocess the data			
	standard_measurement.nc	One "standard" (Std) data file containing the standard 1-Hz and 20-Hz Ku and C bands parameters			
	reduced_mesurement.nc	One "reduced" (Red) data file, containing a subset of the main 1-Hz Ku band parameters			
Annotation Data files					
<small>Foot Note#</small>	File name	Variables contained in the file			N.O.
1	none				
Representation Information Files					
<small>Foot Note#</small>	File name	Variables contained in the file			N.O.
	none				

4.8.2.1.5.1 SR 2 WAN/SR 2 LAN geophysical product description

Table 38 - Surface Height description

GEOPHYSICAL PRODUCT NAME: Surface Height	
ID	"Ocean" sea surface height anomaly: ssha "Sea-ice" sea surface height: sea_ice_sea_surf "Sea-ice" sea surface height anomaly: sea_ice_ssha
LEVEL	2
DESCRIPTION	The surface height (Height), is the satellite's distance at a given instant from the reference surface, so: $(\text{corrected}) \text{ Height} = \text{Altitude} - (\text{corrected}) \text{ Range}$ The sea surface height anomaly (SSHA) is defined here as the Altitude minus the Corrected range minus the Mean Sea Surface (MSS) and minus known geophysical effects.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	See Comments below
PRODUCT FREQUENCY	See Comments below
UNITS	m
ACCURACY	10 cm in NRT processing, 3.5 cm in off-line processing
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, NTC
INSTR. OPERATION MODE	LRM, SAR
COMMENTS	<p><i>Ssha (computed from the radiometer wet tropospheric correction): 1Hz, 20Hz</i></p> <p><i>LRM mode: ocean retracking (LRM mode Ku/C, SAR mode C)</i></p> <p><i>SAR mode: ocean/coastal retracking (SAR mode Ku)</i></p> <p><i>Ssha = Orb_Alt - Alt_Range_Ku - Alt_Iono_Cor_Ku - Model_Dry_Tropo_Cor - Rad_Wet_Tropo_Cor</i></p> <p><i>- SSB_Ku - MSS - Solid_Earth_Tide</i></p> <p><i>- Geo_Ocean_Tide_1 - Geo_Pole_Tide - X</i></p> <p><i>with X = Inv_Baro for NRT products</i></p> <p><i>X = MOG2D (Inv_Baro + HF fluctuations) for STC and NTC products</i></p>

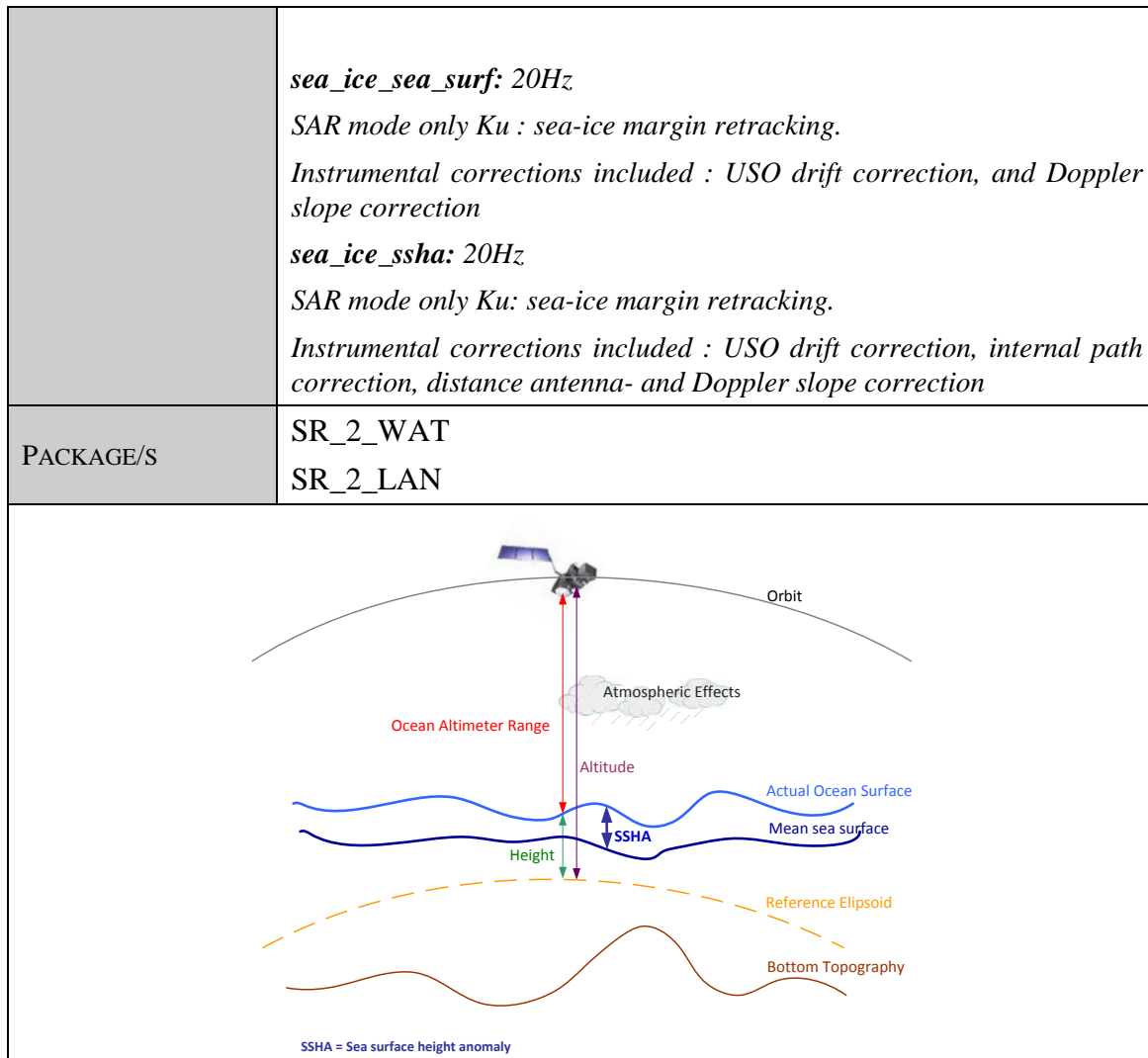
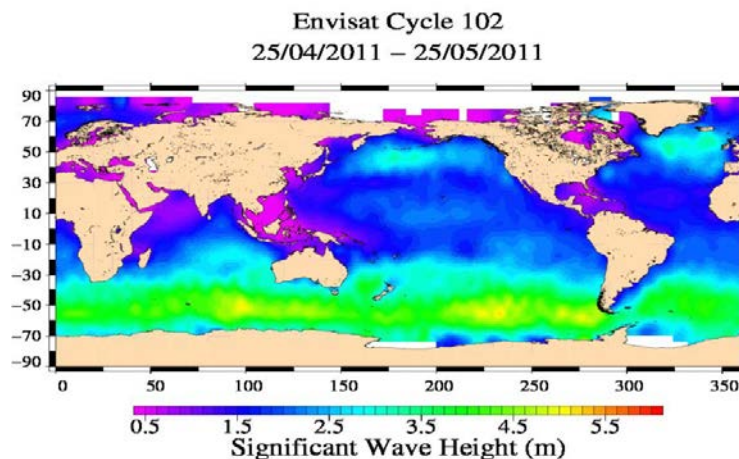


Table 39 - Ocean Significant Waveheight description

GEOPHYSICAL PRODUCT NAME: Significant Wave height	
ID	Ocean Significant Waveheight: swh_ocean
LEVEL	2
DESCRIPTION	It is the average wave height, trough to crest, of the one-third largest waves in a particular geographic location. It is computed from the slope of the return radar pulse (the gradient of the leading edge of the radar echo, known as the leading-edge slope), after reflection on the surface.
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku, C
PRODUCT FREQUENCY	1Hz, 20Hz

UNITS	m
ACCURACY	4% in NRT processing, 1% in off-line processing
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, NTC
INSTR. OPERATION MODE	LRM, SAR, PLRM
COMMENTS	<p><i>swh_ocean: 1Hz, 20Hz</i></p> <p><i>LRM/PLRM mode: ocean retracking (LRM mode Ku/C, SAR mode C)</i></p> <p><i>SAR mode: ocean/coastal retracking (SAR mode Ku)</i></p> <p><i>Instrumental corrections included : modelled instrumental errors correction and system bias</i></p>
PACKAGE/S	SR_2_WAT SR_2_LAN



Note: The above figure is an example of the SWH estimations derived from one cycle of altimeter measurements.

Credits: ENVISAT GDR Quality Assessment Report (SSALTO)

Table 40 - Backscatter description

GEOPHYSICAL PRODUCT NAME: Backscatter	
ID	<p>Corrected ocean backscatter coefficient: sig0_ocean</p> <p>Corrected OCOG backscatter coefficient: sig0_ocog</p> <p>Corrected ice-sheet backscatter coefficient: sig0_ice_sheet</p> <p>Corrected ice backscatter coefficient: sig0_ice</p> <p>Corrected sea-ice backscatter coefficient: sig0_sea_ice_sheet</p>
LEVEL	2
DESCRIPTION	The backscatter coefficient, sigma0, is computed from the power of the altimeter's return pulse.

GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku, C
PRODUCT FREQUENCY	1Hz, 20Hz
UNITS	dB
ACCURACY	±1.0 dB rms, 0.017 dB/s stability in NRT processing ±0.5 dB rms, 0.017 dB/s stability in offline processing
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, NTC
INSTR. OPERATION MODE	LRM, SAR, PLRM
COMMENTS	<p>sig0_ocean: 1Hz, 20Hz LRM/PLRM mode : ocean retracking, SAR mode : ocean/coastal retracking. Instrumental corrections included : AGC instrumental errors correction, internal calibration correction, modelled instrumental errors correction and system bias. The atmospheric attenuation correction is not included.</p> <p>sig0_ocog: 1Hz, 20Hz LRM/PLRM mode; SAR mode : ocog retracking. (Ku/C) Instrumental corrections included : AGC instrumental errors and internal calibration correction</p> <p>sig0_ice_sheet: 20Hz LRM/PLRM mode : ice sheet retracking (LRM mode Ku/C, SAR mode C) SAR mode : ice sheet margin retracking (SAR mode Ku) Instrumental corrections included : AGC instrumental errors correction and internal calibration correction</p> <p>sig0_ice: 20Hz LRM/PLRM mode only : ice (erf) retracking (LRM mode Ku/C, SAR mode C) Instrumental corrections included : AGC instrumental errors correction and internal calibration correction</p> <p>sig0_sea_ice_sheet: 20Hz SAR mode only : sea-ice margin retracking (SAR mod Ku) Instrumental corrections included : AGC instrumental errors correction and internal calibration correction</p>
PACKAGE/S	SR_2_WAT SR_2_LAN

Table 41 - Altimeter Wind Speed description

GEOPHYSICAL PRODUCT NAME: Altimeter Wind Speed	
ID	Altimeter wind speed: wind_speed_alt
LEVEL	2
DESCRIPTION	Wind speed is calculated from the mathematical relationship with the Ku-band backscatter coefficient and the significant wave height. The wind speed model function is evaluated for 10 metres above the sea surface, and is considered to be accurate to 2 m/s
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku
PRODUCT FREQUENCY	1Hz
UNITS	m/s
ACCURACY	< 2 m s ⁻¹ for 1 sec. averages (for a range between 3 and 20 m/s). A goal of 1.5 m s ⁻¹ is expected from improved ground processing.
ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, NTC
INSTR. OPERATION MODE	LRM, SAR, PLRM
COMMENTS	<i>Should not be used over land</i>
PACKAGE/S	SR_2_WAT SR_2_LAN

Table 42 - Freeboard description

GEOPHYSICAL PRODUCT NAME: Freeboard	
ID	Freeboard: freeboard
LEVEL	2
DESCRIPTION	The height by which an ice floe extends above the sea surface
GEOPHYSICAL PRODUCT CHARACTERISTICS	
PDU TYPE	Stripe
ACQUISITION BAND	Ku
PRODUCT FREQUENCY	20Hz
UNITS	m
ACCURACY	To be derived from Cryosat

ADDITIONAL INFORMATION	
DISSEMINATION TIMELINESS	NRT, STC, NTC
INSTR. OPERATION MODE	SAR
COMMENTS	<i>SAR mode only: sea-ice margin retracking. Instrumental corrections included : USO drift correction, internal path correction, distance antenna-COG and Doppler slope correction</i>
PACKAGE/S	SR_2_WAT SR_2_LAN
<p>Not to scale</p> <p>SOURCE: ESA</p>	

APPENDIX A

Table 43 - OLCI Level-1 and Level-2 products spectral bands

BAND	CENTRAL WAVELENGTH (NM)	BANDWIDTH (NM)
Oa01	400	15
Oa02	412.5	10
Oa03	442.5	10
Oa04	490	10
Oa05	510	10
Oa06	560	10
Oa07	620	10
Oa08	665	10
Oa09	673.75	7.5
Oa10	681.25	7.5
Oa11	708.75	10
Oa12	753.75	7.5
Oa13	761.25	2.5
Oa14	764.375	3.75
Oa15	767.5	2.5
Oa16	778.75	15
Oa17	865	20
Oa18	885	10
Oa19	900	10
Oa20	940	20
Oa21	1020	40

Table 44 - SLSTR Level-1 and Level-2 products spectral bands

BAND	CENTRAL WAVELENGTH (NM)	BANDWIDTH (NM)
S1	555	20
S2	659	20
S3	865	20
S4	1375	15
S5	1610	60
S6	2250	50
S7	3740	380
S8	10850	900
S9	12	1000
F1	3740	380
F2	10850	900

Table 45 - SYN Level-2 products spectral bands

SYN BAND	ORIGINAL INSTRUMENT BAND	CENTRAL WAVELENGTH (NM)	BANDWIDTH (NM)
Syn01	Oa01	400	15
Syn02	Oa02	412.5	10
Syn03	Oa03	442.5	10
Syn04	Oa04	490	10
Syn05	Oa05	510	10
Syn06	Oa06	560	10
Syn07	Oa07	620	10
Syn08	Oa08	665	10
Syn09	Oa09	673.75	7.5
Syn10	Oa10	681.25	7.5
Syn11	Oa11	708.75	10
Syn12	Oa12	753.75	7.5
Syn13	Oa13	761.25	2.5

Syn14	Oa16	778.75	3.75
Syn15	Oa17	865	2.5
Syn16	Oa18	885	15
Syn17	Oa19	900	20
Syn18	Oa21	1020	10
Syn19	S1 _{nadir}	555	20
Syn20	S2 _{nadir}	659	20
Syn21	S3 _{nadir}	865	20
Syn22	S4 _{nadir} (TDI)	1375	15
Syn23	S5 _{nadir} (TDI)	1610	60
Syn24	S6 _{nadir} (TDI)	2250	50
Syn25	S1 _{oblique}	555	20
Syn26	S2 _{oblique}	659	20
Syn27	S3 _{oblique}	865	20
Syn28	S4 _{oblique} (TDI)	1375	15
Syn29	S5 _{oblique} (TDI)	1610	60
Syn30	S6 _{oblique} (TDI)	2250	50

Table 46 - SYN Level-2 Vegetation-like products spectral bands

BAND	CENTRAL WAVELENGTH (NM)	BANDWIDTH (NM)
B0	450	40
B2	645	70
B3	835	110
MIR	1665	170

APPENDIX B

Table 47: Subset of 1Hz parameters available in the “Reduced” Measurement data file

Parameter
Time_tag
Location
Surface type
Radiometer-derived surface type
Orbit altitude
Corrected “ocean” altimeter ranges
Corrected “ocean” backscatter
Coefficient
Corrected “ocean” significant wave-height
“Ocean” sea surface height anomaly
Model dry tropospheric corrections (zero and measurement altitudes)
Radiometer wet tropospheric correction
Altimeter ionospheric correction (Ku band)
Sea state bias correction
Mean sea surface height above reference Ellipsoid
Mean dynamic topography above geoid
Ocean depth / Land elevation
Inverted barometer height correction
High frequency fluctuations of the sea surface topography
Geocentric ocean tide height (GOT model)
Solid earth tide height
Geocentric pole tide height
Altimeter wind speed
Radiometer water vapour content
Radiometer liquid water content
Instrument operating mode
Meteorological maps availability
Rain flag
Ocean/Sea-ice flag