Towards a Seamless Transition to New GDR Products

R. Steven Nerem (with input from Brian Beckley, Don Chambers, John Church, Shailen Desai, Eric Leuliette, Remko Scharroo, Neil White)

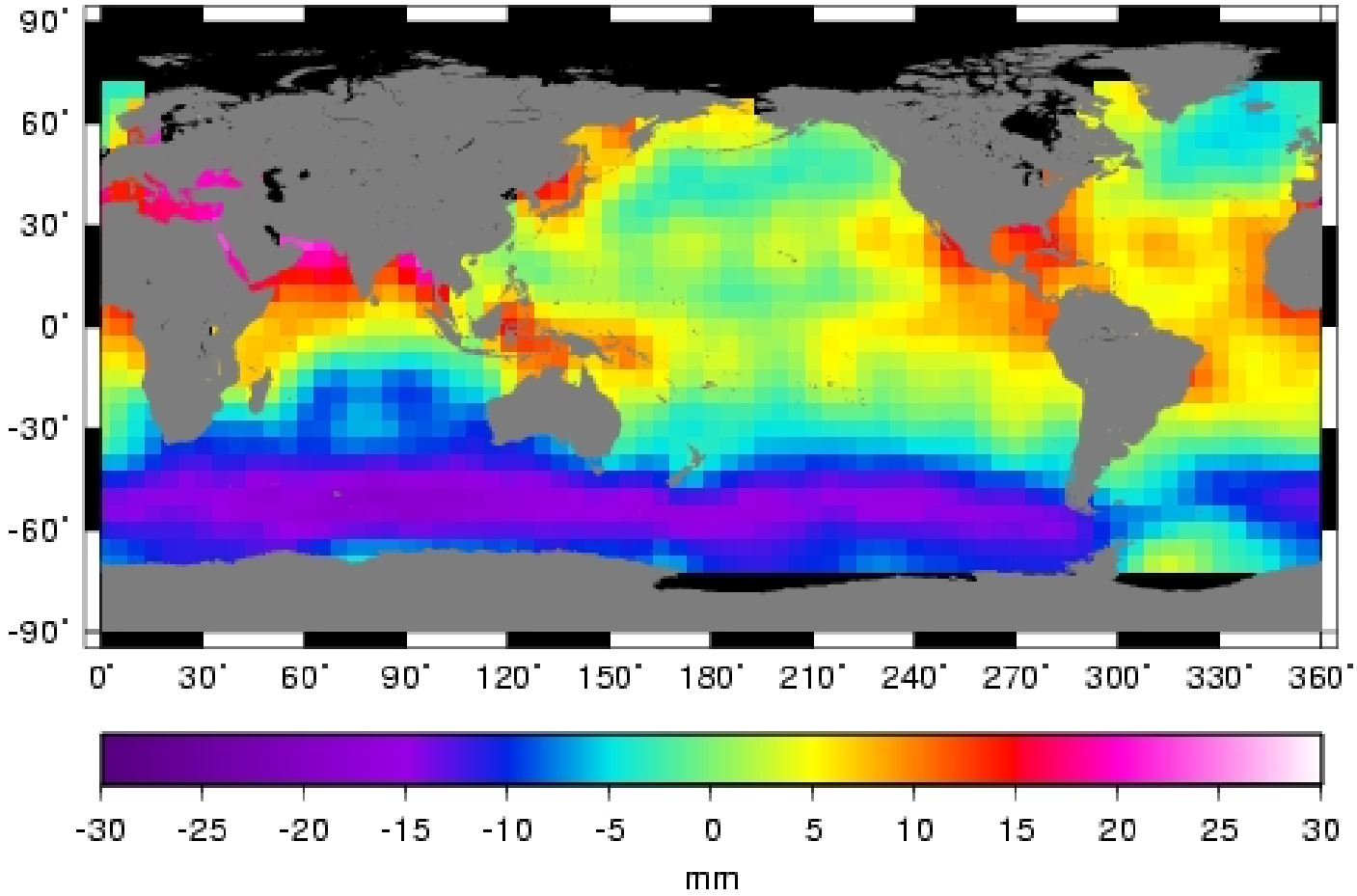
History

- July 2008 – GDR-B processing discontinued with Cycle 232, GDR-C processing initiated (Cycles 220-226) (no advance notice of this change was given, but there were prior discussions at the Hobart SWT).
- Aug 2008 – Problem with GDR-C orbits is identified, GDR-C processing halted – neither GDR-Bs or GDR-Cs are available after Cycle 232.
- Oct 7 2008 – GDR-C processing started again, anticipate completing entire mission by mid-2009. Products supplied that allow advanced users to approximately correct GDR-Bs to GDR-Cs (lets call them GDR-C').

The Problem

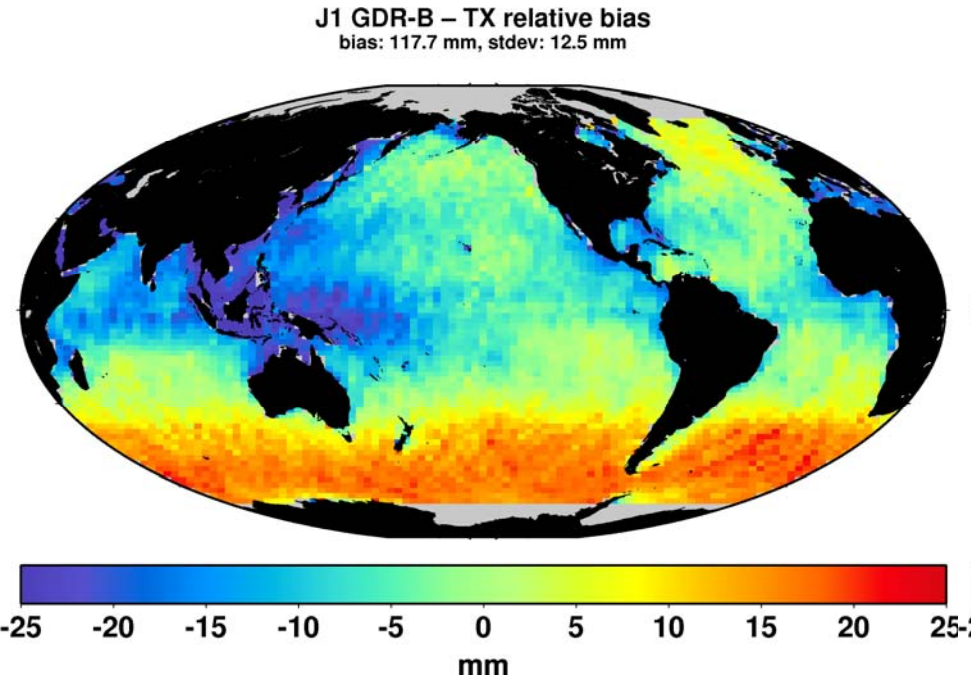
- ~40 mm offset between GDR-B and GDR-C GMSL, substantial regional variation (due largely to changes in the SSB model)
- GDR-B to C conversion products difficult to use for all but the most advanced users, and not all information required was initially supplied.
- Effectively, the switch from GDR-B to GDR-C created a new satellite which must be calibrated as such (at least temporarily).
- SSB model, because it is based on retracked GDR-B data, is still somewhat inconsistent

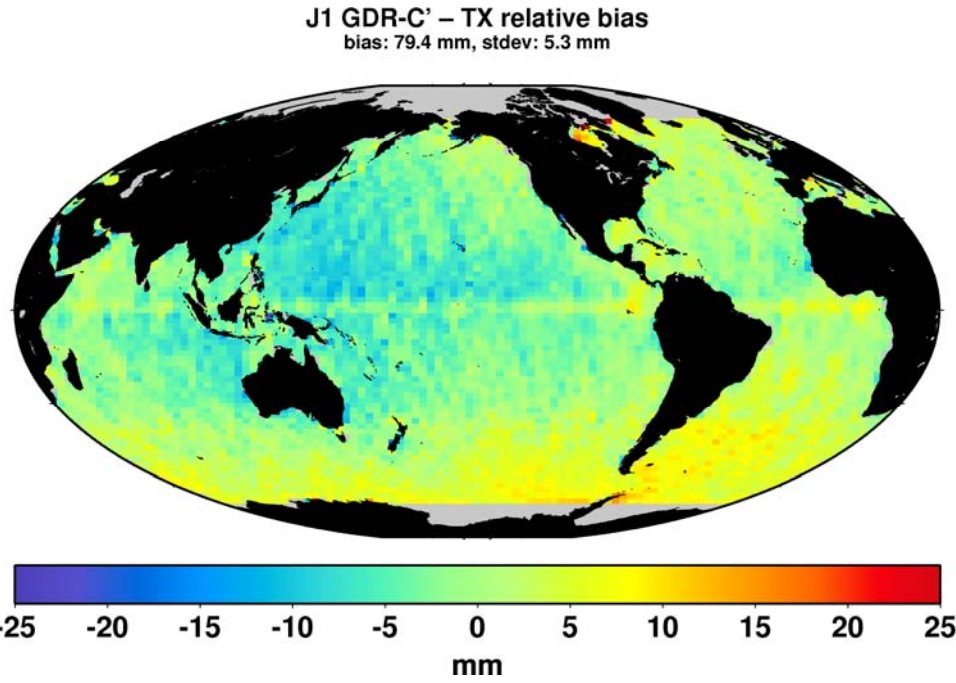
GDR-C versus GDR-B



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

Jason-1 versus TOPEX





J1 GDR-B - TOPEX (1-21)

J1 GDR-C' - TOPEX (1-21)

- 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

University of Colorado at Boulder

Sea level change

Overview

Data and Plots

- Time series
- Maps
- Interactive Wizard
- Publication requests/permissions

Information

- Release Notes
- Documentation
- Calibration
- Tide gauges
- Steric changes
- Presentations
- Bibliography
- Acknowledgments

Support

- Contact Us

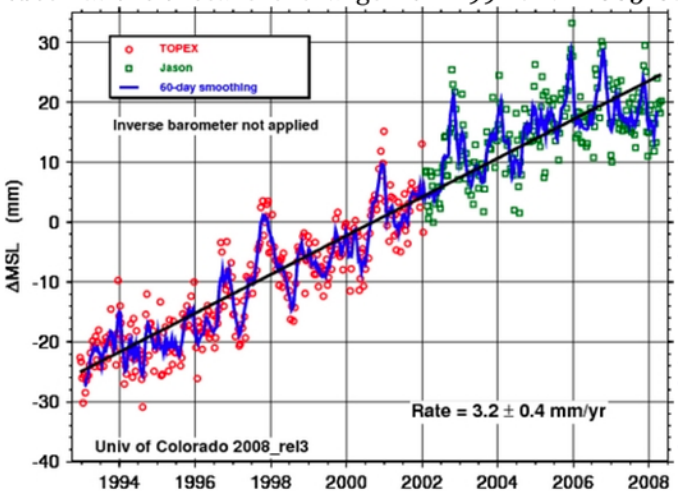
Related Links

- Altimetry
- Tide gauges
- Global change
- CCAR

Due to an interruption/delay in the Jason-1 data processing, the sea level time series on this website will not be updated until further notice. We anticipate this problem will be corrected by the end of the 2008, at which time a complete time series spanning this gap will be available. We apologize for any inconvenience that this may cause for our users. For further information, please see: Jason 1 Info.

Long-term mean sea level change is a variable of considerable interest in the studies of global climate change. The measurement of long-term changes in global mean sea level can provide an important corroboration of predictions by climate models of global warming. Long term sea level variations are primarily determined with two different methods. Over the last century, global sea level change has typically been estimated from tide gauge measurements by long-term averaging. Alternatively, satellite altimeter measurements can be combined with precisely known spacecraft orbits to provide an improved measurement of global sea level change.

Since August 1992 the satellite altimeters have been measuring sea level on a global basis with unprecedented accuracy. The TOPEX/POSEIDON (T/P) satellite mission provided observations of sea level change from 1992 until 2005. Jason-1, launched in late 2001 as the successor to T/P, continues this record by providing an estimate of global mean sea level every 10 days with an uncertainty of 3-4 mm. The latest mean sea level time series and maps of regional sea level change can be found on this site. Concurrent tide gauge calibrations are used to estimate altimeter drift. Sea level measurements for specific locations can be obtained from our Interactive Wizard. Details on how these results are computed can be found in the documentation and the bibliography. Please contact us for further information.

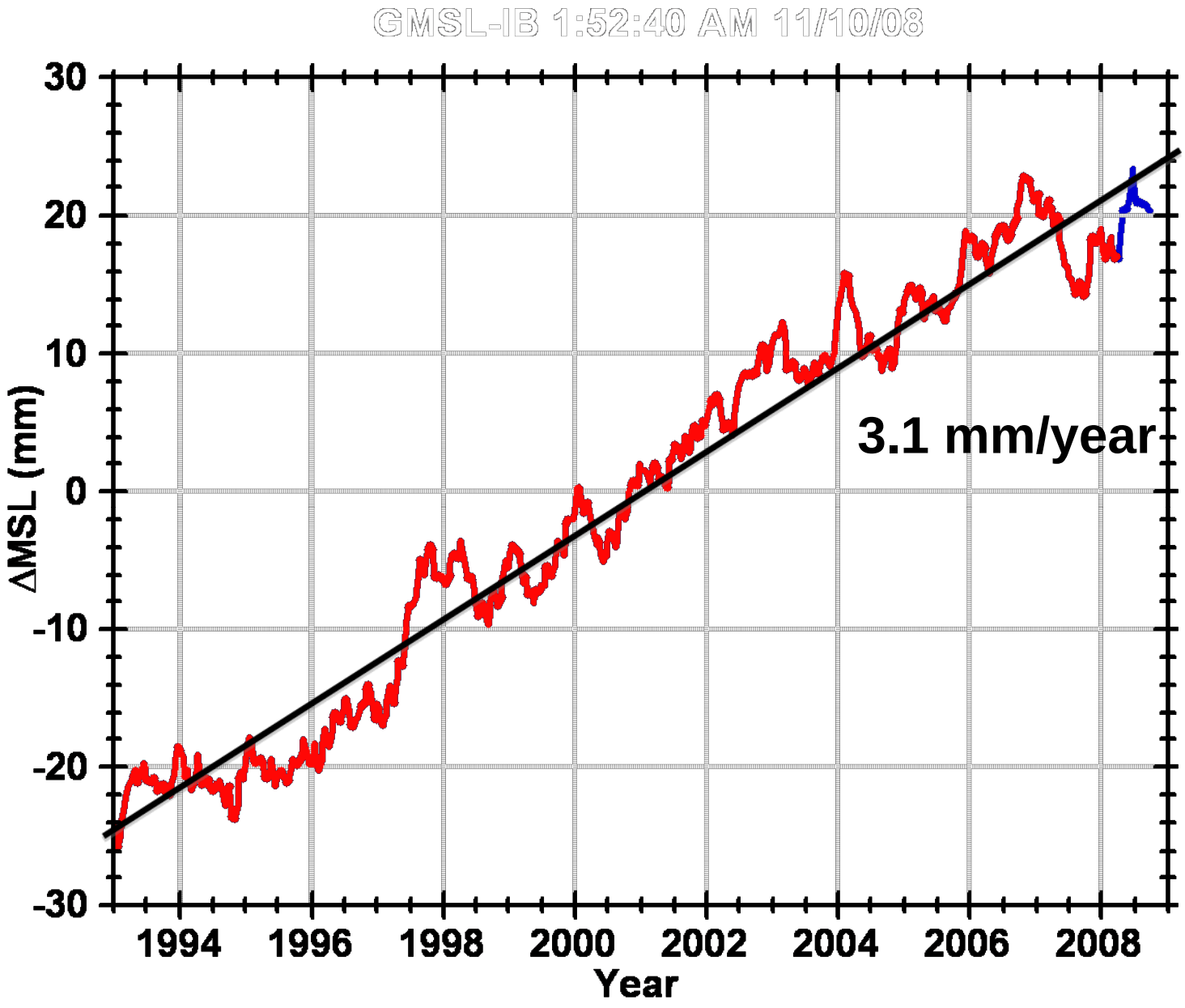


http://sealevel.colorado.edu

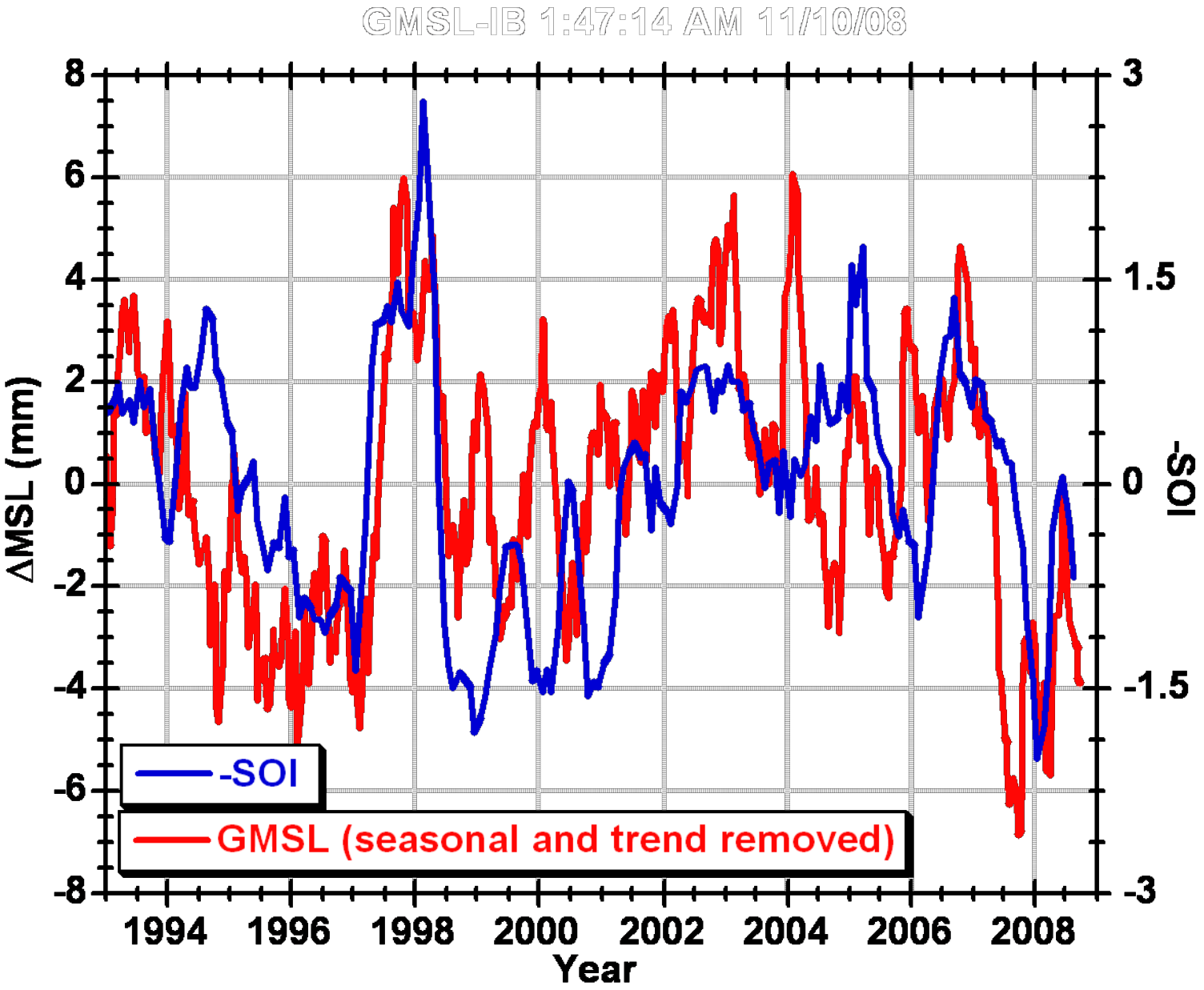
Sea Level Change

- T/P/J-1/J-2 sea level change products being used extensively in a near “operational mode” by a variety of scientists, U.S. government agencies (NOAA, DOE, EPA, etc.), private companies, schools, and other individuals.
- The interruption of these products has generated many complaints from these users, and hasn’t cast our altimeter missions in a good light.
- While one might argue that sea level change doesn’t need to be an “operational product”, many of these users view it as such.

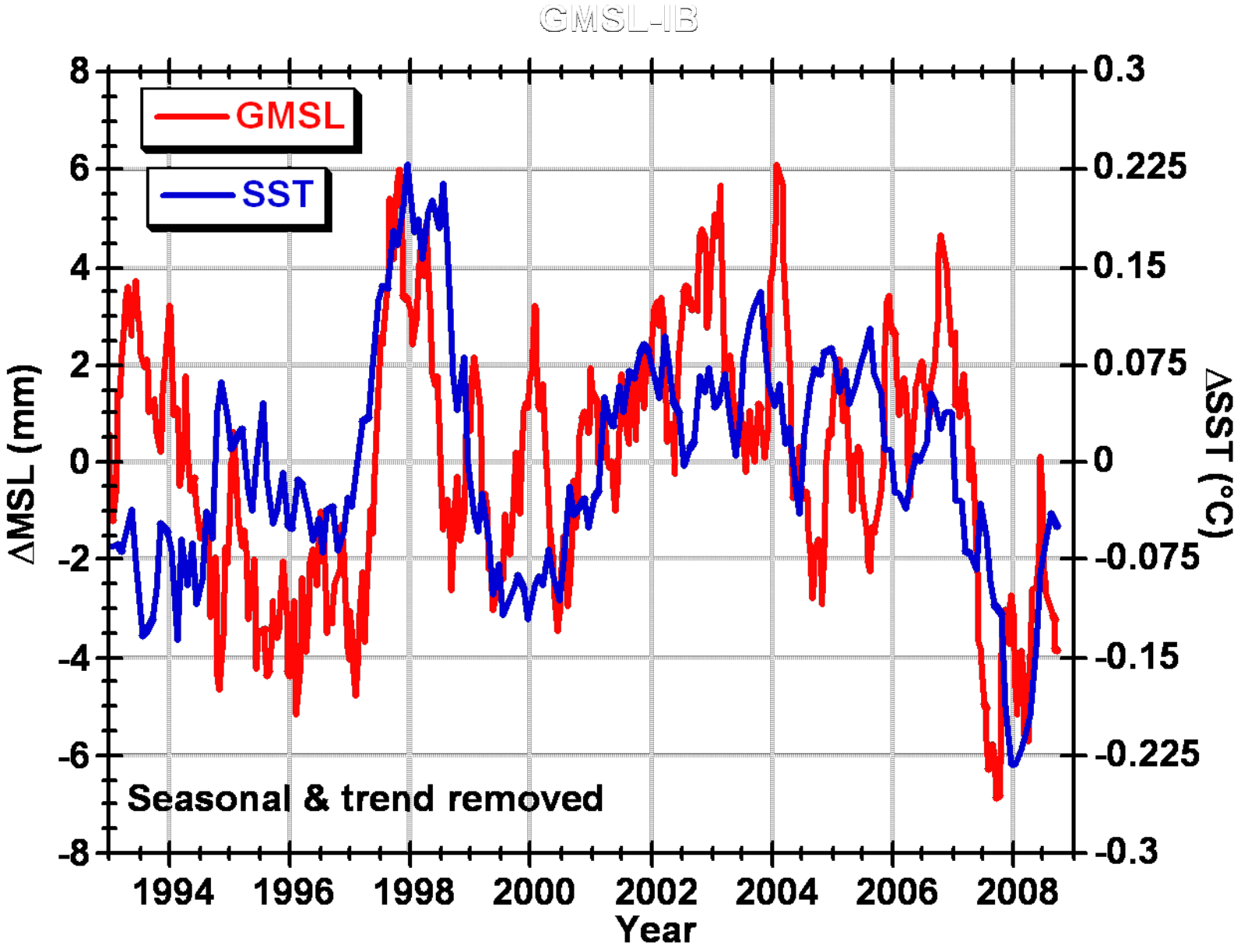
T/P and Jason-1 GMSL Variations



Interannual GMSL versus SOI

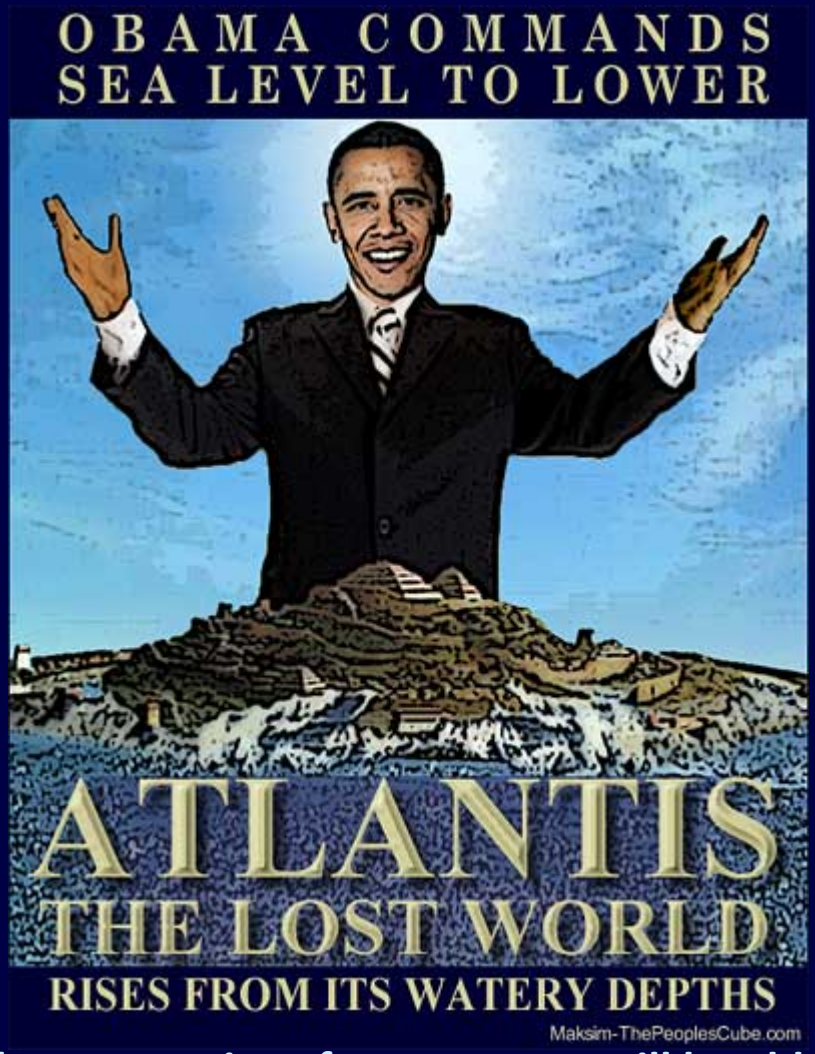


Interannual GMSL and SST Variations



Caution: The Next Two Slides are from a Climate Skeptic!

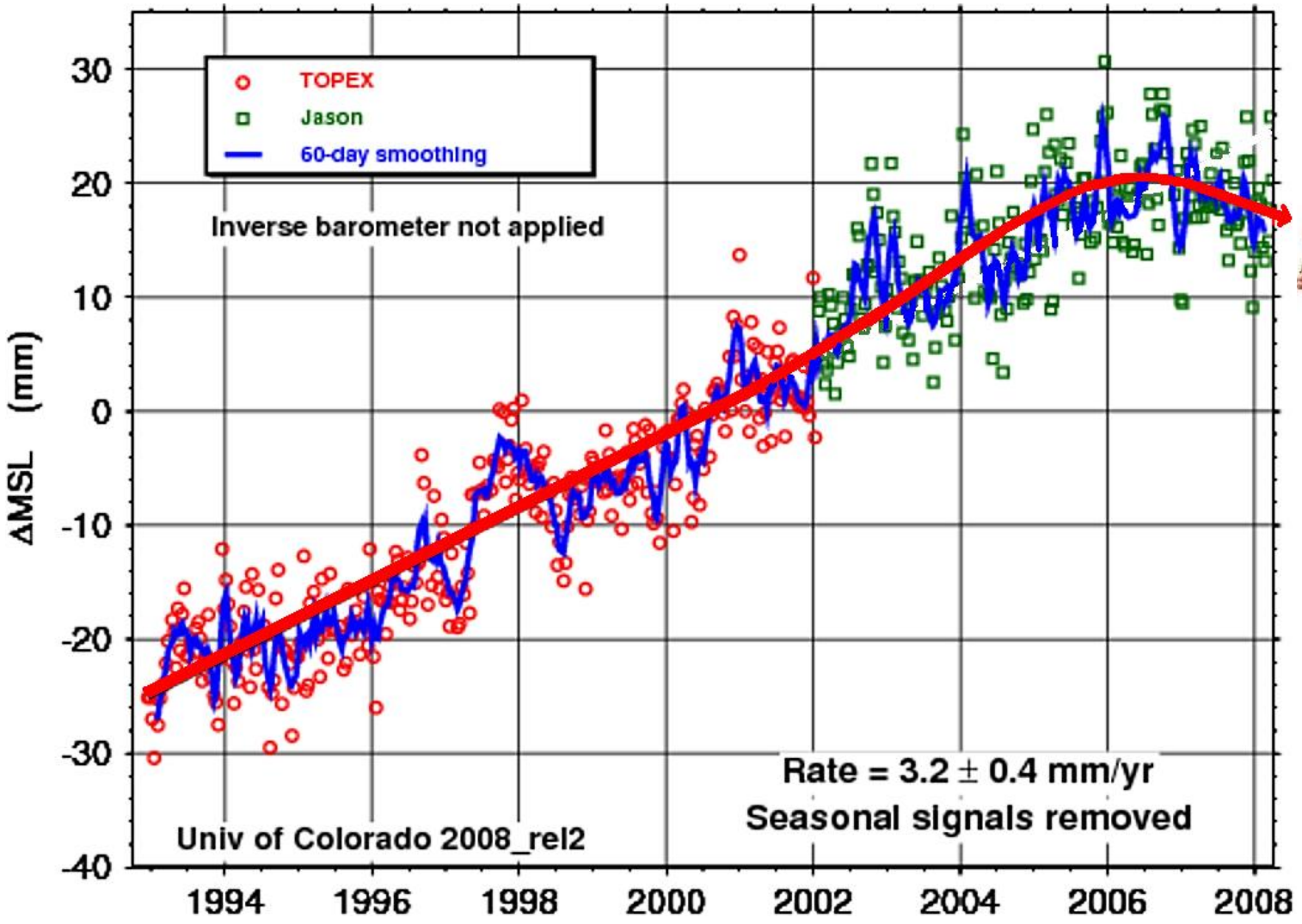
Can this guy lower the seas ?



"I am absolutely certain that generations from now, we will be able to look back and tell our children that this was the moment when the rise of the oceans began to slow and our planet began to heal."

- Barack Obama, June 3, 2008

Why not? This guy did …



Recommendations

- Continue GDR-B processing until a complete set of GDR-Cs are available for the entire mission (or at a minimum provide an overlap period during which GDR-C products can be tested before terminating GDR-B production).
- Provide easier-to-use correction products so that users can more easily convert GDR-Bs to pseudo GDR-C's.
- The Project should better communicate future changes in GDR processing before they occur, and provide assessments of what changes the users should expect to observe when switching between products.
- Proper documentation of the correction products should be provided.
- If possible, minimize biases between GDR products (e.g. biases in the SSB correction, etc.)