

## **Corrections to TOPEX Altimeter Data from Waveform Retracking and Cross Calibration of TOPEX Alt-A and Alt-B**

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During 1998 it became apparent that the TOPEX altimeter was producing unrealistically large significant wave height (SWH) measurements. Investigation determined that changes in the altimeter point target response (PTR) were the cause of these measurement changes. The TOPEX altimeter was switched from the instrument in use ("side A") to the identical redundant instrument ("side B") in February 1999 (cycle 236). Analysis and simulation at the time suggested that the changes in the PTR, which caused changes of up to 0.4 m in SWH from Alt-A, caused less than 1 cm changes in range. Also, the change in SWH tended to change the EM bias correction in such a way as to cancel some of the change in range when sea surface height (SSH) was calculated.

We have performed waveform retracking on TOPEX Alt-A data from cycle 235 backward to determine the changes that occurred in the TOPEX measurements and forward from cycle 236 forward to determine the performance of Alt-B. These comparisons are crucial to determining the relative calibration of Alt-A and Alt-B to insure continuity in the eight year TOPEX data set. Based on altimeter calibration data, a PTR specific to each cycle was determined. The use of the proper PTR causes the retracking to extract correct values from the measured waveforms that are telemetered to the ground in each data frame. In addition to the corrections from the retracking, we have included final calibration values for  $\sigma_0$ . The changes to  $\sigma_0$  change the EM bias correction which affects the ionosphere calculation. Thus, in the revised data, there are several contributions to changes in SSH, and other quantities of interest such as SWH and  $\sigma_0$  (wind speed) are also changed.

We present examples of specific changes to range and SWH from the changes in PTR in Alt-A. We also present cycle statistics for the changes to SSH and other quantities on the Geophysical Data Record. In general the changes are of the expected size: 0.1 to 0.4 m in SWH,  $< \sim 1$  cm in SSH. Some changes in measurement characteristics between Alt-A and Alt-B are noted. It is concluded the relative calibration of the two instruments is within about 10 mm.