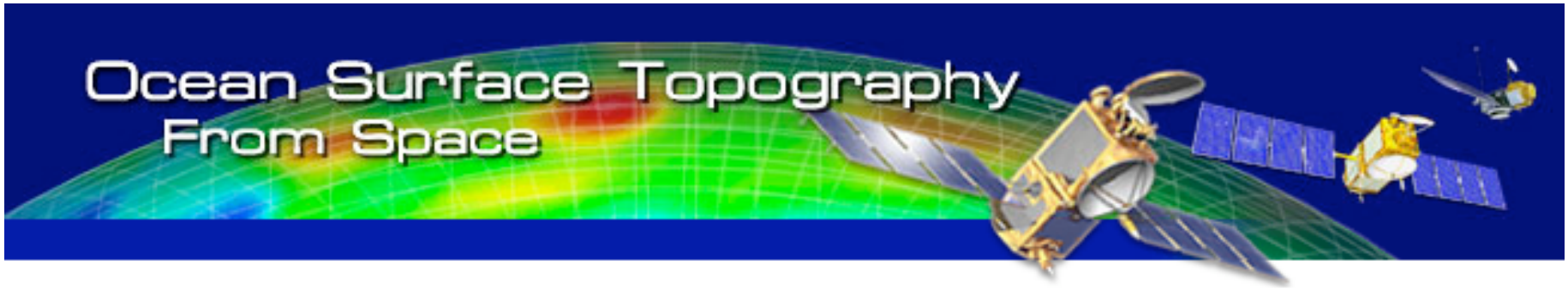


Sea level error budgets:

Current status, needs and future improvements

Wednesday, June 24, 2009

OSTST Meeting, Seattle, WA

Global mean errors

TABLE 11. The rms System Measurement Accuracy for Side A of the TOPEX/POSEIDON Dual-frequency Altimeter, Which was Active from Launch Through February 1999

Single-pass sea surface height accuracy		
NASA radar altimeter noise[a]	1.7 cm	Fu *et al.* (1994)
Ionosphere[b]	0.5 cm	Imel (1994)
EM bias	2.0 cm	Rodriquez and Martin (1994b)
Skewness	1.2 cm	Rodriquez and Martin (1994b)
Dry troposphere	0.7 cm	Fu *et al.* (1994)
Wet troposphere	1.1 cm	Ruf *et al.* (1994)
Orbit	2.5 cm	Ries and Tapley (1999)
Total (RSS) sea surface height	4.1 cm	
Sea-surface height bias and drift errors		
Measurement-system bias[c]	−0.5 cm	Haines *et al.* (1998)
Measurement-system drift[d]	−0.2 cm year^{-1}	Mitchum (1998)
Single-pass wind/wave accuracies		
Wind speed	2 m sec^{-1}	Callahan *et al.* (1994)
Significant wave height[e]	0.2 m	Callahan *et al.* (1994)

[a] Based on 1-sec averages of the range estimates for 2-m significant wave height.

[b] Based on 100-km along-track averages of the dual-frequency altimeter estimates of the ionospheric range correction.

[c] For January 1, 1993, after correcting for the oscillator drift error described in Section 2.4.6. Accounting for systematic *in situ* measurement errors (1–2 cm), the bias is not statistically distinguishable from zero.

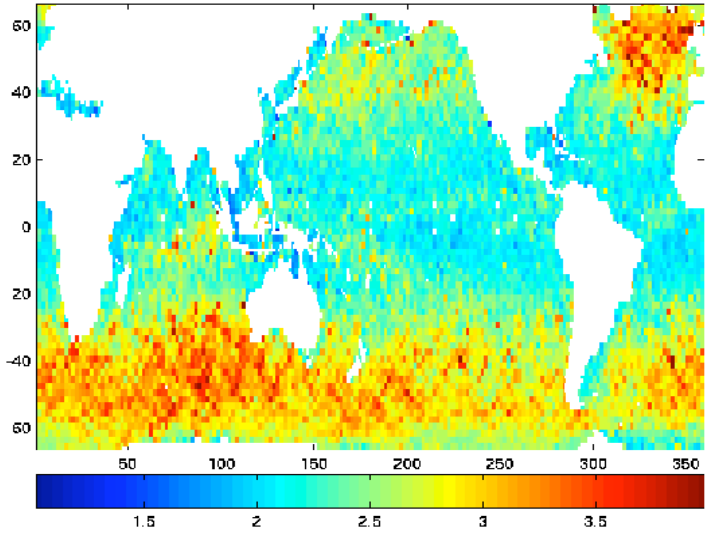
[d] Applying a correction for the recently discovered drift (0.1 cm year^{-1}) in the TMR measurements of path delay (Keihm *et al.*, 2000) would decrease the magnitude of this estimate.

[e] Based on data collected prior to degradation of the side A point target response.

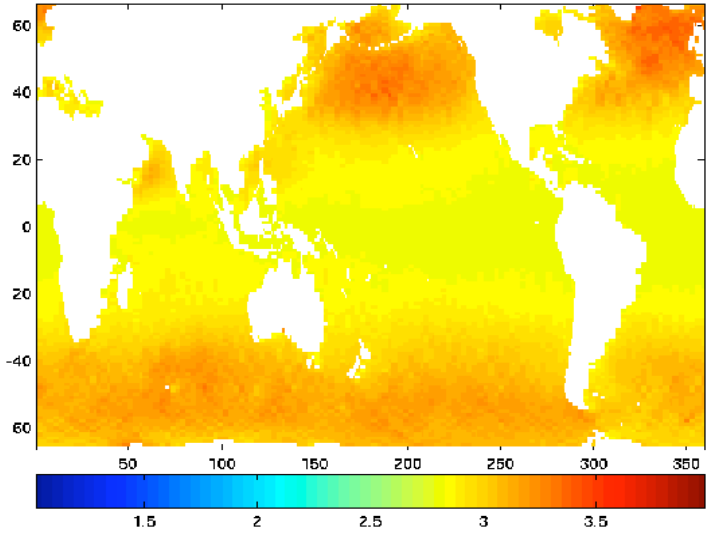
Chelton et al., from the “altimeter book”

Beyond global mean errors

(based on differences T/P–Jason1)



(using significant wave height plus Chelton et al. table)



(range: 1 to 4 cm)

Ponte, Wunsch & Stammer (2007, J. Atmos. Oce. Tech.)

Purposes and focus for the session

- Assess current understanding of errors in various sea surface height datasets
  - radar noise
  - orbit error
  - environmental corrections (wet/dry troposphere, ionosphere, sea state bias)
  - models (tides, inverted barometer, high frequency correction)
- How can error budgets be improved for past, present and future missions?
- Special topics
  - random and systematic components
  - spatio-temporal and spectral characteristics
  - spatial correlation structures
  - global mean sea level trends
  - hardware and software issues
  - …

Sea Level Error Budgets/Agenda

0930	Ponte/Dorandeu	**Introduction and overview**
0950	Ablain	**Error estimation of the global and regional mean sea level trends from altimetry data**
1005	Mitchum	**Global sea level rise uncertainty due to land motion and reference frame issues**
1020	**BREAK**	
1050	Chambers	**A proposal for tighter stability requirements on the wet path delay correction for Jason-3**
1105	Brown	**On the long term stability of the radiometer wet tropospheric path delay retrieval: Past, present and a proposal for the future on Jason-3**
1120	Ray	**Assessment of tide-prediction errors for altimetry**
1135	Lyard	**Precise error budget for the altimeter-derived tidal constants**
1150	Vandemark	**Present uncertainties and future refinement of the altimeter sea state bias correction**
1205	Kaplan	**Error in gridded sea surface height products**
1220		**Wrap-up**
1230	**LUNCH**	