GDR Status

CNES, NASA,
NOAA, EUMETSAT

OSTST meeting - Seattle

From all 4 MSEs

GDR status – 'C' standard

- **GDR_C standard is today used by all flying missions (JA1, JA2, ENVISAT)**
  - Provide very good metrics
  - CalVal session demonstrated that JA1 and JA2 agreed within a few millimeters, and JA2/ENVISAT within 1 to 2 centimeters (excluding biases)
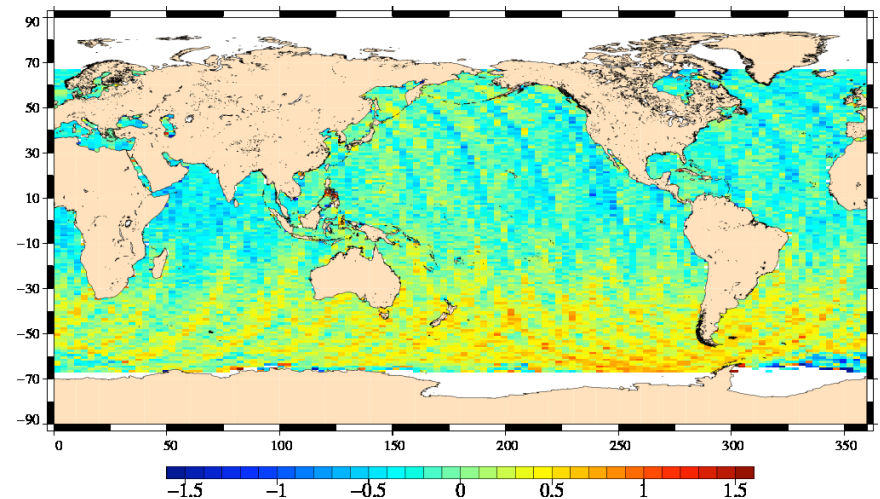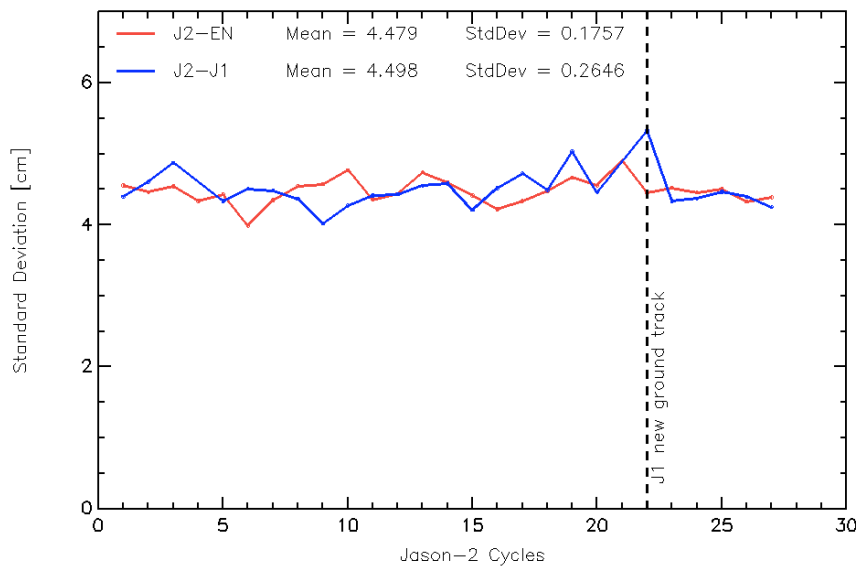
- **Even if some improvements can be implemented (retracking, retrieval algorithm, orbit solutions, tides, …), we have to keep in mind that**
  - We need to provide a continuous data set to end users (one of the major recommendations from Seamless transition analysis)
  - JA1 GDR_C reprocessing is not completed yet
  - ENVISAT GDR_C reprocessing will be started this year
  - GDR_C standard will be used for Topex and ERS1/2 reprocessing, and by the new one (CryoSat2 - SARAL/AltiKa)

- **GDR_C is so a common standard between all missions and PIs and users need time to analyze in details the GDR_C data set**

- **Further work is required on most of the promising techniques**

- **Our recommendation is to disseminate current GDR products (as version "T") to all users with the appropriate product disclaimer :**
  - Rain flag
  - Some flags that are not meaningful
  - Non equilibrium long period tides (impacting Jason-1 also)

- **Jason-2 product spec evolution is under review at 4 partners level. This version (v3.0) includes :**
  - O/I/GDRs products evolutions like :
    - New amr fields (S. Brown) : amr_rain_flag, amr_ice_flag, amr_land_flag, amr_coastal_path_delay
    - rain flag computation based on the MLE3 retracking algorithm
    - Ice flag included in SSHA products
    - Manoeuvre and orbit quality flag to be added/reviewed
  - SGDRs evolutions to support easier processing expertise (coastal dedicated processing) :
    - Additional altimeter parameters to allow to test new retracking techniques (e.g. MLE3 and MLE4…)
    - Additional radiometer parameters to allow to test retrieval techniques
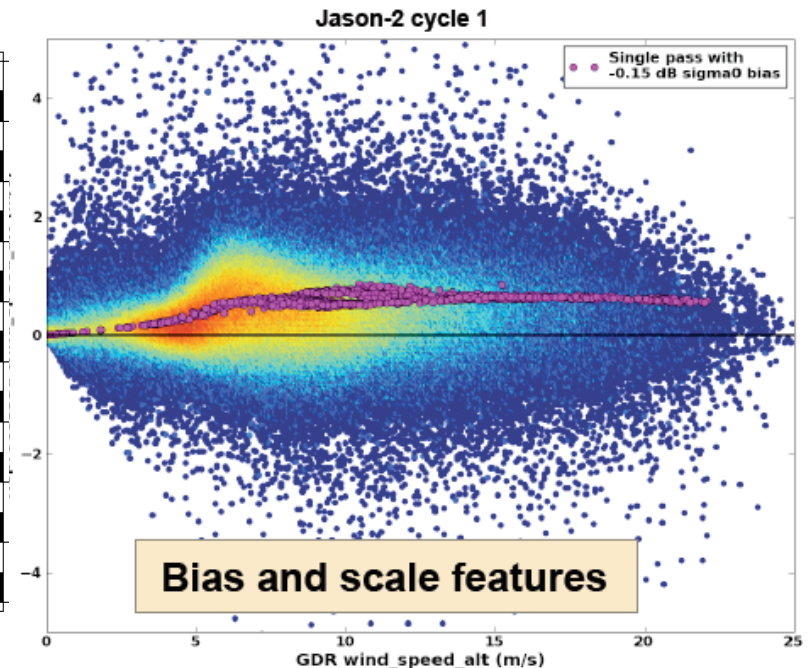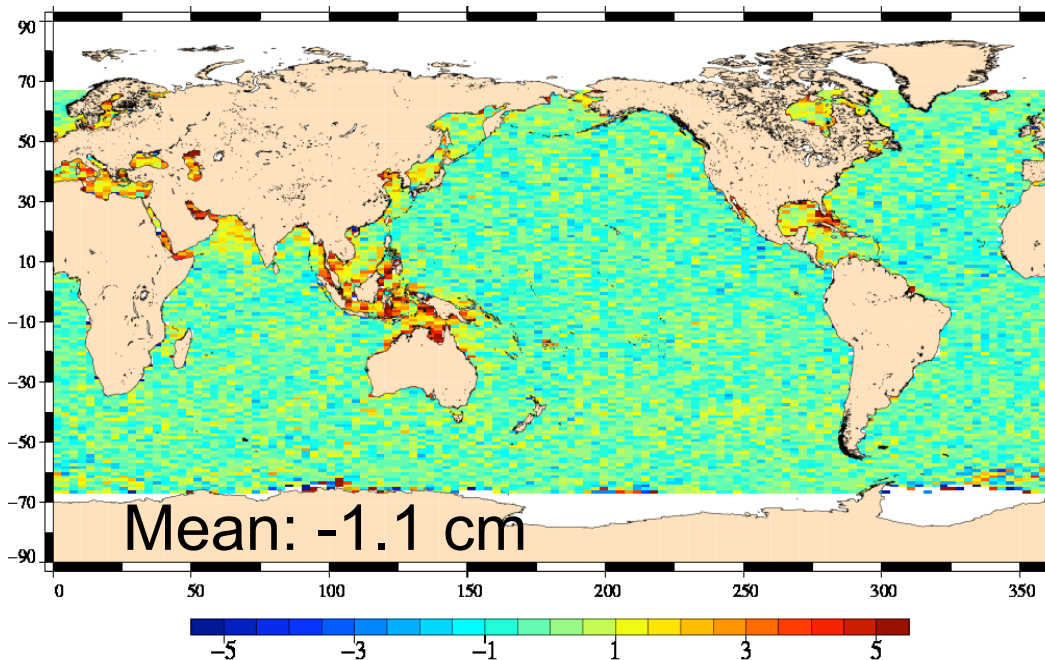
- **We will start the GDR official release preparation (including the reprocessing of all past cycles) with the following corrections/ evolutions:**
  - O/I/GDRs Products evolutions described above
  - AMR evolutions based on coastal path delay algorithms (Brown, instrument splinter meeting)
  - Altimeter rain flag based on the MLE3 method (instrument splinter meeting) including the computation of the sigma0 Ku/C tables. All MLE3 retracking parameters being provided inside SGDR products
  - Altimeter characterization file update (instrument splinter meeting) :
    - PTR more precise value
    - antenna aperture angle
    - MQE setting
    - gain values used for the calibration processing,
    - tracker_range_res more precise value
  - Altimeter instrumental correction (using onboard altimeter calibrations values)

- **GDR evolutions, cont' :**

  – Wind tables : will be recomputed and compared to Jason-1 values. We expect to use the same algorithm and table (Jason-1 GDR-C) on both missions and so to align the Jason-2 sigma0 mean value on Jason-1 mean value to be computed on Jason-2 SWH/sigma0 values)

  – SSB update : will be recomputed and compared to Jason-1 values. We expect to use the Jason-1 GDR-C table on both missions.

Wind Speed J2-J1

Mean: -1.1 cm

Jason-2 cycle 1

Single pass with -0.15 dB sigma0 bias

Bias and scale features

GDR wind_speed_alt (m/s)

- **GDR evolutions, cont' :**
  - Use of '0' off nadir value for the C band retracking (today based on Ku band retracking value)
  - LTM computed on a sliding window of 7 to 10 days to reduce the noise (2 to 3 mm on the altimeter range – impacts also the SWH and wind)
  - Add a maneuver flag
  - Flags tuning
  - Implement the GOT 4.7 new tide model (improvement demonstrated in past Coastalt workshops and again during this OSTST)
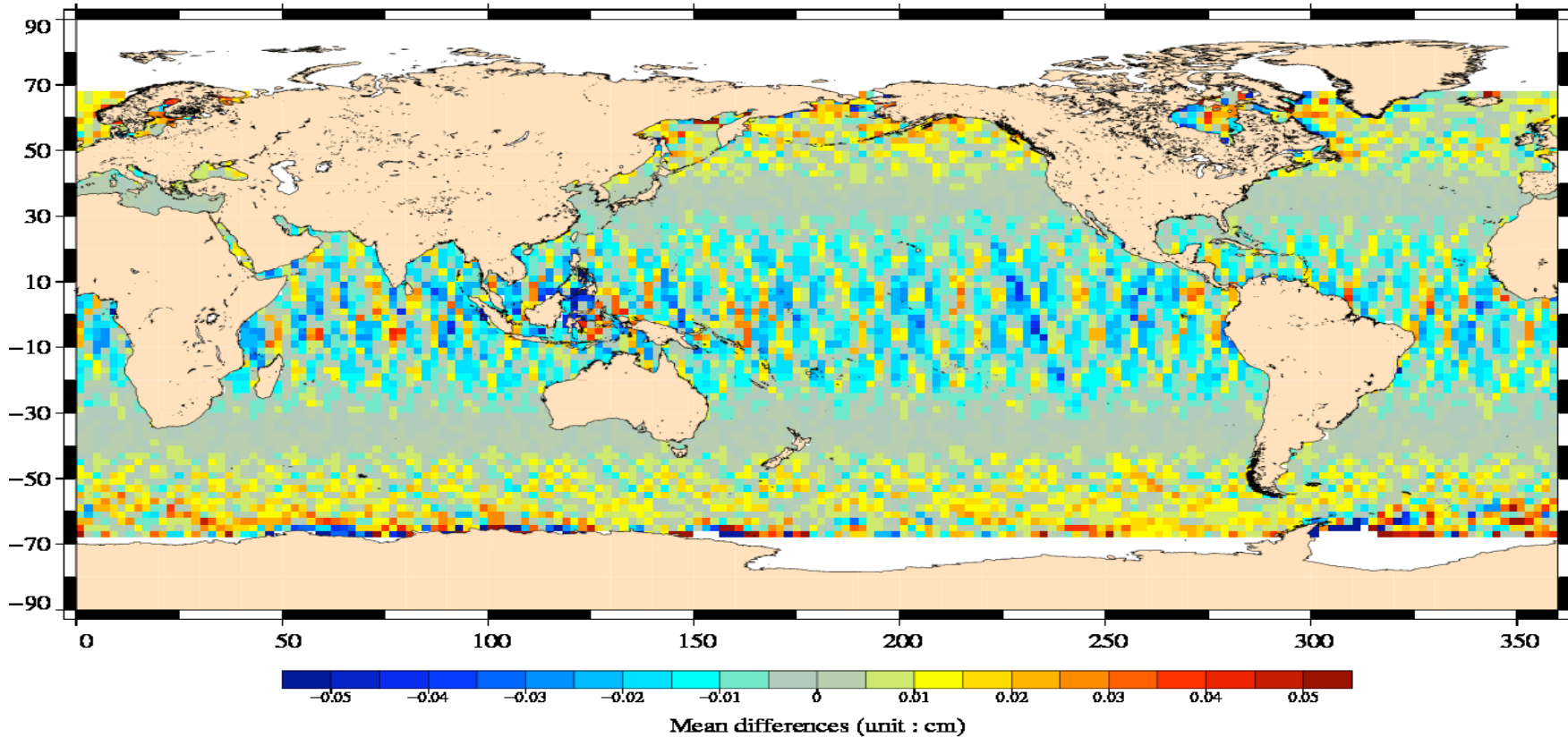 - Correct for the pole tide (error on inland waters)

Non equilibrium long period tides

- **GDR evolutions, cont' :**
  - Correct for the non equilibrium long period tides

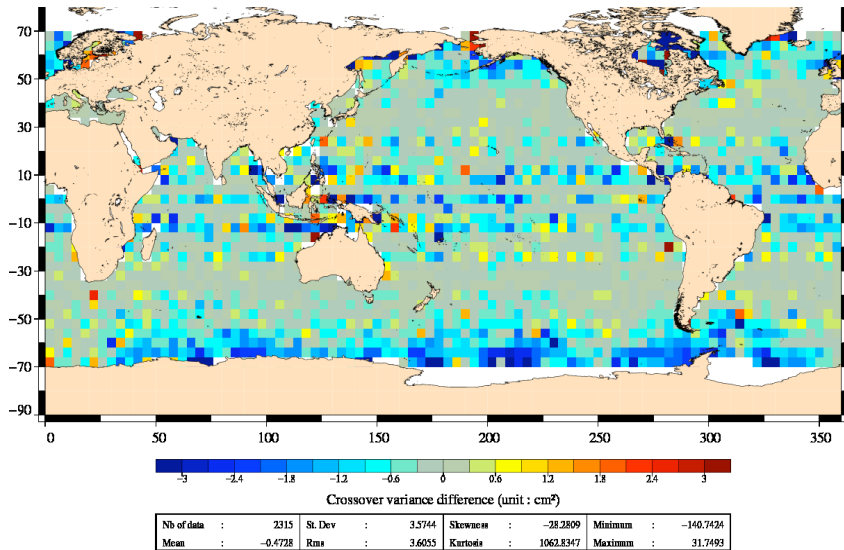**Mean of differences** : MAR_FES_corrected – MAR_FES_uncorrected
MAR_FES99 – MAR_FES95 mean differences
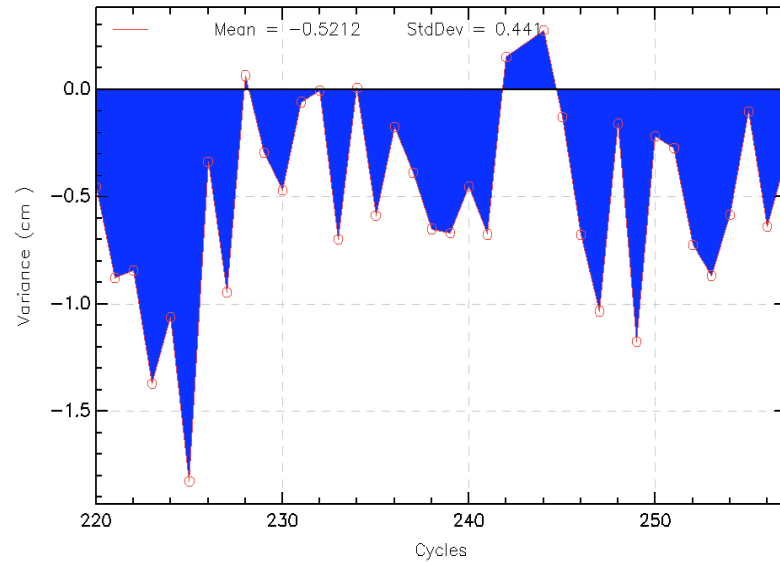Mission : J1, cycle 220 to 257

Var(X_SSH VarEtu) – VAR-X_SSH with VarRef)

Difference of SSH crossover variance

| Nb of data | : | 2315 | St. Dev | : | 3.5744 | Skewness | : | -28.2809 | Minimum | : | -140.7424 |
| Mean | : | -0.4728 | Rms | : | 3.6055 | Kurtosis | : | 1062.8347 | Maximum | : | 31.7493 |

These figures show that the differences between the 2 algorithms are small.

On the right figure, the difference of SSH crossover variance shows the impact of the updated correction. These differences are small but measurable.

- **Jason-2 GDR_C products will be inline with Jason-1 GDR_C apart for :**
    - The tides parameters (GTO 4.7, Non equilibrium long period tide, pole tide)
    - Coastal wet path delay algorithm

    - Recalling also that Ku band altimeter range will be shorten by 2.471 cm → the sea level will be higher
- **Tentative schedule :**
    - Implement all evolutions by early 2010, validate at 4 partners level the accuracy of the evolutions
    - Start reprocessing (backlog) of all past cycles (including cycles 998 and 999) in order to provide to PIs an homogenous data set from June 2008 to June 2010 some months before the 2010 OSTST meeting.

- **2 major origins**
  - Truncate PRF is used in ground segment
  - Difference in the characterization parameter set (from ground measurement)

Parameter	JASON1	JASON2	JAS-1/JAS-2 Difference
PRF truncate effect	-0.316 cm	-2.471 cm	-2.156 cm
Alti correction for Ku band	4.151466 m	4.268487142 m	11.70211423 cm

  - Total difference for Ku band : 9.5 cm (CalVal difference for Ku Band : 8.3 cm)
  - Remaining Difference in Ku Band ~ 1.2 cm

- **Conclusion :**
  - Poseidon2 and Poseidon3 are very close in term of hardware, the difference of range between JASON1 and JASON2 is artificial and explained ---->

  Remaining difference in Ku band : ~ 1cm

  - Investigations are still in progress to explain the difference between Jason1/2 and Topex