Filtered ionospheric correction

outperforms raw correction

over all ocean regions and

for any level of solar activity

Results: Jason-3 SLA @1Hz (cycles 17 to 58)

Advantages and drawbacks of the filtered solution for dual-frequency ionospheric correction from altimeter

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Background

- Electrons in the ionosphere slow down propagation of altimeter signal
- Correction required to avoid resulting altitude errors of O(10) cm
- Ionospheric correction retrieved from dual frequency observations (Ku and C band)

- SLA variance computed over 2° by 2° regions (proxi for SLA noise)
- Difference in SLA variance differences computed between no correction versus raw and filtered correction, respectively
- Positive values indicate good correction performance (reduction of SLA noise)



Results: Jason-1 SLA @1Hz

- SLA variance per cycle 1 to 375 (2 solar activity cycles)
- Raw and filtered correction reduce SLA variance when correction is large



- Correction variability due to:
 - Stochastic noise (>1 cm)
 - Large scale geographical patterns Ο
 - Multi-annual solar activity cycles
- Large stochastic noise negatively impacts the performance of the raw correction

Method

- Apply iterative filter (Lanczos2, 250km) to:
 - Remove noise а.
 - Increase number of observations (no b. fixed threshold for correction outliers)
- Assess performance via
 - SLA variance reduction
 - Number of along-track observations with valid correction values

Raw correction can increase SLA variance when correction is weak



Conclusions

Results: Jason-3 SLA @1Hz (cycle 20)

- **Red circles**: only flagged by raw corr.
- Blue circles: only flagged by filtered corr.
- Green circles: flagged by both corr.
- Filtered correction improves SLA within in the tropics and over periods of high solar activity
- Filtered correction do not degrade SLA at low latitudes and over periods of low solar activity
- Increases the number of valid corrections in the open oceans (intense rain events) but decreases the number along the coastlines and the Antarctic ice margins (under investigation)





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