DT CorSSH and DT SLA Product Handbook

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Chronology Issues:		
Issue:	Date:	Reason for change:
1.0	2005/07/18	1st issue
1.1	2005/11/08	Processing of ERS-2 data
1.2	2005/10/17	Processing of GFO data
1.3	2008/06/10	New standards for corrections and models for Jason-1
1.4	2008/08/07	New standards for corrections and models for Envisat after cycle 65.
1.5	2008/12/18	New standards for corrections and models for Jason-1 GDR-C.
1.6	2010/03/05	New standards for Jason-2
1.7	2010/06/08	New standards for corrections and/or models Processing of ERS-1 data
1.8	2011/04/14	Correction of table 2
1.9	2012/02/28	Specification of the reading routines for SLA files only

D : page deleted I : page inserted M : page modified

List of Acronyms:

ATP	Along Track Product
Aviso	Archiving, Validation and Interpretation of Satellite Oceanographic data
Cersat	Centre ERS d'Archivage et de Traitement
CLS	Collecte, Localisation, Satellites
CMA	Centre Multimissions Altimetriques
Cnes	Centre National d'Etudes Spatiales
CorSSH	Corrected Sea Surface Height
Doris	Doppler Orbitography and Radiopositioning Integrated by Satellite
DT	Delayed Time (>30days)
ECMWF	European Centre for Medium-range Weather Forecasting
EN	Envisat
G2	GFO
GDR	Geophysical Data Record(s)
GFO	Geosat Follow-On
GOT	Global Ocean Tides
IB	Inverse Barometer
IGDR	Interim Geophysical Data Record(s)
J1	Jason-1
J2	Jason-2
JMR	Jason-1 Microwave Radiometer
LWE	Large Wavelength Error
MSS	Mean Sea Surface
MWR	Microwave Radiometer
Nasa	National Aeronautics and Space Administration
NRT	Near Real Time (48/72h)
OER	Orbit Error Reduction
OSDR	Operational Sensor Data Records
POE	Precise Orbit Ephemeris
RD	Reference Document
RT	Real Time (<10h)
Ssalto	Segment Sol multimissions d'ALTimétrie, d'Orbitographie et de localisation précise.
SLA	Sea Level Anomaly
SSB	Sea State Bias
SSH	Sea Surface Height
TAI	IAT – International Atomic Time
TMR	Topex Microwave Radiometer
T/P	Topex/Poseidon

UTC	Universal Time Coordinated

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Applicable documents / reference documents

RD 1: Jason-1 validation and cross calibration activities
Ref: CLS.DOS/NT/04.279

RD 2: Envisat RA2/MWR ocean data validation and cross calibration. Activities Annual Report.
Ref: CLS.DOS/NT/04.289

RD 3: Envisat RA2/MWR Product Handbook, Issue 1.2, 1 September 2004 **European Space Agency**

RD 4: AVISO and PO.DAAC User Handbook – IGDR and GDR Jason-1 Products
Ref: SMM-MU-M5-OP-13184-CN

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Contents

1. Introduction

The Aviso/Altimetry center, in Toulouse, France, is the French distributed active archive data center for multi-satellite altimeter missions. As time goes by, our work will be increasingly to generate and distribute homogeneous long-term data series from multi-satellite altimeter missions.

Aviso is a key element of the new Ssalto multimission ground segment developed by Cnes, with assistance from its subsidiary CLS and science teams involved in altimetry. It is run by CLS.

Aviso's activities encompass:

- operational distribution and validation of Topex/Poseidon, Jason-1&2 and Envisat GDRs;
- high-level processing of data from a range of satellites (SLA, CorSSH, etc.);
- user service;
- a catalog of altimetry, orbit determination and precise location products;
- promotion of ocean altimetry, orbit determination and precise location activities.

Ssalto's core is made of an instrument control center (CCI), which generate level 1 data (i.e timed and located, expressed in appropriate units and checked for quality data), and of a multimission altimetry center (CMA), which process data to level 2 (i.e data corrected from instrumental, atmospheric and geophysical corrections, and validated for quality assurance). These processing steps generate OSDR, IGDR and GDR, then used by both multimission and monomission components to generate Near-Real Time (NRT) and Delayed Time (DT) products:

- DT corrected sea surface heights and sea level anomalies (monomossion component)
- NRT sea level anomalies, gridded or along-track; DT sea level anomalies, gridded or along-track; NRT absolute dynamic topographies gridded or along-track.
- wind/wave data, gridded or along-track

The purpose of this document is to describe products generated by the monomission Delayed Time altimeter data processing segment.

After a description of the input data, a short overview of the processing steps is presented. Then complete information about user products is provided, giving nomenclature, format description, and software routines.

2. Data Processing

2.1. Overview of the monomission component

The monomission component of Ssalto ground segment is in charge of the Delayed Time (DT) production and processing of Topex/Poseidon, ERS-1, ERS-2, Jason-1, Jason-2, and Envisat data in order to provide highly accurate long time series of altimeter data.

The monomission system delivers DT CorSSH and SLA products as follows:

- Corrected Sea Surface Heights (DT CorSSH) for Jason-1, Jason-2, Envisat, T/P, GFO, ERS-1 and ERS-2 missions
- Sea Level Anomalies (DT SLA) for Jason-1, Jason-2, Envisat, T/P, GFO, ERS-1 and ERS-2 missions

Note that monomission products by definition are not intercalibrated at crossover points. Thus Jason-1 and Envisat data for example may not be homogeneous at a given point, since their orbits are different. Please also note that these products are not corrected from Large Wavelength Error (LWE), unlike multimission Ssalto/Duacs products.

2.1.1. Data used

2.1.1.1. Altimeter data

Delayed Time products are generated from GDR products for T/P, Jason-1, Jason-2 and Envisat missions, from NOAA GDR for GFO and from CERSAT (IFREMER) OPR for ERS-1 and ERS-2.

All GDR products are computed with a Precise Orbit Ephemeris (POE) and are delivered within 2 months depending on the mission. For several missions, an updated orbit is used:

- For ERS-1 and ERS-2 the orbit used is DGME-04 provided by Delft Institute (http://www.deos.tudelft.nl/) until June 2003 (cycle 85) and DPAF afterwards.
- For Topex/Poseidon the orbit used is GSFC (std0809) for the whole mission
- For Envisat CNES POE of GdrC standard is used from cycle 015 onwards
- For the whole GFO mission, the orbit used is GSFC (std0809) and when not available, NASA POE is used.

Altimetry product	Source	Availability	Type of orbit
Topex/Poseidon GDR	NASA/CNES	-	GSFC POE
Jason-1 GDR (GdrC)	CNES/NASA	~40 days	CNES POE
Jason-2 GDR (GdrT)	CNES/NASA	~60 days	CNES POE
GFO GDR	NOAA	~2 months	GSFC/NASA POE
ERS-1	IFREMER/ESA	-	DGME-04
ERS-2	IFREMER/ESA	-	DGME-04+DPAF(c≥86)
Envisat (GDR-A, GDR-B and GDR-C from cycle 86)	ESA	~2 months	CNES POE

Table 1: Aviso Delayed Time Input data overview.

2.1.1.2. Dynamic Auxiliary Data

Various Dynamic Auxiliary Data are needed to process these altimeter data. The pressure and wet tropospheric correction grids (gaussian grids) from the ECMWF model are provided by Meteo France, and the pole tide is computed from IERS data in order to homogenize the corrections for ERS-1 and ERS-2 missions (see Table 2) .

2.1.2. Selecting valid data

The processing starts with quality control and validation of altimetric data and geophysical corrections. This is part of the validation task of T/P, Jason-1, Jason-2 and Envisat GDRs performed by the CLS Space Oceanography Division for Aviso/Altimetry (CNES) and F-PAC (ESA). Only valid ocean data are selected. Specific editing criteria are applied near the coasts (10-50 km).

2.1.3. Applying altimetric corrections

Altimetric measurements need to be corrected for instrumental errors, environmental perturbations (wet tropospheric, dry tropospheric and ionospheric effects), the ocean sea state influence (sea state bias), the tide influence (ocean tide, earth tide and pole tide) and atmospheric pressure (combined atmospheric correction : high frequency fluctuations of the sea surface topography and inverted barometer height correction).

2.2. Product Generation

2.2.1. Computing the corrected sea surface height

To compute the correct value of sea surface height, the following operation is done:

'Sea Surface Height = Satellite Altitude – Altimeter Range – Corrections'

'Sea Surface Height' is the height of the sea surface above the reference ellipsoid. **'Satellite Altitude'** refers to the distance of the center of mass of the satellite above a reference point. The reference point will usually be either on the reference ellipsoid or the center of the Earth.

'Altimeter Range' is the distance from the center of mass of satellite to the surface of the Earth, as measured by altimeters (figure 1).

'Corrections': see table2.

The **Reference ellipsoid** used is the first-order definition of the non-spherical shape of Earth with:

- equatorial radius of 6378.1363 kilometers
- flattening coefficient of 1/298.257000000
  (Jason-1, Topex/Poseidon, GFO)
- WGS-84 Equatorial Radius (a) = 6378.1370 kilometers
- WGS-84 Flattening (f) = 1/298.257223563
  (Envisat, ERS)

Concerning DT-CorSSH and DT-SLA products, **the only reference ellipsoid to take into account is the first one: Envisat and ERS sea surface heights are adjusted above Jason-1 ellipsoid**.

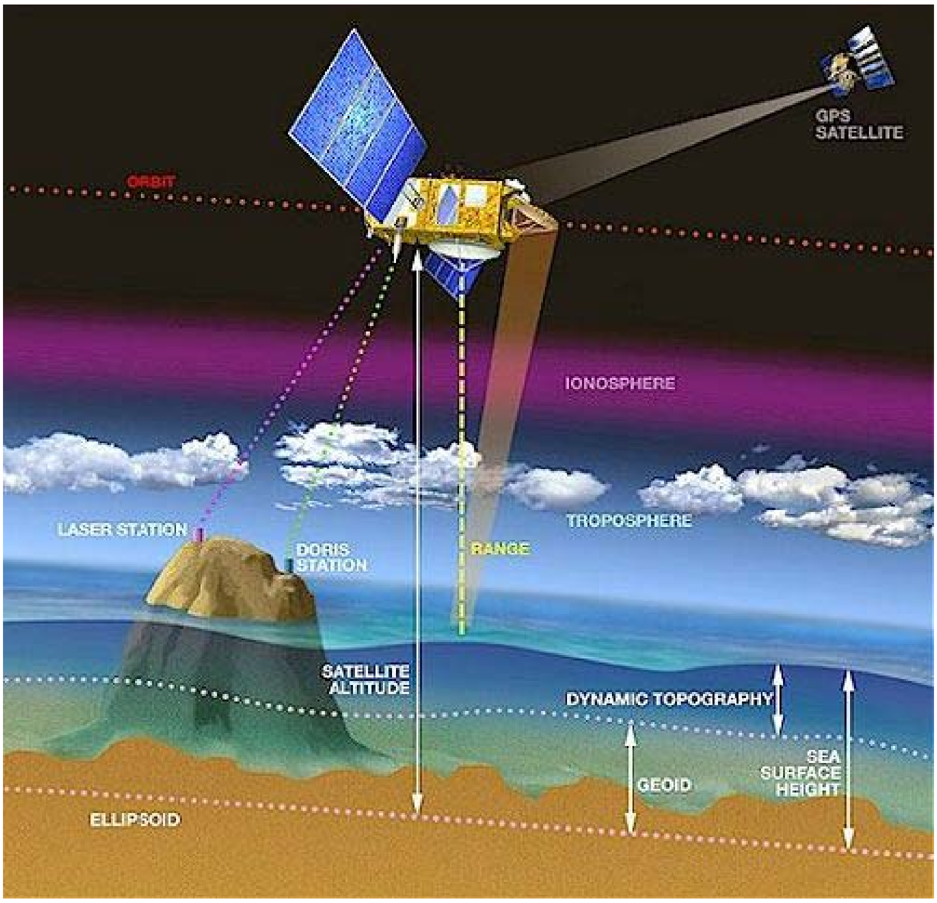

Figure 1 : Altimetry principle

2.2.2. Computing the sea level anomaly

For all satellites, the following operation is done to compute the correct value of sea level anomaly:

'Sea Level Anomaly = Sea Surface Height- Mean Sea Surface – Mean Profile – Inter Mission Bias'

'Sea Surface Height': see section 2.2.1.

'Mean Sea Surface' represents the position of the ocean surface averaged over an appropriate time period to remove annual, semi-annual, seasonal and spurious sea surface height signals. **'Mean Sea Surface'** is a distance above the reference ellipsoid and is based on seven years of Topex/Poseidon data series, five years of ERS data series and two years of Geosat data series [reference CLS01, *Hernandez et al.*, 2000].

'Mean Profile' is an average over several years of the sea level anomalies with respect to Mean Sea Surface, computed following the satellite's tracks. 4 Mean Profiles were computed for each ground track:

- A 'Mean Profile' used for T/P (cycles 1 to 364), Jason-1 (cycles 1 to 259) and Jason-2: It was computed with 10 years of T/P (cycles 11 to 353) and 6 years of Jason-1 (cycles 11 to 250).
- A 'Mean Profile' used for T/P (cycles 368 to 481) and from Jason-1 cycle 262 onwards (where satellites are on interleaved ground-tracks): It was computed with 3 years of T/P (cycles 369 to 479)..

- A 'Mean Profile' used for ERS-1, ERS-2, and Envisat: It was computed with 8 years of ERS-2 (cycles 1 to 85) and 6 years of Envisat (cycles 10 to 72).
- A 'Mean Profile' is used for GFO: It was computed with 7 years of GFO cycles 37 to 187.

For these Mean Profiles, the latest standards and a maximum of data were used in order to increase as much as possible the quality of their estimation. Note that a particular care was brought to the processing near coasts. Note that for continuity reasons, the reference to the 7 years MSS CLS01 was kept in terms of oceanic variability contain.

'Inter Mission Bias' is a bias calculated to have consistent time series since TOPEX/Poseidon. It is therefore zero for T/P.

Sea Level Anomalies are computed along a theoretical satellite ground track: individual measurements are re-sampled along a Mean Track. Therefore, each missing data is replaced by a mean Sea Level Anomaly value all along this theoretical track, or by a default value in case of no available value on a length exceeding 20 kilometres.

2.2.3. Orbits, Passes and Repeat cycle

'Orbit' is one revolution around the Earth by the satellite.

A satellite **'Pass'** is half a revolution of the Earth by the satellite from one extreme latitude to the opposite extreme latitude. Passes with odd numbers correspond to ascending orbits, from minimum to maximum latitude; passes with even numbers correspond to descending orbits, from maximum to minimum latitude.

'Repeat Cycle' is the time period that elapses until the satellite flies over the same location again. Every "pass file" of a given cycle (identified by its track number) flies over the same path as the pass file of every other cycle in the same repeat-cycle phase, and covers oceans basins continuously.

For example:

For Jason-1, an ascending pass (odd numbers) begins at Latitude -66.15 deg and ends at +66.15 deg. A descending pass is the opposite (+66.15 deg to -66.15 deg).

The passes are numbered from 1 to 254 representing a full repeat cycle of the Jason-1 ground track; for Jason-1, a repeat cycle is about 9.9156 days.

2.2.4. Available products

Monomission component delivers Delayed Time processed SLA and CorSSH products using fully processed data from various altimetric missions (Topex/Poseidon, Jason-1, Jason-2, GFO, ERS-1, ERS-2 and ENVISAT) such as:

- DT CorSSH Ref
- DT CorSSH Upd (not yet available)
- DT SLA Ref
- DT SLA Upd (not yet available)

Each product contains data series which correspond to a complete satellite's cycle; therefore, products availability will depends on the satellite's orbital period.

The main reference characteristics for computing both DT CorSSH and DT SLA are summarized in following table. These information are provided by appropriated fields in the data file.

	Jason-1/ Jason-2	Topex/Poseidon	Envisat	ERS-1/ERS-2	GFO
Orbit	Cnes POE	GSFC POE (std0809)	Cnes POE (GdrC version from cycle 15 onwards)	DGME-04 /DGME-04 +DPAF	GSFC POE (std0809)/NAVSO C POE (where no GSFC POE)
Dry troposphere	Model computed from Gaussian grids (new S1 and S2 atmospheric tides applied)	Model computed from rectangular grids (new S1 and S2 atmospheric tides are applied)			
Wet troposphere	From JMR (AMR) radiometer further than 50 km from the coasts. From ECMWF model for distances between 10 and 50 km	From TMR radiometer [Scharoo *et al.* *2004*] further than 50 km from the coasts, From ECMWF model for distances between 10 and 50 km	From MWR radiometer further than 50 km from the coasts. From ECMWF model for distances between 10 and 50 km	From MWR with neural algorithm corrected for drift [Scharoo *et al.* 2004]	From GFO radiom. further than 50 km from the coasts. From ECMWF model for distances between 10 and 50 km. From ECMWF model for cycles 135-137,166,181-189,and >201
Ionosphere	From dual-frequency altimeter range measurements	From dual-frequency altimeter range measurements (Topex), from Doris (Poseidon)	From dual-frequency altimeter range measurements (cycle 1-64) and GIM model from cycle 65	Bent model. Bent model (cycle 1-49), GIM model from cycle 50 [Iijima *et al.*, 1999]	GIM model [Iijima *et al.*, 1999]
Sea State Bias	Non parametric SSB (from GDR)	Non parametric SSB (Topex)[Tran *et al.*, 2010] BM4 formula (Poseidon) [Gaspar *et al.*, 1996]	Homogeneous to GDR-B standards for cycles ≤85 and non parametric SSB [Labroue, 2007] for cycles≥86	BM3 [Gaspar *et al*, 1996] Non parametric SSB [Mertz *et al.*,2005],	Non parametric SSB (updated 2009)
Ocean tide and loading tide	GOT4.7 (including ocean tides, loading effect, long period equilibrium tide, S1 tides…)				
Solid Earth tide	Elastic response to tidal potential [Cartwright and Tayler, 1971], [Cartwright and Edden, 1973]				
Pole tide	From GDR [Wahr, 1985]			computed from IERS data [Wahr, 1985]	From GDR [Wahr, 1985]
Combined atmospheric correction	MOG2D High Resolution [Carrère and Lyard, 2003] + inverse barometer computed from rectangular grids.				
Major Instrumental correction			USO correction correcting from anomaly periods and aging drift from auxiliary files taken into account	SPTR corrections [Martini and Féménias, 2000] and USO correction (extrapolated for cycles>85)	

Table 2 : Aviso Reference products corrections overview.

3. Product Presentation

3.1. How to access products

Delayed Time (DT) products are freely available via anonymous **FTP**, at: ftp://ftp.aviso.oceanobs.com/pub/oceano/AVISO/SSH/monomission/dt/

For DT SLA and DT CorSSH products, the following acknowledgement must be cited:

"The altimeter products were produced by CLS Space Oceanography Division and distributed by AVISO, with support from CNES".

3.2. Overview

Two types of products are delivered by the monomission system:

Delayed Time Corrected Sea Surface Height (DT CorSSH)

Delayed Time Sea Level Anomaly (DT SLA)

Information regarding the latest improvements and changes are available on the Aviso web site. http://www.aviso.oceanobs.com/en/data/product-information/monomission-data-updates/

3.3. Nomenclature

Generally speaking, the nomenclature used for all monomission products is designed to be self-explanatory and to ease data selection and data access. The standard filename nomenclature is:

<**TYPE**>_<**CATEGORY**>_<**MISSION**>_<**CYCLE**>.<**EXT**>

where

TYPE is the type of product:

- CorSSH
- SLA

CATEGORY is the category of product:

- Upd for updated product
- Ref for historically homogeneous product

MISSION is the mission name:

- J2 for Jason-2
- J1 for Jason-1
- EN for Envisat
- TP for Topex/Poseidon
- E1 for ERS-1
- E2 for ERS-2
- G2 for GFO

CYCLE is the number of the satellite's cycle on 3 digits.

Note that for ERS-1 a specific cycle notation has been adopted: the whole period of ERS-1 has been divided into 35 days periods, thus the cycle 1 is considered to be the first cycle of phase A (begins on the 26th July 1991) and the cycle 53 is the last cycle of phase G (ends on 3rd June 1996). Note that the information of the date of the measurements is accessible in the files (TimeDay, TimeSec and TimeMicroSec for the CorSSH and BeginDates in the SLA).

EXT is the file extension:

- nc stands for NetCDF.

Filenames examples:

CorSSH_Ref_EN_Cycle031.nc: contains cycle's number 31 of Envisat historically homogeneous data sets for corrected sea surface heights.

SLA_Upd_J1_Cycle112.nc: contains cycle's number 112 of Jason-1 updated data sets for sea level anomalies.

■ Time Convention

Times are UTC and referenced to January 1st 1950, 00 h 00 min 00 s.

An UTC leap second can occur on June 30 or December 31 of any year. The leap second is a sixty-first second added to the last minute of the day. UTC values (minutes:seconds) thus appear as: 59:58; 59:59; 59:60; 00:00; 00:01.

On July 1, 1992, the difference between UTC and TAI is 27 seconds; on July 1, 1993, 28 seconds; on July 1, 1994, 29 seconds; on January 1, 1996, 30 seconds; on July 1, 1997, 31 seconds; on January 1, 1999, 32 seconds; on January 1, 2006, 33 seconds; on January 1, 2009, 34 seconds.

4. Data Format

4.1. Introduction

This chapter presents the data storage format and convention used for monomission products. All products are distributed in NetCDF.

NetCDF (Network Common Data Form) is an open source, generic and multi-platform format developed by Unidata. An exhaustive presentation of NetCDF and additional conventions is available on the following web site:

http://www.unidata.ucar.edu/packages/netcdf/index.html.

The information about the monomission NetCDF package, libraries and reading programmes is described in section 5.

All basic NetCDF conventions are applied to monomission files.

The data storage format is the same for reference (Ref) products and for updated (Upd) products: only file contents should be different.

4.2. DT CorSSH and DT SLA Format

4.2.1. Dimensions

3 Dimensions are defined:

- **Data:** (UNLIMITED dimension) number of data per parameter in current file,
- **Cycles:** maximum number of cycles for each pass.
- **Tracks:** maximum number of passes in current file.

4.2.2. Data Handling Variables

4.2.2.1. DT CorSSH products

Type	Name	Content	Unit	Scale Factor
int	Delta T	Time gap between two measurements	seconds	10^{-6}
int	Tracks(Tracks)	List of passes contained in current file	none	none
int	NbPoints(Tracks)	Number of points per pass	none	none
int	Cycles(Tracks, Cycles)	List of cycles per pass	none	none
int	Longitudes(Data)	Longitude value of each point of each pass [1]	degrees	10^{-6}
int	Latitudes(Data)	Latitude value of each point of each pass [1]	degrees	10^{-6}
double	BeginDates(Tracks, Cycles)	Date of the first measurement for each pass and cycle	days	none
int	DataIndexes(Data)	Index of the point [2]	none	none
short	TimeDay(Data, Cycles)	Number of days from reference date	days	none

int	TimeSec(Data, Cycles)	Number of seconds within the day	seconds	none
int	TimeMicroSec(Data, Cycles)	Number of microseconds	microseconds	none
int	CorSSH(Data, Cycles)	Corrected see surface height	meters	10^{-4}
short	dry_tropo_corr(Data, Cycles)	Dry tropospheric correction	meters	10^{-4}
short	dynamic_atmosph_corr(Data, Cycles)	Combined atmospheric correction	meters	10^{-4}
Int	ocean_tide(Data, Cycles)	Ocean tide height	meters	10^{-4}
short	solid_earth_tide(Data, Cycles)	Solid Earth tide height	meters	10^{-4}
short	sea_state_bias(Data, Cycles)	Sea state bias	meters	10^{-4}
short	pole_tide(Data, Cycles)	Pole tide height	meters	10^{-4}
short	iono_corr(Data, Cycles) → Jason-1, Jason-2 → T/P → ERS-1 → ERS-2 → Envisat → GFO	Ionospheric correction Filtered dual frequency ionospheric correction Filtered dual frequency ionospheric correction + bias between Topex-A/Topex-B/ Poseidon Bent model Bent or GIM model Filtered dual frequency ionospheric correction (cycle 1-64) and GIM model (≥65) GIM model	meters	10^{-4}
short	wet_tropo_corr(Data, Cycles)	Radiometer wet tropospheric correction (if >50km from the shores), ECMWF model wet tropospheric correction (10 to 50km)	meters	10^{-4}
short	mean_sea_surface(Data, Cycles)	Mean sea surface height (CLS01)	meters	10^{-4}
short	swh(Data, Cycles)	Significant wave height	meters	10^{-3}
short	sigma0(Data, Cycles)	Backscatter coefficient	dB	10^{-3}
int	bathymetry(Data, Cycles)	Bathymetry	meters	10^{-3}
int	inter_mission_bias	Bias to have consistent time series since TOPEX/Poseidon	meters	10^{-3}

Table 3: Overview of data handling variables in DT CorSSH NetCDF file.

[1] *This global 1D array contains longitude and latitude information for all passes. Yet each satellite pass may be accessed directly. The array index **i** of the first point (first longitude/latitude) of a given pass **i** is obtained by: $Indice_i=Sum_{j=0..i-1}(NbPoints_j)$ (see Figure 2)*

[2] *Not used for CorSSH*

4.2.2.2. DT SLA products

Type	Name	Content	Unit	Scale Factor
int	Delta T	Time gap between two measurements	seconds	10^{-6}
int	Tracks(Tracks)	List of passes contained in current file	none	none
int	NbPoints(Tracks)	Number of points per pass	none	none
int	Cycles(Tracks, Cycles)	List of cycles per pass	none	none
int	int Longitudes(Data)	Longitude value of each point of each pass [1]	degrees	10^{-6}
int	Latitudes(Data)	Latitude value of each point of each pass [1]	degrees	10^{-6}
double	BeginDates(Tracks, Cycles)	Date of the first measurement for each pass and cycle	days	none
int	DataIndexes(Data)	Index of the point [3]	none	none
short	SLA(Data, Cycles)	Sea Level Anomaly	meters	10^{-3}

Table 4: Overview of data handling variables in DT SLA NetCDF file

[1] *This global 1D array contains longitude and latitude information for all passes. Yet each satellite pass may be accessed directly. The array index **i** of the first point (first longitude/latitude) of a given pass **i** is obtained by:* $Indice_i = Sum_{j=0..i-1}(NbPoints_j)$ *(see Figure 2)*

[3] *The date of each measurement is given by:* $Date_i = BeginDate + Indice_i * DeltaT$.

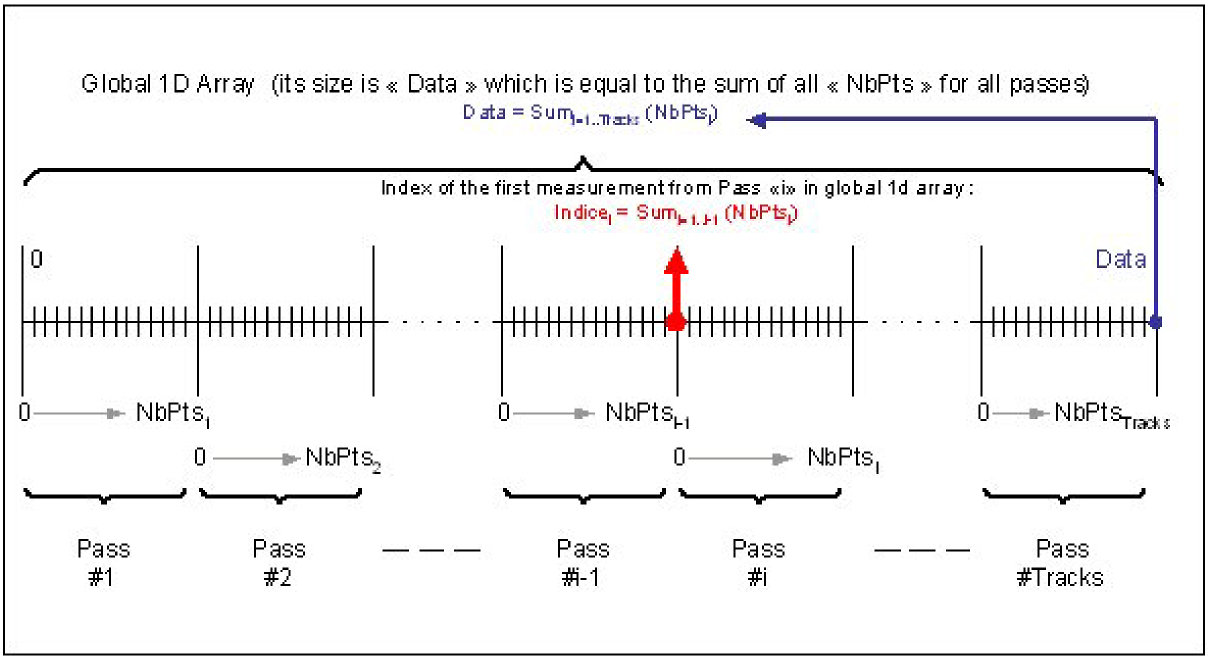

Figure 2: Illustration of the definition of a multi-pass 1D array

4.2.2.3. Attributes

Additional attributes may be available in Along Track Product (ATP) files. They are providing information about the type of product or the processing and parameter used.

- The global attribute **FileType** contains 'ALONG_TRACK_PRODUCT',
- The global attribute **OriginalName** contains the filename.
- The global attribute **CreatedOn** contains the date of the data sets creation.
- ...

5. Software Routines

5.1. Reading SLA files

This chapter intends to give a link to various software routine packages able to read **SLA monomission products (not CorSSH)**.

The package contains stand-alone library files as well as example ASCII dump programs and sample netCDF/ASCII products). They are available on the monomission ftp site:

ftp://ftp.aviso.oceanobs.com/pub/oceano/AVISO/software/

Two different packages are available:

PublicReadDelivery.tar.gz contains sources, in C and Fortran,

PublicReadBinaries.Linux.tar.gz,
PublicReadBinaries.MSWindows.zip, and
PublicReadBinaries.SunOS.tar.gz contain the same software precompiled on three architectures.

Feel free to check out the README file which gives exhaustive details about the content of each tar files.

Note that NetCDF data can be browsed and used through other software, like:

ncBrowse: http://www.epic.noaa.gov/java/ncBrowse/,

NetCDF Operator (NCO): http://nco.sourceforge.net/.

5.2. Reading CorSSH files

For the moment, no routines are delivered to read CorSSH files.

Note that for reading the dates, you need to combine 3 fields available in CorSSH files:

- TimeDay(Data, Cycles): Number of days from reference date
- TimeSec(Data, Cycles): Number of seconds within the day
- TimeMicroSec(Data, Cycles): Number of microseconds

So if you want to know the time of a given measurement you have to use its corresponding "TimeDay","TimeSec" and "TimeMicroSec".

The decimal format of time is computed by using "TimeDay" + ("TimeSec" + "TimeMicroSec"/1000000)/86400.

6. Updates

For all information relative to corrections updates, please check the Aviso website at:
http://www.aviso.oceanobs.com/en/data/product-information/monomission-data-updates/
Check out the Aviso website for more information and more useful netCDF tools.

7. Contacts

For more information, please contact:

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On Internet: http://www.aviso.oceanobs.com/

The user service is also interested in user feedbacks; questions, comments, proposals, requests are much welcome.