Continuity of TOPEX Data – Calibration of Side B of the TOPEX Altimeter

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Abstract

Through the efforts of numerous people the TOPEX data have been made a highly accurate, long term record of sea surface height with a global RMS accuracy of approximately 4.3 cm over a span of 7 years. Unfortunately, during 1997 and 1998 the aging of side A of the altimeter caused changes in the point target response (PTR) which may have degraded these data at the 1 cm level. While this change would have no effect on most investigations using the TOPEX data, it could affect efforts to monitor long-term global sea level trends at the mm per year level. It was decided to switch to the redundant side B of the TOPEX altimeter in February 1999. The switch was successful and all indications are that side B is performing similarly to side A early in the mission. However, in order to continue various data series for trend monitoring, the switch requires that side B be calibrated to give values as close to side A as possible. Also, it is necessary to assess and correct the side A data from the period during which changes may have affected it.

The calibration of side B was carried out by a small collaborative group of TOPEX Science Team members and Wallops Flight Facility (WFF) and JPL personnel. The team recommended adjustments to the side B data processing to give GDRs similar enough to side A to allow distribution to the entire science team for oceanographic use and further investigation of the calibration. This initial calibration was thought to be accurate to be giving Side B data which are within approximately

10 to 20 mm in Sea Surface Height
0.1 dB in sigma0
0.1 m in SWH
4 mm in ionospheric delay

of Alt-A data before the changes in point target response (PTR). As there was not adequate Side B data at the time of the calibration and the exact magnitude of the PTR effect in Alt-A data is uncertain, a direct match of the values at the altimeter switch was not attempted. Thus, these initial calibration adjustments attempt to make the Side B data generally consistent with the Alt-A data before significant changes in the PTR become apparent after approximately cycle 140. That consistency is investigated here.

The correction of the side A has begun. The corrections come from waveform processing (or "retracking") by Ernesto Rodriguez of JPL and calibrations from WFF personnel. An initial evaluation of these corrections is presented.

Together, these corrections and calibrations will lead to a continuous TOPEX data set suitable for monitoring global changes and for cross calibration with Jason to continue the series.