Some Thoughts on the Jason-1/2 Tandem Mission and a Climate Data Record of Sea Level Change

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The T/P/Jason-1/Jason-2 Climate Record

- One of the primary purposes of the T/P/J-1/J-2 measurement time series is to provide a precise climate data record for sea level change. This contribution is unique among other altimeter missions, and it was a task that the missions were specifically designed for.

- The tandem mission provides a unique opportunity to improve the climate data record for sea level change. By studying the Jason-1 and Jason-2 measurement differences point-by-point, we can reduce the errors in the measurements, and also reduce the errors in T/P, through its tandem mission with Jason-1.

- This is a once-in-a-mission opportunity – tide gauges or any other cal/val measurements cannot give us the same information. Due to the poor spatial distribution of the tide gauges, we have very limited tools for resolving these spatial differences once we are out of the tandem phase.

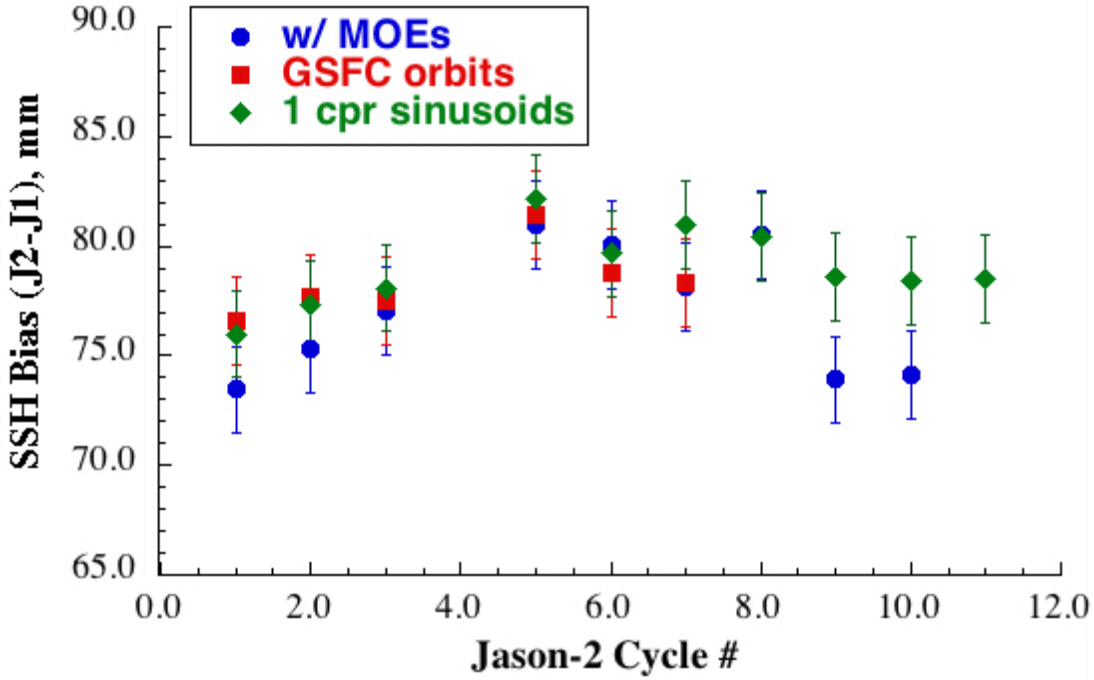
The T/P/Jason-1/Jason-2 Climate Record

- Note we are not only calibrating Jason-2, but are also using Jason-2 to observe how Jason-1 has changed from its initial calibration

- The tandem mission dataset will be a lasting resource that we will return to again and again as we improve the datasets in an effort to obtain a climate data record of 30 years in length or more.

- The 11 cycles of tandem mission data that we have in hand is simply not enough to draw any conclusions with regards performance objectives required for climate data records.

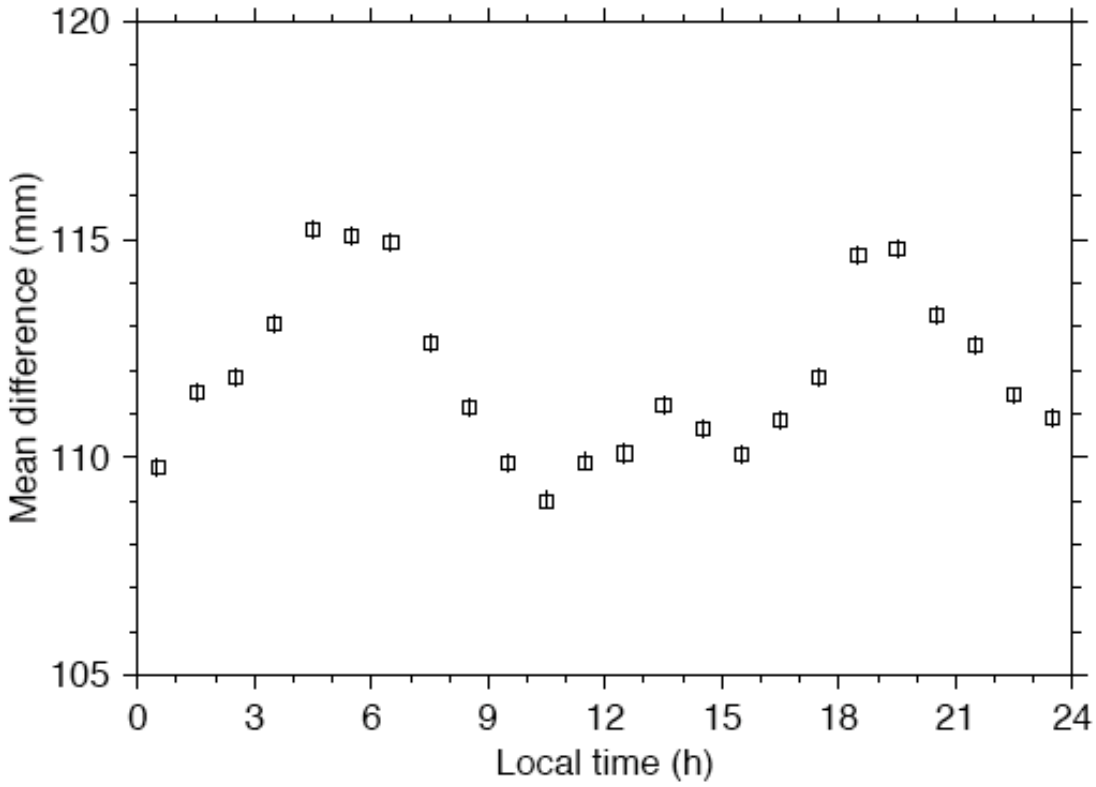
- This basically comes down to the following decision: Do we move Jason-1 early to benefit operational oceanographic requirements, or do we collect the tandem mission dataset that we need to ensure a well-understood well-calibrated climate data record of sea level change?



- Important to detect drifts in measurement early
- Need more than a year of data at an absolute calibration site (or tide gauges) to detect drift of 1 mm/year or smaller
- Need only 20 cycles of cal/val phase to reach similar precision
  - With 4 months, can only detect drift of > 2 mm/year

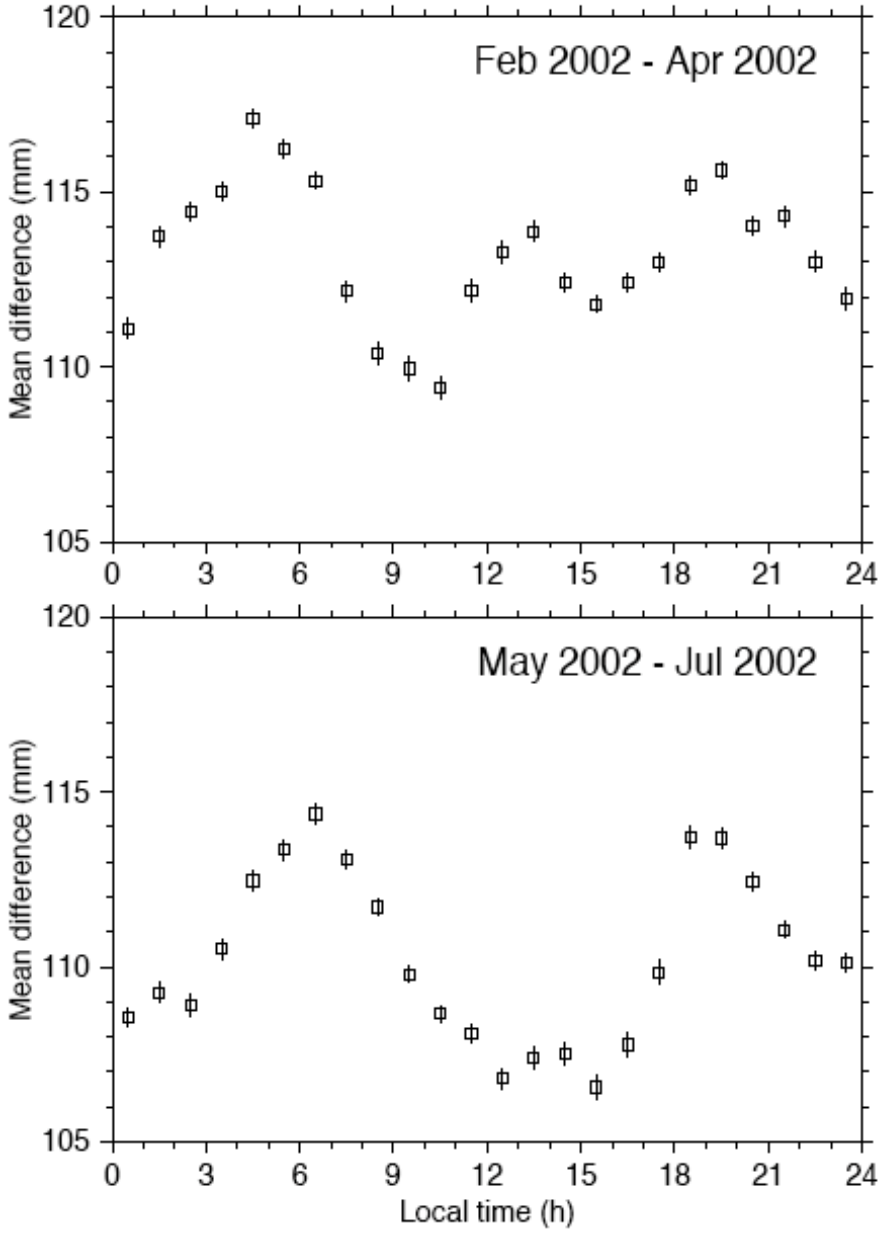
Mean Jason – Topex Sea-surface Height Differences as Function of Local Time

Jason-1 cal/val period Feb–July 2002



NOTE: Results are independent of tide corrections!

Could cause be related to spacecraft thermal effects?



Mean Jason – Topex SSH Differences as Function of Local Time

In T/P and Jason, these errors map mostly into ~60-day periods.

Sun-synch maps them into long periods.