



EVALUATION OF TOPEX RETRACKED DATA DURING TANDEM FLYING PHASE OF TOPEX AND JASON-1

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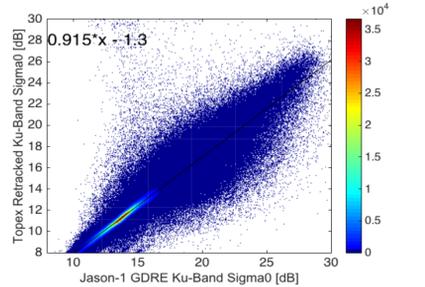
ABSTRACT

We present results from the global calibration and validation of the sea surface height and component measurements from the Topex retracked product (Side B and Skew 0.1). Our study is based on cross calibration between Topex and Jason-1 data during the tandem flying phase (Side B). Also, included in the study is the improvement in the effect of significant wave height and wind speed measurements on the sea state bias contribution to the sea surface height measurements from retracking.

APPROACH

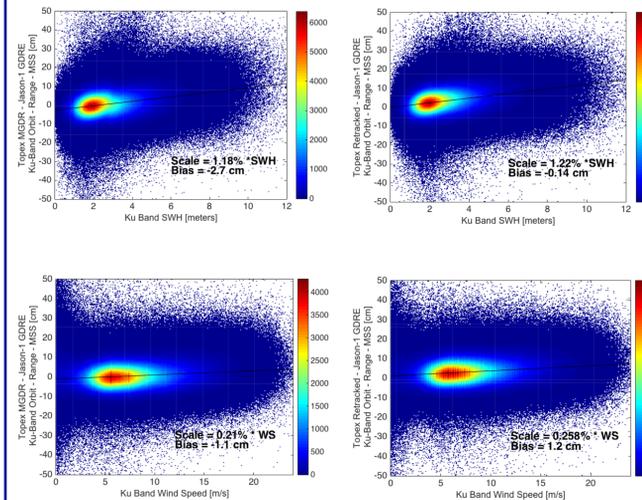
- Compare measurements from Topex Retracked, Topex MGDR, and Jason-1 GDRE from tandem flying phase (side B).
 - Cycle 344-364 for Topex Mission and Cycle 1-21 for Jason-1 Mission
- Quantify the effect of SWH and Wind speed measurements on the sea state bias and orbit minus range minus mean sea surface.

CORRECTED BACKSCATTER COEFFICIENT (SIGMA0)



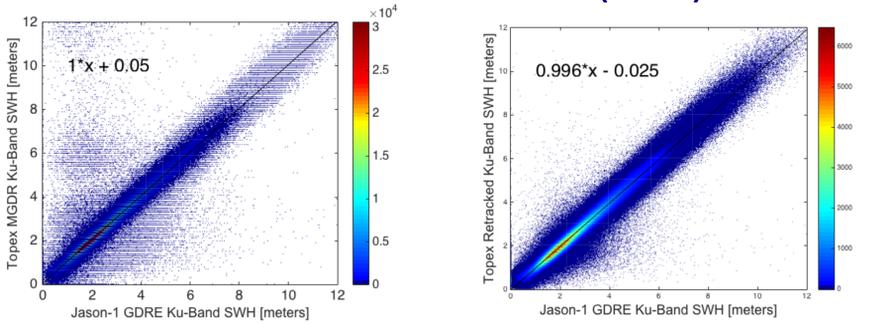
- Radiometer atmospheric correction was applied
- Standard deviation of difference is ~ 0.2 dB
- Topex Retracked Sigma0 biased by -1.3 dB relative to Jason-1 GDRE with $> 93\%$ correlation

EFFECT OF SWH AND WIND SPEED ON ORBIT MINUS RANGE



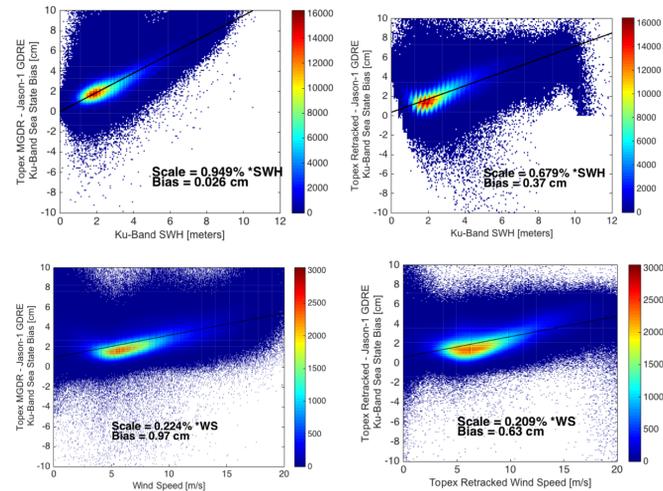
- Bias on Topex minus Jason-1 range dependence on SWH has decreased from -2.7 cm to -0.14 cm
- Retracking has little/no change on Side B's Range Difference dependence on SWH ($\sim 1.2\%$) or on Range Difference dependence on Wind Speed ($\sim 0.2\%$)

SIGNIFICANT WAVE HEIGHT (SWH)



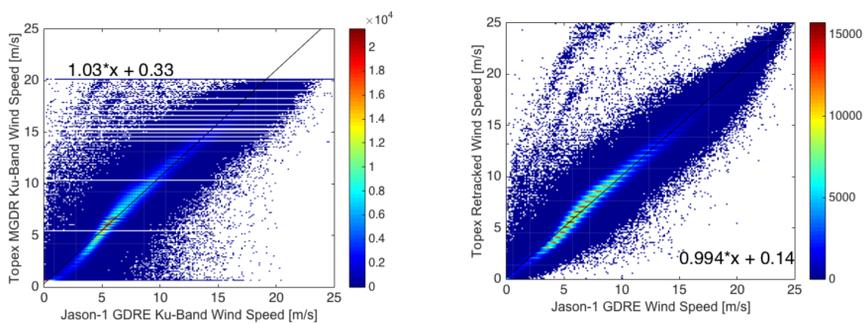
- Standard deviation of difference between Topex and Jason-1 GDRE SWH reduced from ~ 49 cm to ~ 21 cm
- Topex SWH bias relative to Jason-1 GDRE decreased from 5 cm to -2.5 cm
- SWH correlation between Topex and Jason-1 GDRE is $> 98\%$

EFFECT OF SWH AND WIND SPEED ON SEA STATE BIAS



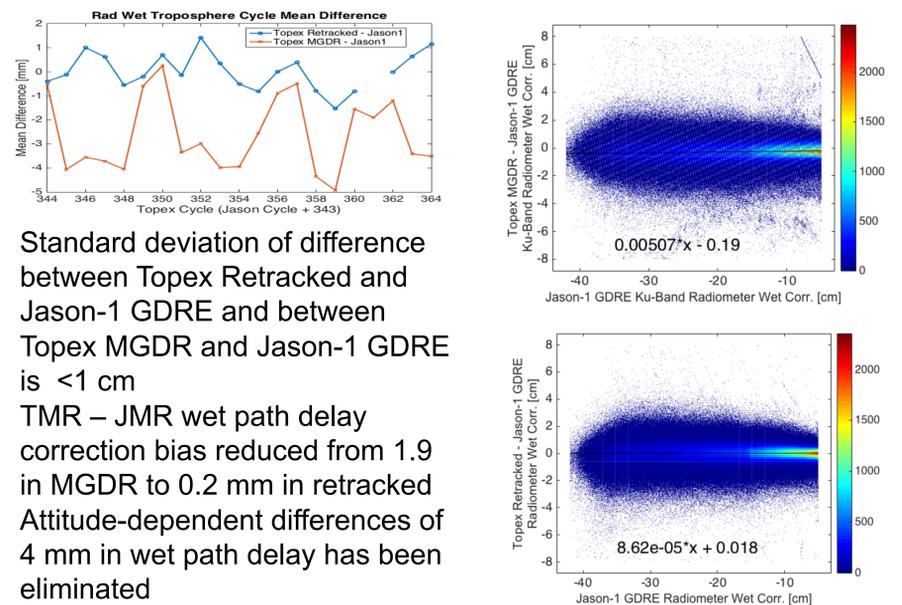
- Effect on SWH on SSB difference between Topex and Jason-1 GDRE has decreased from 0.95% to 0.68%
- Slight bias between Topex and Jason-1 GDRE SSB is present

WIND SPEED



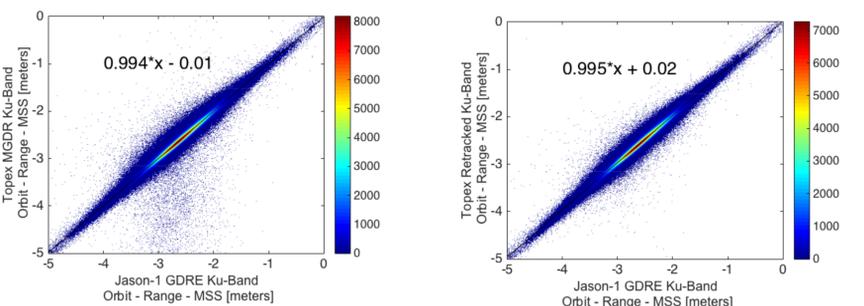
- Standard deviation of difference between Topex and Jason-1 GDRE Wind Speed reduced from ~ 0.98 m/s to ~ 0.81 m/s
- Topex Wind Speed bias relative to Jason-1 GDRE reduced from 0.33 m/s to 0.14 m/s
- Wind Speed correlation between Topex and Jason-1 GDRE is $> 96\%$

RADIOMETER WET TROPOSPHERE CORRECTION



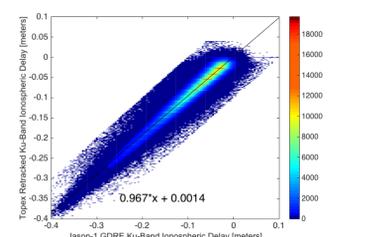
- Standard deviation of difference between Topex Retracked and Jason-1 GDRE and between Topex MGR and Jason-1 GDRE is < 1 cm
- TMR - JMR wet path delay correction bias reduced from 1.9 in MGDR to 0.2 mm in retracked
- Attitude-dependent differences of 4 mm in wet path delay has been eliminated

RANGE DIFFERENCE (ORBIT - RANGE - MSS)



- Standard deviation of difference between Topex and Jason-1 GDRE Range (Orbit-Range-MSS) reduced from ~ 0.063 m to ~ 0.056 m
- Topex Range (Orbit-Range-MSS) bias relative to Jason-1 GDRE changed from -0.01 m to 0.02 m
- Range (Orbit-Range-MSS) correlation between Topex and Jason-1 GDRE is $> 99\%$

KU-BAND IONO. DELAY



- Standard deviation of difference between Topex Retracked and Jason-1 GDRE is ~ 1.3 cm
- Topex Retracked Ionospheric delay biased by $+1.4$ mm relative to Jason-1 GDRE with $\sim 97\%$ correlation

SUMMARY

- During the formation flying phase (early 2002), comparisons with Jason-1 indicate that retracking (skew 0.1) provides no obvious improvement to the Side B range data.
- However, the agreement of the Side B wind speed and SWH with respect to Jason-1 both improve.
- The new TMR wet troposphere correction also shows important improvements.
- SSB models from Topex Retracked data and Jason-1 GDRE have better agreement than Topex MGR vs. Jason-1 GDRE