Jason-1/2/3 and SARAL GDR Status

CNES, NASA, NOAA, EUMETSAT

From all 4 MSEs
Cristina (EUM),
Alejandro (NOAA),
Shailen (JPL),
Nicolas (CNES)

OSTST meeting

Ocean Surface Topography Science Team Meeting (OSTST)

21-25 October, 2019
Chicago, Illinois

- **Currently 8 flying altimeters (CFOSAT will celebrate its 1st year in orbit within 3 days), with a quite homogenous processing baseline (thanks to coordination between agencies) and with an overall very good data quality.**

- **27 years of past data (since Topex-ERS1) to continue improving data quality.**

- **And Jason-CS to come in about 12 months. Using GDR-F standard**

- **All splinters summary requiring reprocessing of past data and more frequent updates.**

- **Thus a busy period with different project constraints (staff and funding)**

SARAL GDR-F

- **SARAL has implemented GDR-F standard recently, not fully inline with Jason-CS (naming nomenclature, some aux data) but very close.**

- **About 70 evolutions have been included in this version. Including numerical retracking**

- **2015 GDR-F will be soon released as a demo product**

- **Complete reprocessing of the mission by mid next year**

Major evolutions

New fields	Updated fields
3-Parameter SSB (SWH, wind and swell)	Retracking accounting for the **actual altimeter antenna aperture**
Wet & dry tropospheric correction based on 3D ECMWF fields	Updated altimeter **calibration schemes** (CAL2 normalization, CAL1 not corrected by CAL2, updated gains values)
Atmospheric correction derived from ECMWF fields	New Radiometer processing algorithms
New geophysical correction : E. Zaron internal tide model	Updated geophysical correction : FES2014 & GOT4.10 ocean tide models S. Desai pole tide with new IERS linear mean pole 2018 Mean Dynamic Topography model EGM 2008 geoid model
Platform mispointing angles Etc ...	Netcdf v4 product format Etc ...

- **Jason-1 GDR_E** since April 2016, with some caveats on the dry tropo correction when approaching the coast

- **Jason-2 GDR_D** since March 2013.
  - Processing baseline described in the User Handbooks (available for example on https://www.aviso.altimetry.fr/fileadmin/documents/data/tools/hdbk_j3.pdf)

- **Jason-3 using the same GDR-D standard** :
  - JA3 also available as prototype products (PEACHI)

2020 priorities

- **Topex GDR-F will be completed in 2020, it would be important to update Jason-1 to GDR-F standard.**

- **But Jason-CS is to be launched late 2020 and we need to update Jason-3 standards to ease the comparison during CalVal phase and insure a seamless continuity for the reference mission data set. (Note: SWOT nadir will use the same baseline and product format).**

- **Thus, Jason-3 GDR-F update is the highest priority. It includes about 70 evolutions (Including numerical retracking) and has to be implemented in operations before Jason-CS launch.**

- **Jason-3 product format and variables names will be aligned to JCS one's. This is quite an important evolution and project shall ease a smooth transfer in operations of this new standard, tools to convert from new to current product format shall be made available to all.**

Grouping variables in GDR-F – refer to Remko presentation

Not grouped (as in Jason-3 or Sentinel-3)

- Requires stringed variables like *time_20_ku, time_20_c*
- Creates confusing names like *sea_state_bias_c_20_ku*

Grouped (as in Sentinel-6)

- All variables of same posting rate contained in groups with same dimension name (*time*)
- Variable names can be reused in groups: e.g. *altitude* in /data_01 and /data_20/ku

/ (root)			
Global attributes, common dimensions			
/data_01		**/data_20**	
1-Hz time dimension, 1-Hz variables common to Ku- and C-band (time, location, tides, MSS)		(Few, if any)	
/data_01/ku	**/data_01/c**	**/data_20/ku**	**/data_20/c**
1-Hz Ku-band measurements and corrections	1-Hz C-band measurements and corrections	20-Hz Ku-band time, location, measurements and corrections	20-Hz C-band time, location, measurements and corrections

EUMETSAT

Example: Jason-CS NetCDF groups in Level 2 LR product

No waveforms in L2 products,

EUMETSAT
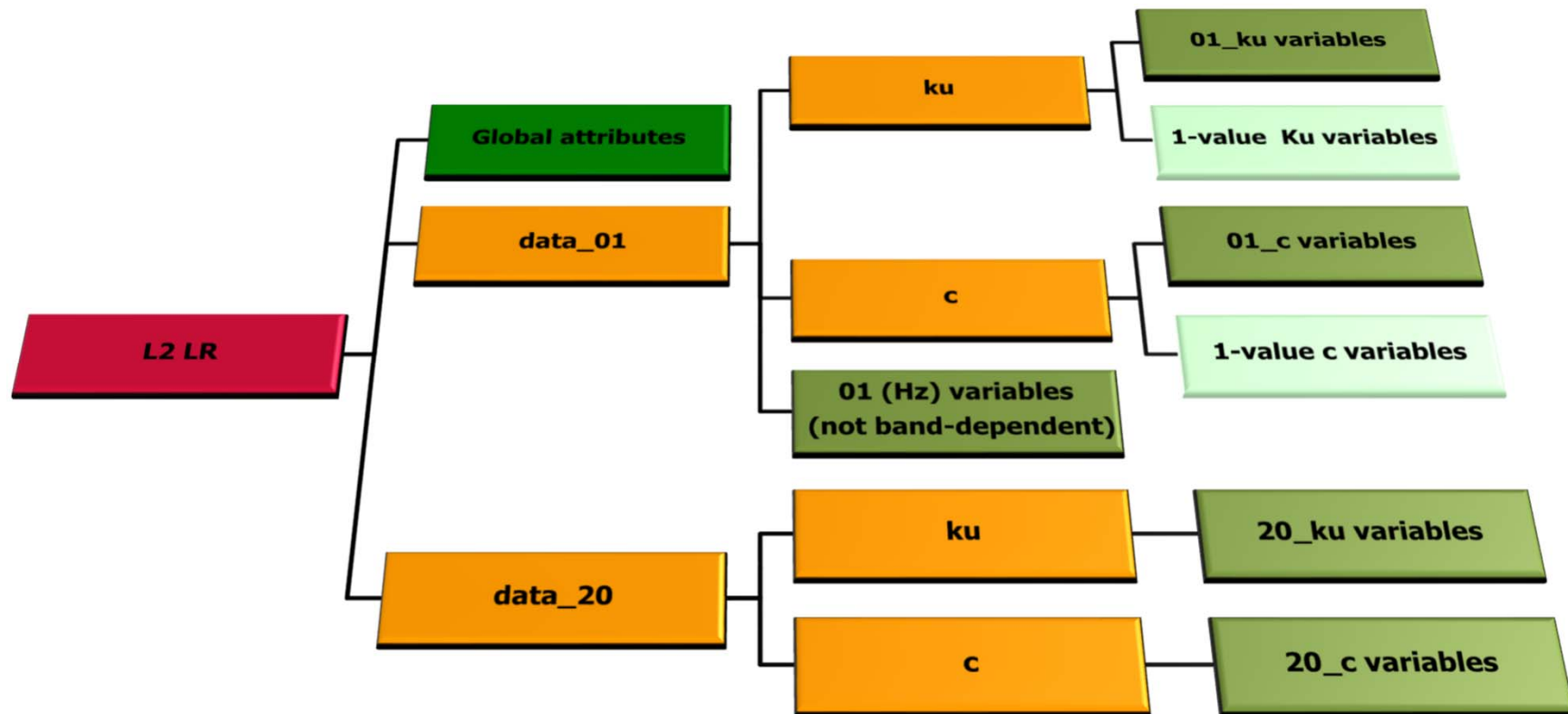
- **Jason-1 and Jason-2 will be updated in GDR-F**

- **Tentatively in 2021, in parallel of Jason-CS commissioning activities**

BACKUP SLIDES

- **Jason-1 GDR_E** : reprocessing completed end April 2016

De :	Desai, Shailen D (335A) <shailen.d.desai@jpl.nasa.gov>	Date : lun. 09/05/2016 17:25
À :	ostst; ostst-users	
Cc :		
Objet :	Jason-1 Version E GDR Release Notice	

Dear OSTST,

We are pleased to announce that reprocessing of all Jason-1 data, as version "E", is now complete and available for download. This release includes reprocessed data from primary, tandem, and geodetic mission phases, which spans 2002-2013 and includes repeat cycles 1-373, 500-537.
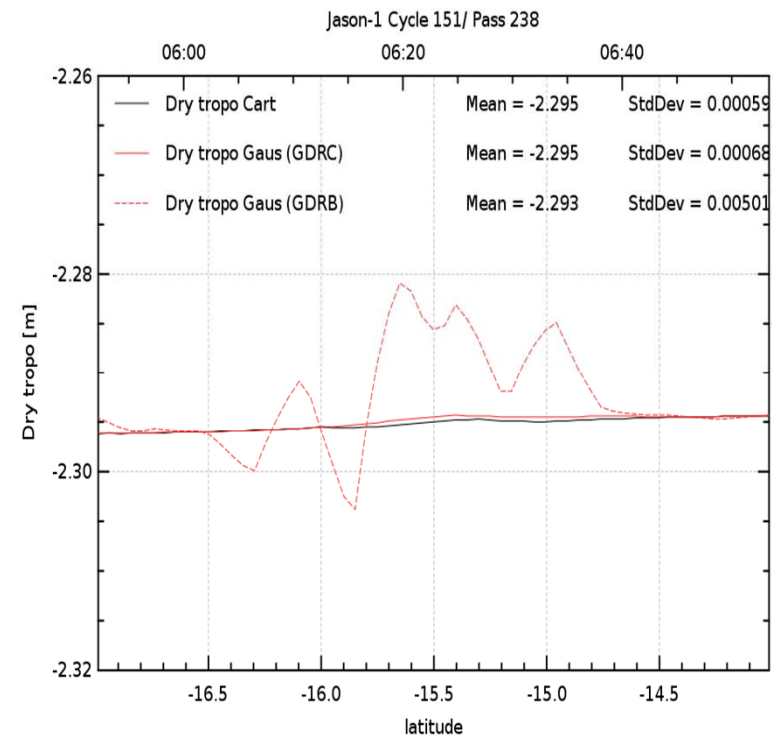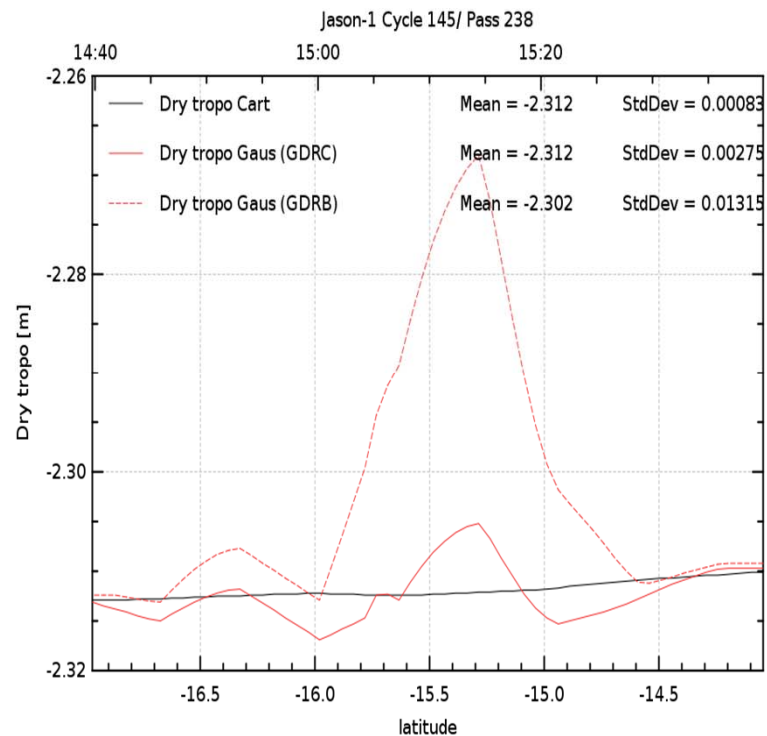
This new release takes into account user and cal/val feedback from last year's beta release.
Products from this updated release have creation dates ("history" parameter on products) of January 2016 and later.
Products from the last year's beta release have creation dates in 2015, and should be discarded.

The reprocessed data are now available as version "E" GDR data products at the AVISO and PODAAC ftp sites as follows:
ftp://avisoftp.cnes.fr/AVISO/pub/jason-1/
ftp://podaac.jpl.nasa.gov/allData/jason1/L2/

- One anomaly on the dry tropospheric (see next slides)

JA1 GDR Reprocessing Status – Dry Tropo

➢ Oscillations in dry troposphere correction **were clearly visible in Jason-1 GDR-B** data when approaching coasts. The amplitude of these oscillations were more important before the change of ECMWF grids model on 2006-02-01 (corresponds to cycle 150)

➢ These oscillations were reduced but still visible before cycle 150 (and they disappeared after cycle 150) in GDR-C data thanks to the use of reprocessed ECMWF **(update 'Met Script' no modifications of the ECMWF fields)** data between 2002-01 and 2007-03-07)

➢ As dry troposphere correction were copied from GDR-C in GDR-E, **this phenomenon is also visible in GDR-E**

Jason-1 Cycle 145/ Pass 238

	Mean	StdDev
Dry tropo Cart	Mean = -2.312	StdDev = 0.00083
Dry tropo Gaus (GDRC)	Mean = -2.312	StdDev = 0.00275
Dry tropo Gaus (GDRB)	Mean = -2.302	StdDev = 0.01315

Jason-1 Cycle 151/ Pass 238

	Mean	StdDev
Dry tropo Cart	Mean = -2.295	StdDev = 0.00059
Dry tropo Gaus (GDRC)	Mean = -2.295	StdDev = 0.00068
Dry tropo Gaus (GDRB)	Mean = -2.293	StdDev = 0.00501

The use of the sea pressure fields over ocean allows to correct these oscillations (red curve)
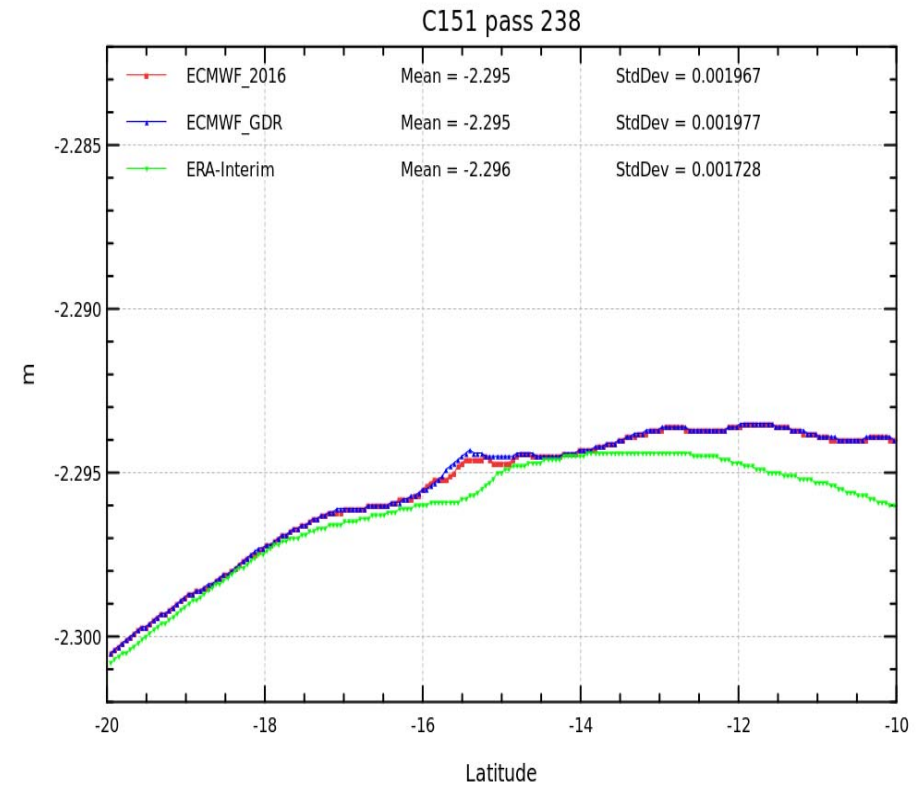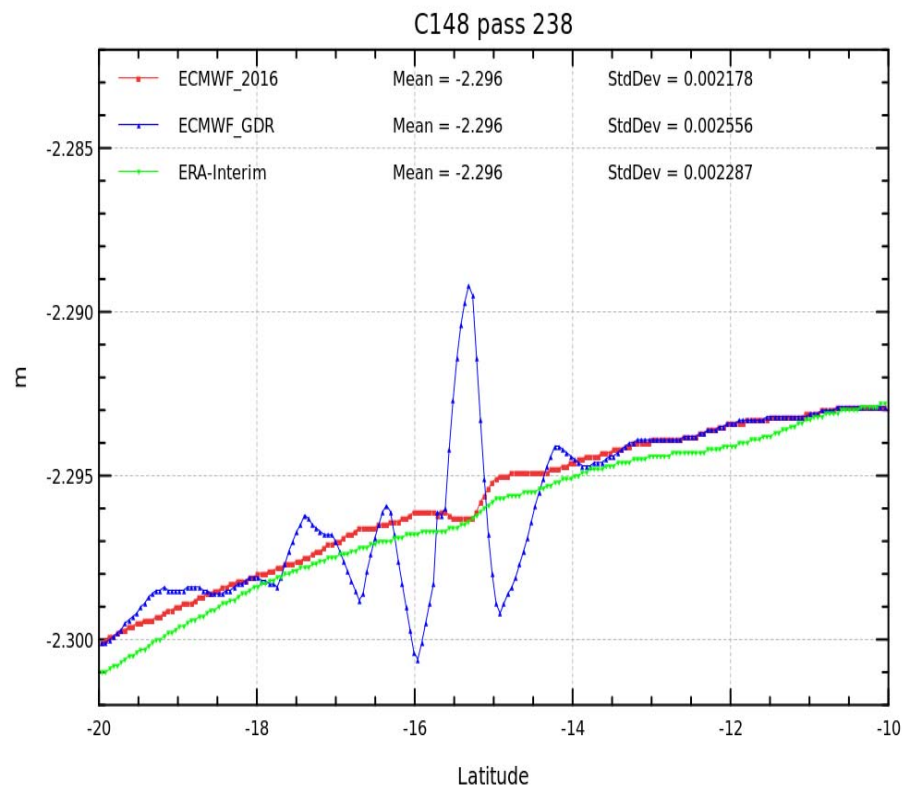
➢ Oscillations that were visible on ECMWF minus ERA-Interim difference near coasts before cycle 150 (light blue) are no more visible when sea pressure fields are use over ocean

➢ We propose to patch Jason-1 GDR-E netCDF with a recomputed dry troposphere correction solution.

➢ We propose to compute dry troposphere correction with:

    ✓ the surface pressure ECMWF fields over land

    ✓ the sea pressure ECMWF fields over ocean

Mean of DRY_TROPOSPHERIC_CORRECTION difference
Mission j1

	Mean	StdDev
C148: ECMWF_2016 - ERA_INTERIM	Mean = -0.02737	StdDev = 0.02217
C148: ECMWF_GDR - ERA_INTERIM	Mean = -0.04698	StdDev = 0.1011
C151: ECMWF_2016 - ERA_INTERIM	Mean = -0.04652	StdDev = 0.04682
C151: ECMWF_GDR - ERA_INTERIM	Mean = -0.0467	StdDev = 0.06727

Coastal Distance (km)