Global Cross-Calibration of Jason-1 & Jason-2 Sea Surface Height

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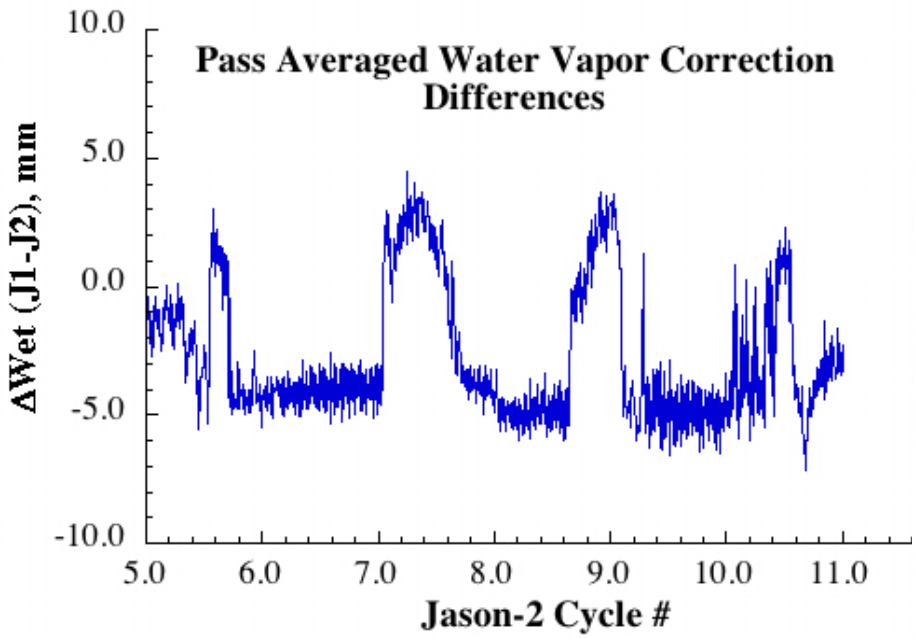
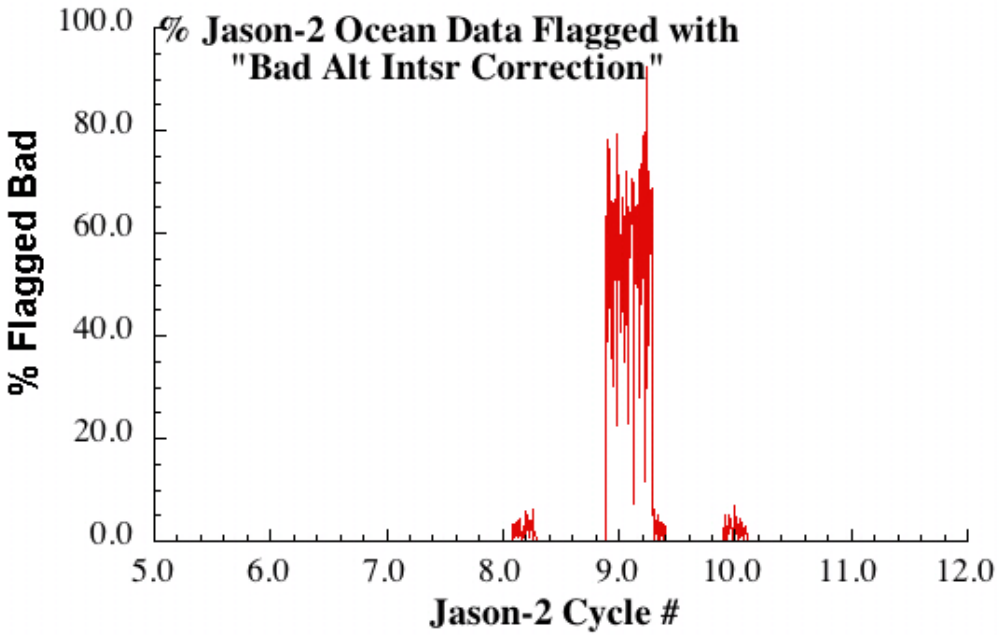
Ocean Surface Topography Science Team Meeting

Nice, France, 10-12 November 2008

Data

- Jason-1 and Jason-2 IGDRs data (J2 Cycles 1-11)
  - » Change from IGDR-C to IGDR-C' processing in Cycle 4
  - » Very little data for J1 in Cycle 4 due to SEU
- No bias applied to Jason-1
- 1-sec SSH data interpolated to same reference track using along-track MSS model
  - » All corrections applied except wet troposphere

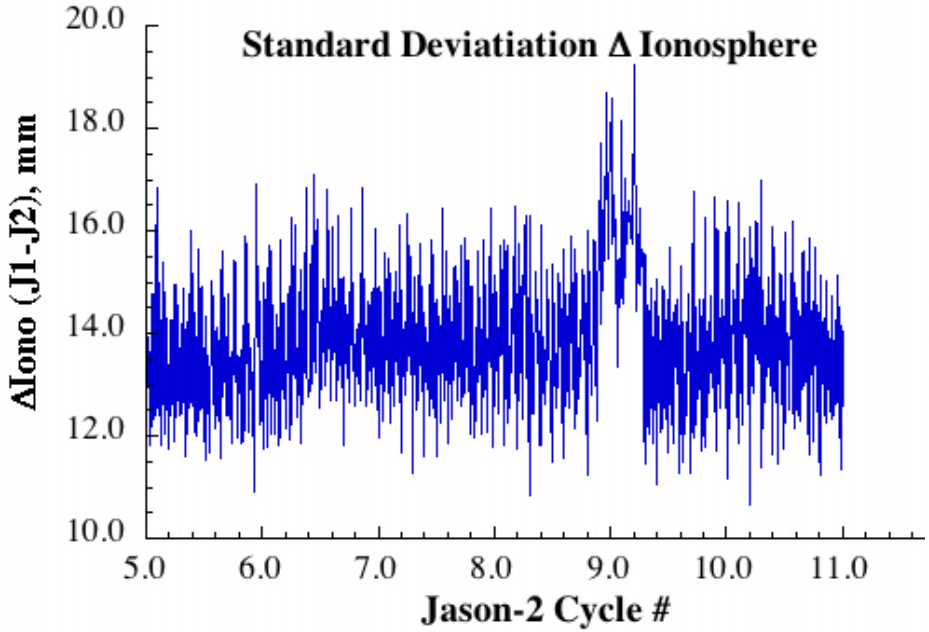


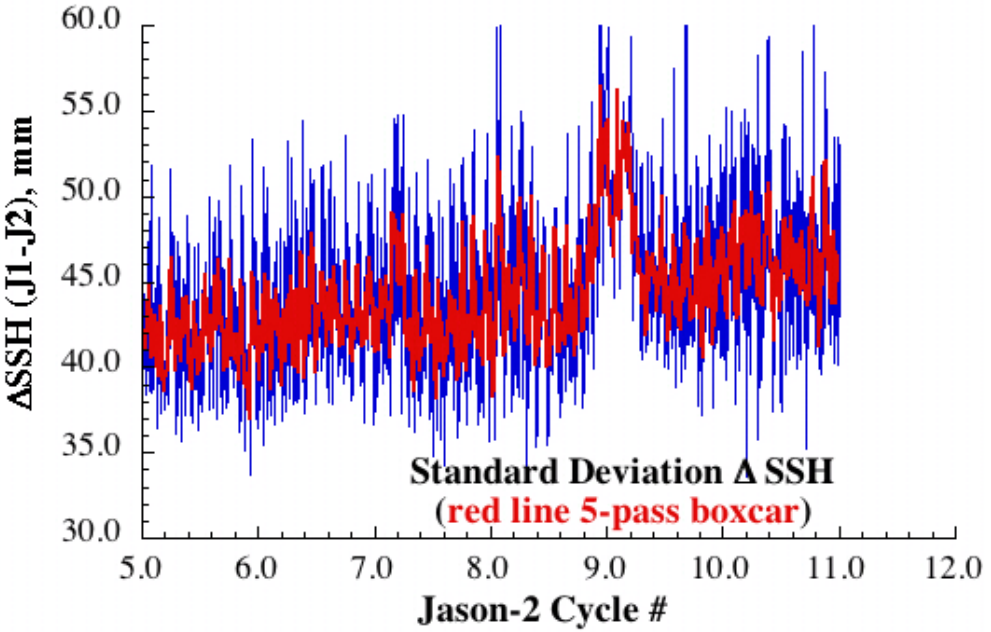


- Jumps in wet tropo correction affect bias and standard deviation
- Statistics better if correction not used
- Jumps appear to be in JMR (not JMR2) based on comparisons to ECMWF model

- Do not use passes 226-254 Cycle 8 & passes 1-73 Cycle 9
- Either reduced number of observations affects statistics, or not all data properly flagged

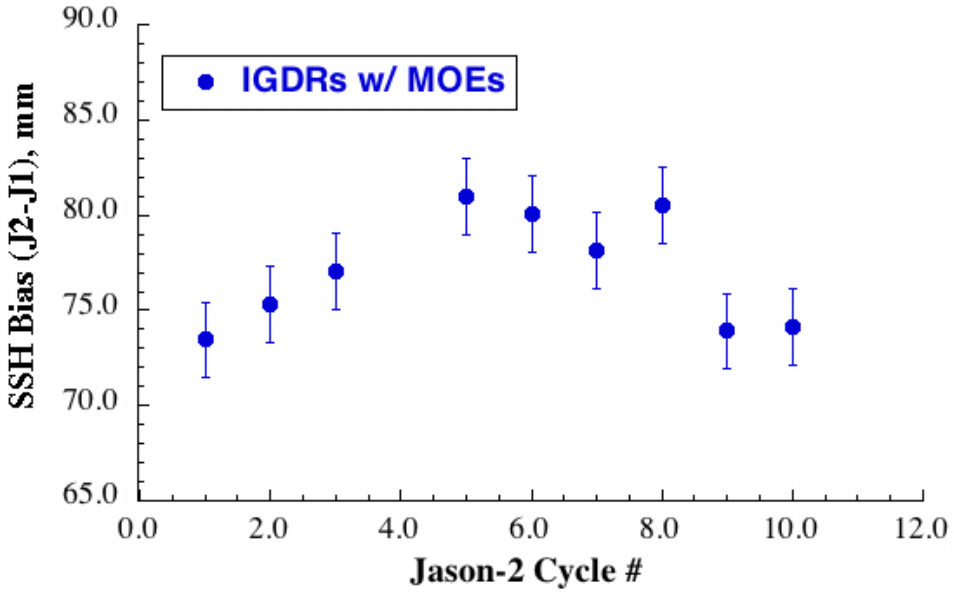
Pass-Averaged Statistics

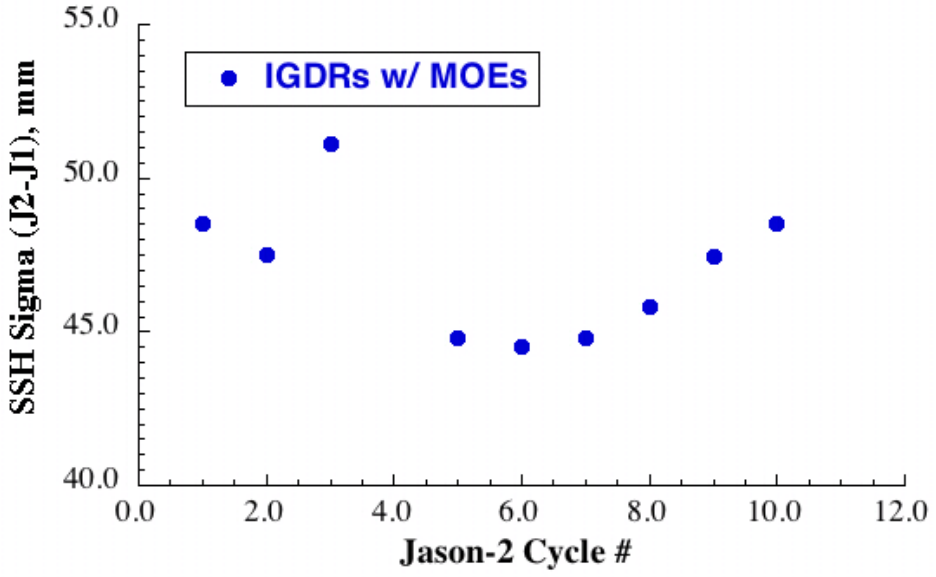




- Period with bad J2 altimeter corrections corresponds to poorer statistics
  - » Although ionosphere correction sigma returned to normal, ΔSSH standard deviation did not and is higher after event

Cycle-Averaged Statistics



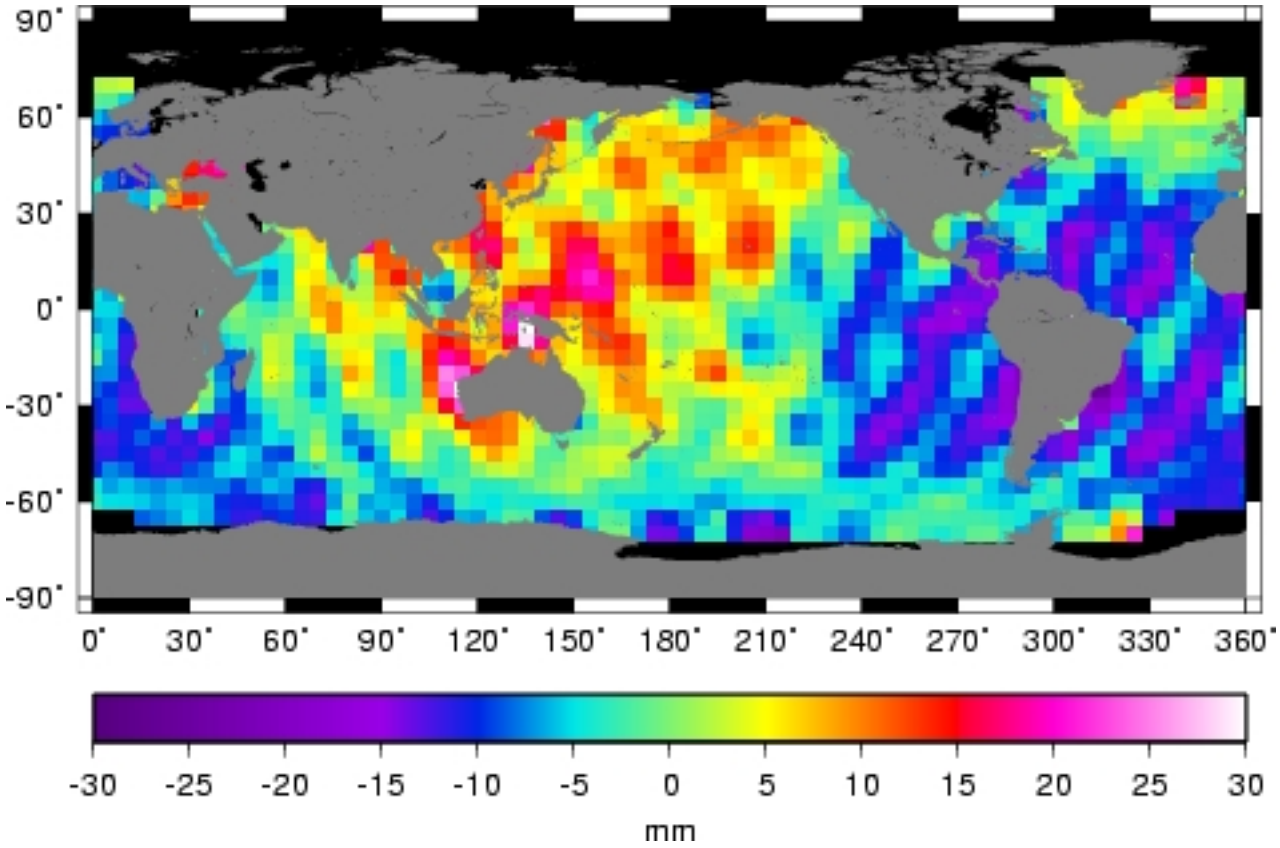


Mean

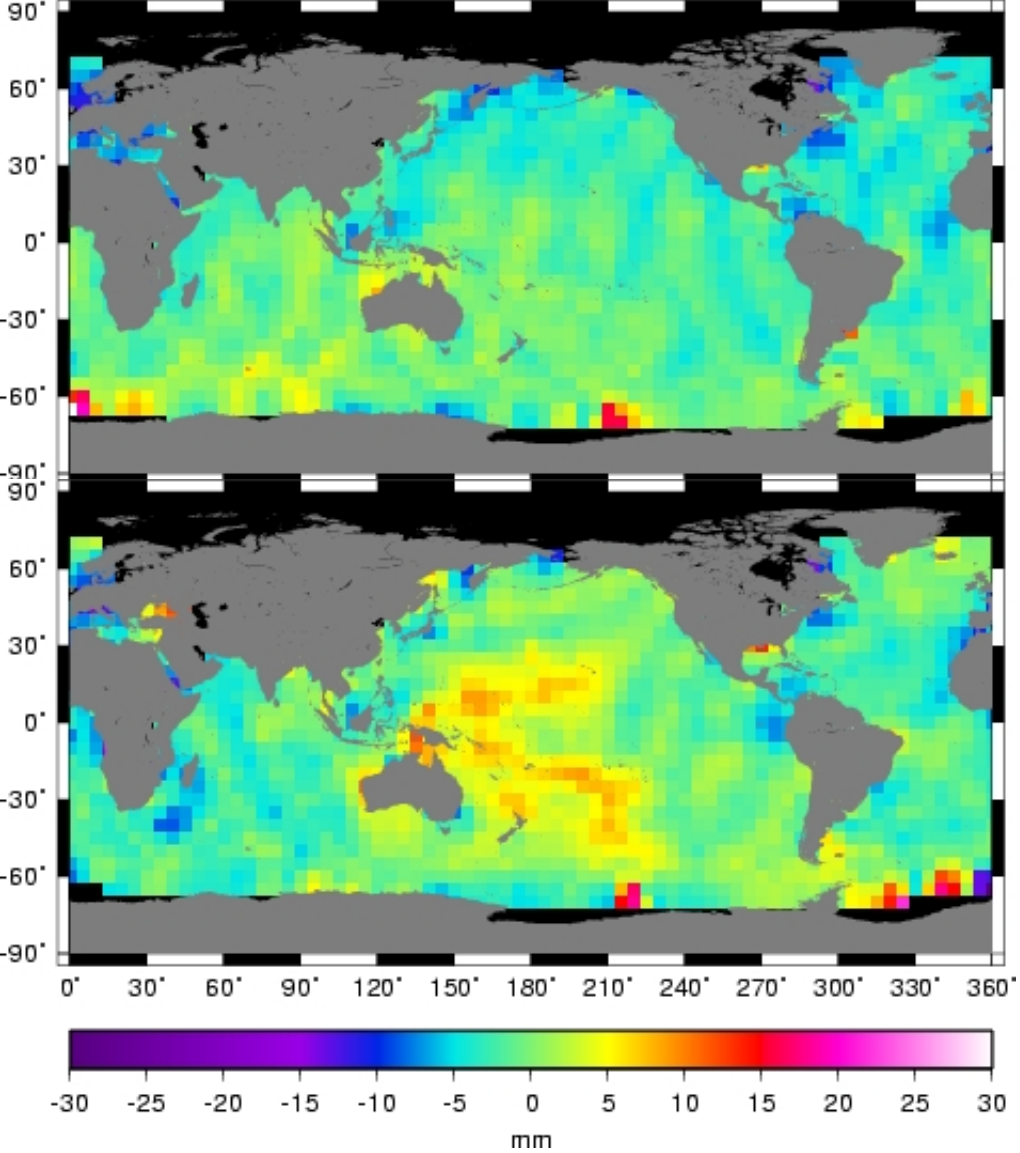
Standard Deviation

- The global relative bias for IGDR-C' data (Cycles 5+) is ~ **80 mm**
  - » Jason-2 SSH higher than Jason-1
- Mean standard deviation is **47 mm**

Map of Relative Bias (J2 - J1)



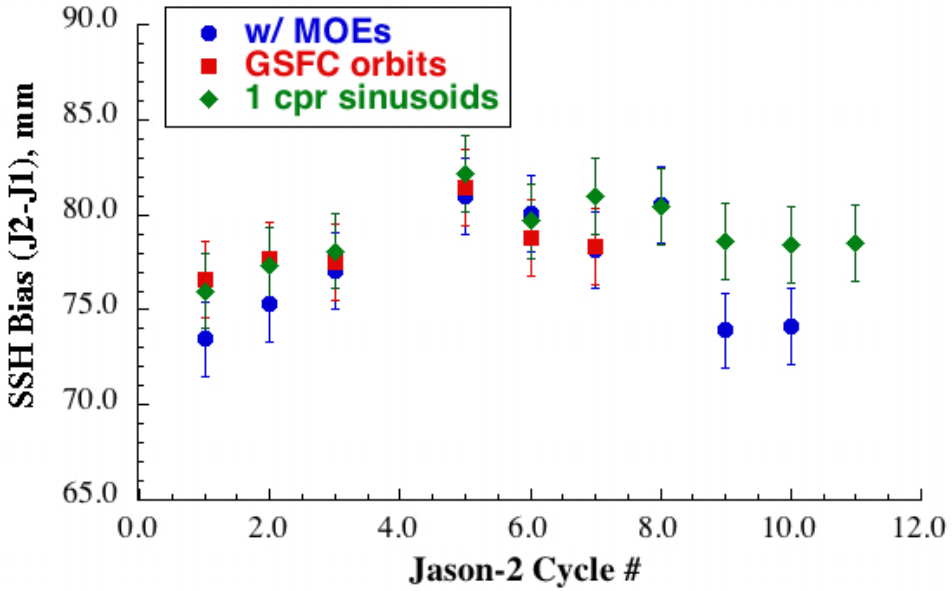
- Significant geographically correlated departures from global mean of **80 mm**
- Probably related to limited accuracy of MOEs

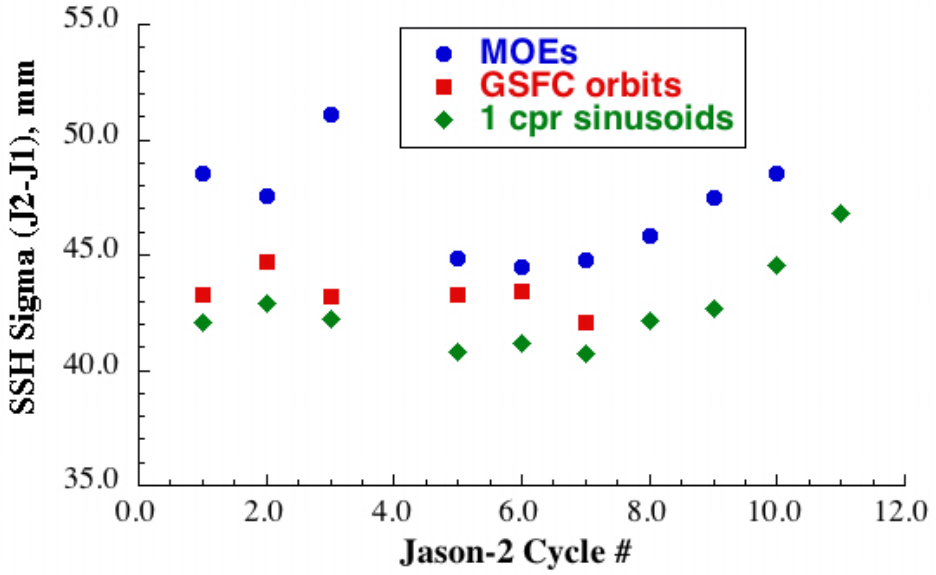


- **Cycles 1-7:** replace orbits with POEs from GSFC [Lemoine et al., 2008]
- **Cycles 1-11**: Model and remove 1-cycle-per-revolution sinusoids from SSH residuals (each revolution) to correct for orbit error

- Both relative to global mean of **80 mm**

Cycle-Averaged Statistics

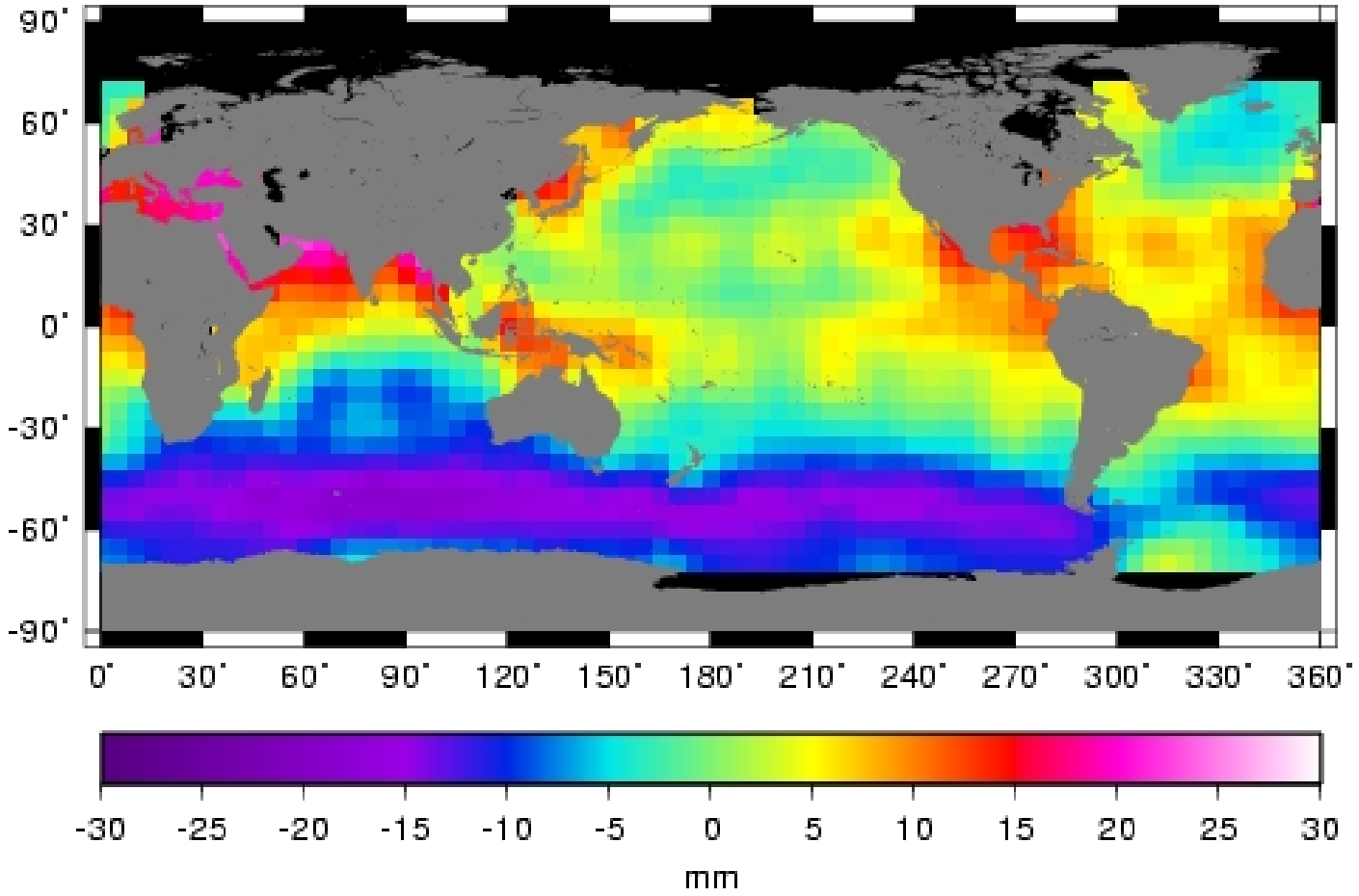




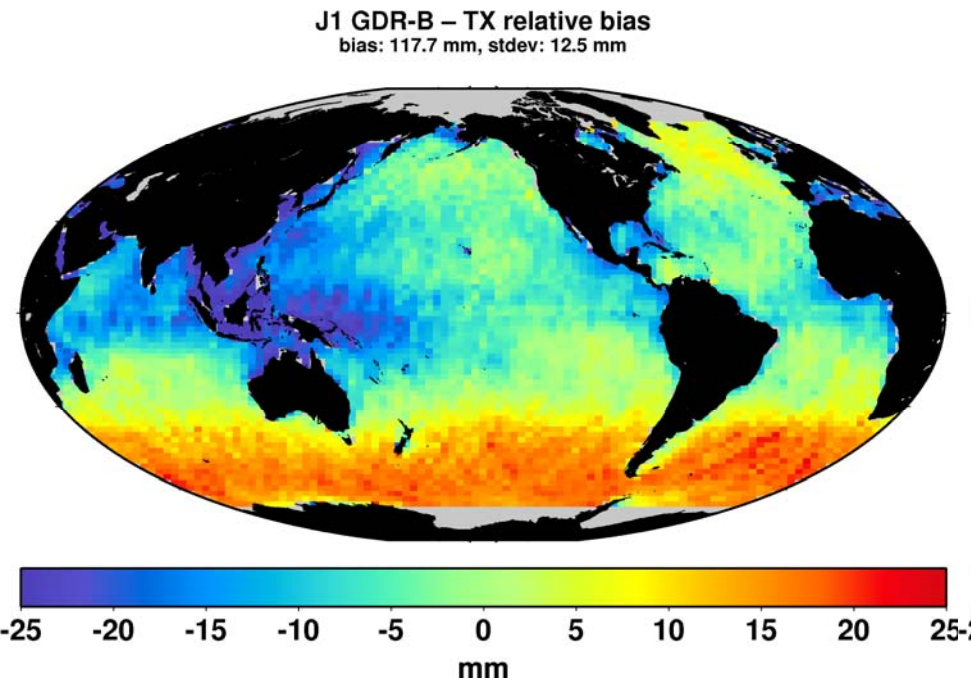
Mean **Standard Deviation**

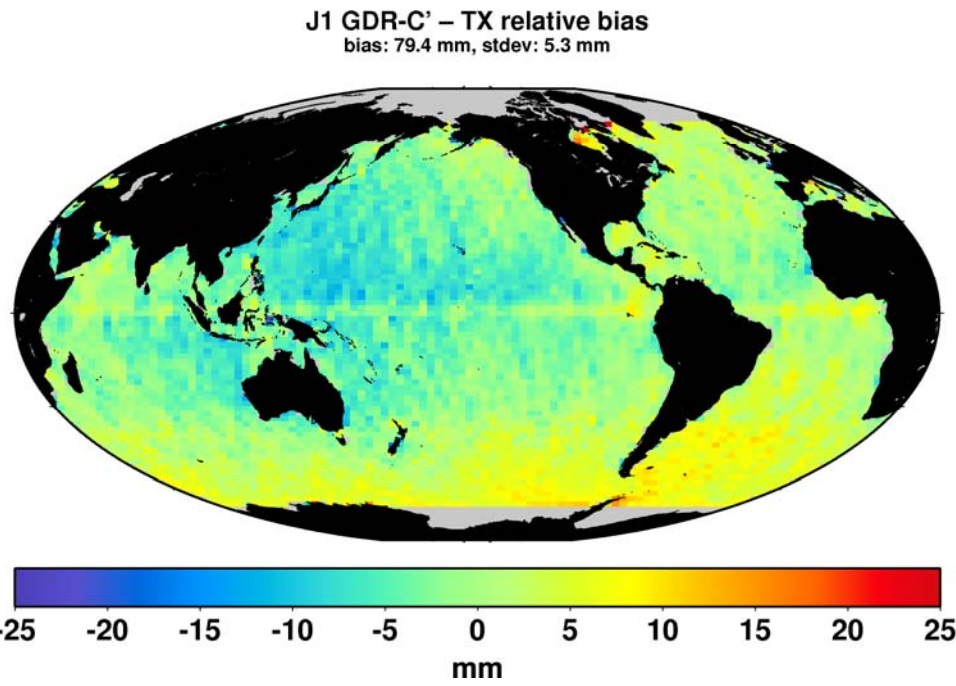
- After "correcting" for orbit error, IGDR-C' bias is **80 ± 2 mm** (J2 SSH higher than J1)
- Mean standard deviation for Cycles 1-8 is **43 mm**
- Standard deviation is increasing after Cycle 8

GDR-C versus GDR-B



- Average of J1_GDR-C' - J1_GDR-B (Cycles 219-232) SSH relative to a global mean of **40.0 mm**





J1 GDR-B - TOPEX (c1-21) **J1 GDR-C' - TOPEX (c1-21)**

- Courtesy Eric Leuliette and Remko Scharroo
- TOPEX data corrected for TMR wet troposphere jumps, a new CLS sea state bias model, and new GSFC orbits using ITRF 2005

Conclusions

- Jason-2 & Jason-1 SSH agree quite well, other than an **80 ± 2 mm** bias (J2 SSH higher than J1)
- After using POEs or a 1 cycle-per-revolution orbit error removal scheme, mean standard deviation is **43 mm**.
- Standard deviation is increasing after Cycle 8
  - » Corresponds with a problem in Altimeter correction quality flags on Jason-2. A clue?
- Jason-1 GDR-C SSB model much better than GDR-B and removes the large geographically correlated bias jumps between TOPEX and Jason-1
  - » This assumes, however, that TOPEX models have also been corrected and no “official” record exists where this has been done