

CP40
Validation Data Set
User Manual
—DSUM+—

isardSAT Reference: ISARD_ESA_CPO_USR_DSUM+_242
Issue: Final V1a

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11 June 2014
Activity: CryoSat+ for Ocean

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Change Record

Date	Issue	Section	Page	Comment
30 April 2014	draft	all	all	Initial Issue
27 May 2014	draft V1	2, 3.5	7, 8, 12, 13	Starlab contribution updated
04 June 2014	V1	2, 3.5	8, 12	Starlab contribution updated
11 June 2014	V1a	1.3, 2, 3.1, 3.6, 3.7	6, 8, 9, 14, 15	ESA requested changes

Control Document

Process	Name	Date
Written by:	Pablo García	11 June 2014
Checked by:	Bernat Martínez	11 June 2014
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1 Introduction

1.1 Scope

The scope of this document is to describe all data sets needed by each partner in order to develop the validation of the algorithms defined in WP4000. Data sets include CryoSat-2 data and some of the geophysical corrections. The products defined from the algorithms developed in WP4000 and the data sets used for that purpose were described in the CP4O Data Set User Manual (see **AD. 9**).

The Validation Data Sets will be assessed within the CP4O project in WP5000 (Impact Assessment).

These Validation Data Sets will also be openly available for others users to access and evaluate them, as referred in section 4 (**Data Access**).

This document is expected to be updated along the course of the project following the evolutions of the CP4O team data requirements and further contributions of all partners.

1.2 Acronyms

TBD	To be defined
DS	Data Set
CS2	CryoSat-2
CP4O	CryoSat Plus For Ocean

1.3 References

- AD. 1** Cryosat +: Ocean Theme. CP4O-Cryosat Plus 4 Oceans. Technical Proposal. November 2011. SATOC, DTU Space, isardSAT, NOC, Noveltis, STARLAB, TUDelft, University of Porto and CLS. Response to ESA ITT AO/1-6827/11/I-NB, November 2011
- AD. 2** CryoSat-2 Product Handbook. 2013/04/17.
<https://earth.esa.int/documents/10174/125272/CryoSat-PHB-17apr2013.pdf/23bdad87-5537-4980-b3b9-c243941e93fc?version=1.1>
- AD. 3** CRYOSAT Ground Segment Instrument Processing Facility L1b. Products Specification Format. Issue 4.9. 2011/11/14. CS-RS-ACS-GS-5106
https://earth.esa.int/documents/10174/125273/%5BPROD-FMT%5D_L1_Products_Format_Specification_v4.9.pdf/7bc7bdf6-3fef-4cc2-b7c9-b14437dcc6c2?version=1.0
- AD. 4** CryoSat-2 L2 Products Format Specifications. Issue 4.6. 2011/11/14. CS-RS-ACS-GS-5123
https://earth.esa.int/documents/10174/125273/%5BL2_FMT%5D%20-L2_Products_Format_Specification_v2.8.pdf/44c48581-c370-4c30-94a6-52051f637ff3?version=1.0

-
- AD. 5** [Boy et al., 2011]: F. Boy et al., “Cryosat Processing Prototype, LRM and SAR processing on CNES side”, oral presentation given at OSTST’2011.
- AD. 6** [Boy et al., 2012]: Boy, F., J.-D. Desjonquieres, N. Picot, T. Moreau, S. Labroue, J.-C. Poisson, and P. Thibaut, 2012, Cryosat Processing Prototype: LRM and SAR processing on CNES side. Ocean Surface Topography Science Team 2012, Venice, 27-28 Sept 2012, Available from: <http://www.aviso.oceanobs.com/en/courses/sci-teams/ostst-2012.html>.
- AD. 7** CPP SAR L2 Product Format Description. Issue 1.0 Date 2013/05/06. CLS-DIR-NT-13-118
- AD. 8** SAMOSA-3 Altimeter SAR Mode Echo Model: Information and Configuration Control: http://www.satoc.eu/projects/samosa/samosa_config.html
- AD. 9** CP4O Data Set User Manual, Issue 2.0, 12 December 2013, ISARD_ESA_CPO_USR_DSUM_182
- AD. 10** Scharroo, R., W. H. F. Smith, E. W. Leuliette, and J. L. Lillibridge, CryoSat-2: The other ocean altimeter, ESA Living Planet Symposium, Edinburgh, Scotland, 9-13 September 2014, 2013: https://www.researchgate.net/publication/262963696_CryoSat-2_The_other_ocean_altimeter
- AD. 11** Scharroo, R., E. W. Leuliette, J. L. Lillibridge, D. Byrne, M. C. Naeije, and G. T. Mitchum, RADS: Consistent multi-mission products, in Proc. of the Symposium on 20 Years of Progress in Radar Altimetry, Venice, 20-28 September 2012, Eur. Space Agency Spec. Publ., ESA SP-710, p. 4 pp., 2013.

2 Data sets overview

In this section, a general overview of the different CP4O validation data sets is provided. In **Table 2-1** it is specifically described for each particular investigation the data type, the responsible and the geographical and time coverage. Afterwards, in section 3, we provide a more detailed description.

Table 2-1. Summary of CP4O validation data sets and overall description

Field of Investigation	CS-2 data mode	Responsible	Time Coverage	Geographical Coverage
Open and Coastal Ocean	RDSAR	TU Delft	July 2012, Jan 2013	Pacific and North Atlantic SAR boxes
	SAR	CLS	July 2012, Jan 2013	Pacific and North Atlantic SAR regions
	SAR	ESRIN	July 2012, Jan 2013	Pacific SAR regions
	SAR	NOC	July 2012, Jan 2013	North East Atlantic SAR regions
	SAR	Starlab	July 2012, Jan 2013	South Pacific SAR box
Polar Ocean	SAR	DTU Space	March 2012, April 2012, September 2012	Above 65 degrees of latitude
Sea Floor Mapping	SAR	DTU Space	One "369 days" CS2 cycle from 01/10/2012	Pacific SAR boxes

In addition, **Table 2-2** also describes very briefly the different geophysical corrections addressed in this project. Similarly, afterwards in section 3 a more detailed description is provided.

Table 2-2. Summary of CP4O geophysical corrections and overall description

Geophysical Correction	Responsible	Time Coverage	Geographical Coverage
Ionospheric	Noveltis	July 2012, Jan 2013	Mediterranean and European Shelf
Tidal	Noveltis	July 2012, Jan 2013	NE Atlantic (Coastal)
Wet Troposphere	University of Porto	July 2012, Jan 2013	Global

Table 2-3 summarises the information about the product provider of each data set for all validation activities.

Table 2-3. Data sets production responsibilities

Field of Investigation	CS-2 data mode	Validation Responsible	Data Producer	Validation Data Set Identifier
Open and Coastal Ocean	RDSAR	TUDeft	TUDeft	RDSAR_RADS_TUDEFT
	SAR	CLS	CNES	SAR_CPP_PAC / SAR_CPP_NEA
	SAR	Starlab	Starlab	SAR_SAMOSAS_STARLAB
	SAR	NOC	ESA/ESRIN	SAR_SAMOSAS_NEA
	SAR	ESA/ESRIN	ESA/ESRIN	SAR_SAMOSAS_PAC
Polar Ocean	SAR	DTU Space	ESA/ESRIN	SAR_SAMOSAS_POLAR
Sea Floor Mapping	SAR	DTU Space	ESA/ESRIN	SAR_SAMOSAS_SEAFLOOR

The ESA/ESRIN L2 products for Open and Coastal Ocean have been processed starting from CNES CPP L1b products. For Polar Ocean and Sea Floor Mapping, the products have been processed starting from ESA's SAR FBR data products.

For the geophysical corrections, the validation data sets production responsibilities fall on the corrections task responsible (i.e. Noveltis and UPorto), already showed in **Table 2-2**.

3 Data Sets Description

This section contains a detailed description of the validation data sets used in the frame of the validation activities in the CP4O project. There is one sub-section dedicated for each sub-task.

In each sub-section, there are as many tables as needed to describe the data sets used for the sub-theme investigation. Also there is additional information included when needed.

3.1 Open and Coastal Ocean RDSAR (TUDelft)

Table 3-1: Open and Coastal Ocean Pseudo-LRM CS2 Data – RADS

Parameter	Value	Comments
OPEN AND COASTAL OCEAN Pseudo-LRM – RADS CryoSat-2 Data		
Partner	TUDelft	
Geographical Coverage	Pacific and North Atlantic SAR boxes	
Temporal Coverage	July 2012, Jan 2013	
Product provider	TU Delft	
Product identifier	RDSAR_RADS_TUDELFT	
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	Data rate 1Hz and 20Hz, except geophysical corrections at 1Hz
Access details	Register at: http://rads.tudelft.nl/rads/data/authentication.cgi	
FURTHER INFORMATION		
URL's	http://rads.tudelft.nl/rads/rads.shtml	
Documents	See AD. 11	
Contact	remko.scharroo@eumetsat.int	

Two sets of products are provided in order to keep the files manageable: one with the waveforms included and one without.

There is one file per pass, combining all SAR bits along the pass, both ocean and land. The retracking is done as Remko Scharroo presented during the Living Planet Symposium in Edinburgh, using Jensen's suggested zero-padding of the waveform, excluding the waveform averaging (see AD. 10). This way it should give a clean comparison with the CPP data.

The data production is similar to the Jason products except:

- Some differences in names and attributes, explained in NETCDF attributes descriptions.
- For a more logical division land/ocean, Ocean Tides does not include load tide. Therefore, it is necessary to apply both.
- The MOG2D correction is the total DAC, not only the high-frequency part.

The ssha field, at both 1Hz and 20Hz rates is now included in the RADS product, after all corrections and editing are applied.

3.2 Open and Coastal Ocean SAR (CLS)

Table 3-2: Open and Coastal Ocean SAR CS2 CPP Data – CLS

Parameter	Value	Comments
OPEN AND COASTAL OCEAN SAR – CPP CryoSat-2 Data		
Partner	CLS	
Geographical Coverage	Pacific and North Atlantic SAR boxes	
Temporal Coverage	July 2012, Jan 2013	
Product provider	CNES	L2 CPP products V13
Product identifier	SAR_CPP_PAC / SAR_CPP_NEA	
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	Data rate 1Hz and 20Hz, except geophysical corrections at 1Hz
FURTHER INFORMATION		
Documents	See AD. 7	
Contact	francois.boy@cnes.fr	

A detailed description of the V13 CPP products is available at the referenced document AD. 8 including a list of the different fields with comments and a short CPP processing configuration description. The differences of this last version with respect to the previous are marked.

3.3 Open and Coastal Ocean SAR (ESA/ESRIN)

Table 3-3: Open and Coastal Ocean SAR CS2 Data – ESA

Parameter	Value	Comments
OPEN AND COASTAL OCEAN SAR – ESA CryoSat-2 Data		
Partner	ESRIN	
Geographical Coverage	Pacific SAR regions	
Temporal Coverage	July 2012, Jan 2013	
Product provider	ESA/ESRIN	SAMOS A L2 processing from L1b CPP CNES products
Product identifier	SAR_SAMOS A_PAC	
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	
FURTHER INFORMATION		
Documents	See AD. 8 for re-tracking processing configuration (SAMOSA)	
Contact	salvatore.dinardo@esa.int, bruno.manuel.lucas@esa.int, jerome.benveniste@esa.int	

Some relevant standards of this product are listed here below:

- The Reference Time for the TAI Datation is 01/01/2000 00:00:00
- The Reference Ellipsoid is the Topex/Poseidon Ellipsoid
- The SAR Return Power Model is SAMOSA2 with Gaussian PTR approximation corrected by the usage of Look-up Tables
- The Curve Best-Fitting Scheme is a Bounded Levenberg-Marquardt Least-Squares Estimation Algorithm (LEVMAR-LSE)
- No static bias has been applied to the range, wave height and sigma nought measurements
- The Doppler Shift Correction has been applied to the range measurements
- The internal path delay has not been applied to the range measurements
- The measurements are provided at both 1Hz and 20Hz.
- No geophysical and SSB corrections are available (as in input L1b CPP product).
- No data editing has been applied to the measurements.

3.4 Open and Coastal Ocean SAR (NOC)

Table 3-4: Open and Coastal Ocean SAR CS2 Data – NOC

Parameter	Value	Comments
OPEN AND COASTAL OCEAN SAR – ESA CryoSat-2 Data		
Partner	NOC	
Geographical Coverage	North East Atlantic SAR Regions	
Temporal Coverage	July 2012, Jan 2013	
Product provider	ESA/ESRIN	SAMOSa L2 processing from L1b CPP CNES products
Product identifier	SAR_SAMOSa_NEA	
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	
FURTHER INFORMATION		
Documents	See AD. 8 for re-tracking processing configuration (SAMOSA)	
Contact	salvatore.dinardo@esa.int, bruno.manuel.lucas@esa.int, jerome.benveniste@esa.int	

This product's characteristics are the same as in subchapter 3.3. The geographical coverage is the only difference.

3.5 Open and Coastal Ocean SAR (Starlab)

Table 3-5: Open and Coastal Ocean SAR CS2 Data – Starlab

Parameter	Value	Comments
OPEN AND COASTAL OCEAN SAR – ESA CryoSat-2 Data		
Partner	Starlab	
Geographical Coverage	South Pacific SAR Box	
Temporal Coverage	July 2012, Jan 2013	
Product provider	Starlab	SAMOSa adapted L2 processing from L1b CPP CNES SAR products
Product identifier	SAR_SAMOSa_STARLAB	

Table 3-5: Open and Coastal Ocean SAR CS2 Data – Starlab

Parameter	Value	Comments
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	
FURTHER INFORMATION		
Documents	http://www.satoc.eu/projects/samosa/samosa_config.html	Information about the re-tracker configuration
Contact	alejandro.egido@starlab.es, marco.caparrini@starlab.es	

Some relevant standards of this product are listed here below:

- The Reference Time for the TAI Datation is 01/01/2000 00:00:00
- The Reference Ellipsoid is the Topex/Poseidon Ellipsoid
- The SAR Return Power Model is SAMOSA2 with Gaussian PTR approximation corrected by the usage of Look-up Table
- The DDM SAR Power Model masked according to Range-Cell Migrated range bins
- Thermal noise estimation from SAR waveform
- Levenberg-Marquardt Least Mean Squares Minimization Algorithm (LEVMar-LSE)
- No static bias has been applied to the range, wave height and sigma nought measurements
- The Doppler Shift Correction has been applied to the range measurements
- The internal path delay has been not applied to the range measurements
- Level-2 measurements are posted at 20 Hz
- No data editing has been applied to the measurements
- The Goodness of fit (GOF) is calculated as:

$$\text{GOF} = \sqrt{\text{mean}((\text{SAR_Waveform_CPP}[12:116] - \text{Model_Waveform}[12:116])^2)}$$
- First and last 12 range bins are discarded for the estimation

3.6 Polar Ocean SAR (DTU)

Table 3-6: Polar Ocean SAR CS2 Data – DTU

Parameter	Value	Comments
POLAR OCEAN SAR – ESA CryoSat-2 Data		
Partner	DTU	
Geographical Coverage	Above latitudes 60° N, longitudes 0-100° E	
Temporal Coverage	March 2012, April 2012, September 2012	
Product provider	ESA/ESRIN	SAMOSASAM3 L2 processing from ESA CS2 PDGS SAR FBR products
Product identifier	SAR_SAMOSASPOLAR	
Format	NETCDF	
FURTHER INFORMATION		
Documents	See AD. 8 for re-tracking processing configuration (SAMOSA)	
Contact	salvatore.dinardo@esa.int, bruno.manuel.lucas@esa.int, jerome.benveniste@esa.int	

Some relevant standards of this product are listed here below:

- The Reference Time for the TAI Datation is 01/01/2000 00:00:00
- The Reference Ellipsoid is the WGS84 Ellipsoid
- The SAR Return Power Model is SAMOSA3 with Gaussian PTR approximation corrected by the usage of Look-up Tables
- The Curve Best-Fitting Scheme is a Bounded Levenberg-Marquardt Least-Squares Estimation Algorithm (LEVLMAR-LSE)
- A static bias of -70.4 cm has been applied to the range
- The Doppler Shift Correction has been applied to the range measurements
- The internal path delay has been applied to the range measurements
- Waveform Zero-Padding in range has been applied at L1b
- No sea state bias applied
- The geo-corrections are the ones reported in the KIRUNA FBR SAR data products

- The measurements are provided at both 1Hz and 20Hz.
- No data editing has been applied to the measurements.

3.7 Sea Floor Mapping SAR (DTU)

Table 3-7: Polar Ocean SAR CS2 Data – DTU

Parameter	Value	Comments
3.7.1.1 SEA FLOOR MAPPING SAR – ESA CryoSat-2 Data		
Partner	DTU	
Geographical Coverage	Pacific SAR boxes	
Temporal Coverage	One “369 days” CS2 cycle from 01/10/2012	
Product provider	ESA/ESRIN	SAMOSA SAM2 L2 processing from ESA CS2 PDGS SAR FBR products
Product identifier	SAR_SAMOSA_SEAFLOOR	
Cycles/Passes	One entire CS2 cycle	
Format	NETCDF	
FURTHER INFORMATION		
Documents	See AD. 8 for re-tracking processing configuration (SAMOSA)	
Contact	salvatore.dinardo@esa.int, bruno.manuel.lucas@esa.int, jerome.benveniste@esa.int	

This product’s characteristics are the same as in subchapter 3.3. The geographical and temporal coverage is the only difference.

3.8 Ionospheric Correction (Noveltis)

Table 3-8: Ionospheric Corrections Data - Noveltis

Parameter	Value	Comments
Ionospheric Corrections DATA – SPECTRE (Noveltis)		

Table 3-8: Ionospheric Corrections Data - Noveltis

Parameter	Value	Comments
Partner	Noveltis	
Geographical Coverage	Med / European Shelf	
Temporal Coverage	Jan 2011 to Jan 2013	
Product provider	Noveltis	As for SPECTRE project
Cycles/Passes	All passes provided by CP4O team for the production of this correction	
Format	NETCDF	
FURTHER INFORMATION		
Documents	http://www.noveltis.com/spectre/interface/pdf/ProceedingGalileo2007_SPECTRE.pdf	
Contact	eric.jeansou@noveltis.fr	

The variables contained in these products are:

- Time in seconds with respect to CryoSat reference (01/01/2000 00:00)
- Longitude
- Latitude
- Ionosphere correction
- Tide correction

The corrections are provided and have to be applied as in GDR products. The fill value used is 32767.

3.9 Tidal Correction (Noveltis)

Table 3-9: Tidal Corrections Data - Noveltis

Parameter	Value	Comments
Tidal Corrections DATA – COMAPI (Noveltis)		
Partner	Noveltis	
Geographical Coverage	NE Atlantic (Coastal)	
Temporal Coverage	Jan 2011 to Jan 2013	
Product provider	Noveltis	As for COMAPI project
Cycles/Passes	All passes provided by CP4O team	

Table 3-9: Tidal Corrections Data - Noveltis

Parameter	Value	Comments
	for the production of this correction	
Format	NETCDF	
FURTHER INFORMATION		
Documents	http://www.coastalt.eu/files/portoworkshop10/pres/102_presentation_NOV_ELTIS_COMAPI.pdf + validation reports provided by CNES	
Contact	mathilde.cancet@noveltis.fr	

This product's characteristics are the same as in subchapter 3.8. The geographical and temporal coverage is the only difference.

3.10 Wet Troposphere Correction (UPorto)

Table 3-10: Wet Troposphere Corrections Data - University of Porto

Parameter	Value	Comments
Wet Troposphere Corrections DATA – University of Porto		
Partner	University of Porto	
Geographical Coverage	Global	
Temporal Coverage	July 2012, Jan 2013	
Product provider	University of Porto	2 datasets are provided (from ESA and RADS data). See details below.
Cycles/Passes	Sub-cycles 29-30, 36-37	
Format	NETCDF	
FURTHER INFORMATION		
Documents	http://www.coastalt.eu/files/portoworkshop10/pres/102_presentation_NOV_ELTIS_COMAPI.pdf + validation reports provided by CNES	
Contact	mathilde.cancet@noveltis.fr	

All files are provided at 1-Hz. The correction is provided in NETCDF files including the following fields:

Cycle: sub-cycle number according to RADS convention

Pass: pass number according to RADS convention

Tisec: time in seconds since 2000-01-01 00:00:00 (UTC) – on Dataset 1

Tisec: time in seconds since 2000-01-01 00:00:00 (TAI) – on Dataset 2, as in original ESA files

MJD: Modified Julian date (UTC) Latitude : Latitude (degrees north) Longitude : Longitude (degrees east)

wet_ECMWF: WTC from the ECMWF operational model (metres)

wet_DComb: WTC from the DComb algorithm (metres)

formal_error: formal error of the wet_DComb estimate (metres)

Surface_type: 0=open ocean, 1=enclosed seas and lakes, 2=continental ice, 3=land

N_obs: total number of observations used

flag_GNSS : 1 if GNSS observations were used

flag_ECMWF: 1 if ECMWF operational model was used

flag_SI-MWR: 1 if SI-MWR observations were used

Two sets of files are provided:

Dataset 1 – Computed for CS-2 data points available in RADS. This includes all ocean points and the land points closest to the coast (up to 50km). It includes all LRM data and most of SAR mode data.

Dataset 2 – Computed for files provided by ESA, containing points for all surface types and all instrument modes.

All fields contained in Dataset 1, except for those related with the DComb WTC, were extracted from RADS.

Dataset 2 files (containing only time, latitude, longitude, surface type and instrument mode) had to be processed using the following steps:

- The sub-cycle and pass numbers according to RADS convention were introduced. These are required to run the DComb algorithm
- The WTC from ECMWF operational model grids at 0.125°x0.125°spacing and 6 h time interval was interpolated for the time and location of each measurement
- Duplicated points were removed
- Only 1-Hz points were extracted (those for which the surface type and instrument mode were defined).

The reason for providing the two datasets is the fact that the RADS dataset is easier to handle due to the points discussed below. Regarding the points for the LRM and SAR modes, the two datasets contain approximately the same points, although with different time and locations. The ESA dataset contains points for a few SAR mode regions which are not present in RADS, but there is also a very small number of track portions present in RADS which are not present in the ESA files.

The time interval between consecutive points in the ESA files is not constant. It can vary from 0.88 s to 0.94 s while in RADS the time interval is always ~0.94 s. To match the two data sets the time difference between TAI and UTC must be accounted for. Due to the fact that the time interval between the 1-Hz measurements is not the same, for a given epoch, the location of the corresponding points must be computed by interpolation. For a WTC comparison the closest point in time can be used, provided that the time difference between the matching points is small enough, e.g. < 0.60s.

The DComb WTC has been computed only for ocean points, therefore only these points should be used in the comparisons.

4 Data Access

The aim of this section is to give information about the access to the above characterised validation data sets (4.2), and additionally the data sets described in AD. 9 (4.1).

4.1 Data Sets

Information on all data sets described in AD. 9 is accessible through dedicated pages on the CP4O website <http://www.satoc.eu/projects/CP4O/data.html>.

In the web page we will find links to information on the source data, auxiliary and validation data for each development product, as well as a brief description of the methods used in each investigation.

Here below it is showed the website table from which we can access to the different sub-themes descriptions and links.

Table 4-1. Table showed in the website: Data Set

Theme	Product	Partner	Area	Source data		Validation data	
Open Ocean	LRM	TU Delft	Global	Cryosat	-	Satellite	-
	RDSAR	TU Delft	Global	Cryosat	-	Satellite	-
	RDSAR	CLS	Global	Cryosat	-	Satellite	-
	SAR	CLS	Global	Cryosat	-	Satellite	-
	SAR	Starlab	NE Atlantic	Cryosat	-	Satellite	In situ
Coastal Ocean	SAR	NOC	S Coast UK	Cryosat	Auxiliary	Satellite	In situ
	SARIN	isardSAT	Cuba / Chile	Cryosat	-	-	-
Polar Ocean	SAR	DTU		Cryosat	-	Satellite	Airborne
Sea Floor Mapping	SAR	DTU		Cryosat	-	Satellite	In situ
Corrections	Wet Tropo	U Porto	Global	-	Auxiliary	Satellite	-
	Iono	Noveltis	Med / European Shelf	Cryosat	Auxiliary	-	-
	Tides	Noveltis	NE Atlantic (Coastal)	Cryosat	Auxiliary	-	-

4.2 Validation Data Sets

Also in the same CP4O website <http://www.satoc.eu/projects/CP4O/data.html>, it is showed the different validation data sets described in this document.

Links to readme txt files are available for more extensive description of each subtask data set.

Some of the subtasks developed in WP4000 were not defined to be validated, as for the case of the SARIN for Coastal Ocean task developed by isardSAT, which consisted more in a small scientific study. Hence, not all subtasks on **Table 4-1**. Table showed in the website: Data Set will appear in **Table 4-2**.

The access to the data sets, via ftp, can be addressed by:

- login as guest to [ftp.satoc.eu](ftp://ftp.satoc.eu)
- go to cp4o/validation_data directory.

A password may be required (on request to info at satoc.eu).

Here below it is showed the website table from which we can access to the different validation data sets, and descriptions links.

Table 4-2. Table showed in the website: Validation Data Set

Theme	Product	Responsible	Data Producer	Area	Time Period	Validation Data Set	Supporting Information
Open and Coastal Ocean	RDSAR	TU Delft	TU Delft	Pacific and N Atlantic SAR boxes	July 2012, Jan 2013	RDSAR_RADS_TUDELFT/	readme file
	SAR	CLS	CNES	Pacific and N Atlantic SAR Regions	July 2012, Jan 2013	SAR_CPP_PAC/ SAR_CPP_NEA	readme file xls description
	SAR	ESRIN	ESRIN	Pacific SAR Regions	July 2012, Jan 2013	SAR_SAMOSAS_PAC/	readme file
	SAR	NOC	ESRIN	North East Atlantic SAR Regions	July 2012, Jan 2013	SAR_SAMOSAS_NEA/	readme file
	SAR	Starlab	Starlab	Pacific and N Atlantic SAR Regions	July 2012, Jan 2013	SAR_SAMOSAS_STARLAB	readme file
Polar Ocean	SAR	DTU	ESRIN	Lats > 60N	March 2012, April 2012, September 2012	SAR_SAMOSAS_POLAR	readme file
Sea Floor Mapping	SAR	DTU	ESRIN	Pacific SAR Boxes	1 x 369 day cycle, starting 01/10/2012	SAR_SAMOSAS_SEAFLOOR	readme file
Corrections	Wet Tropo	U Porto	U Porto	Global	July 2012, Jan 2013	UPorto_Wet_Tropo	readme file
	Iono	Noveltis	Noveltis	Med / European Shelf	July 2012, Jan 2013	noveltis/	readme file
	Tides	Noveltis	Noveltis	NE Atlantic (Coastal)	July 2012, Jan 2013	noveltis/	readme file