Validation status of a global altimeter wind & wave data base

P. Queffeulou, A. Bentamy and D. Croizé-Fillon

Ifremer

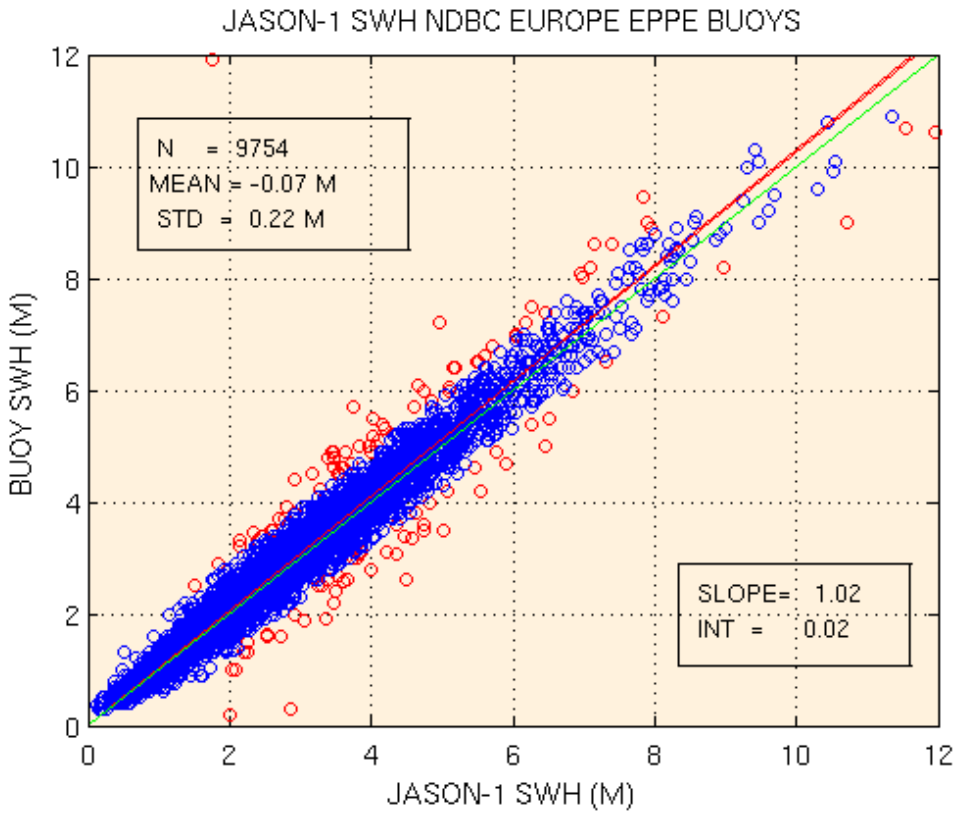
Laboratoire d'Océanographie Spatiale
pierre.queffeulou@ifremer.fr

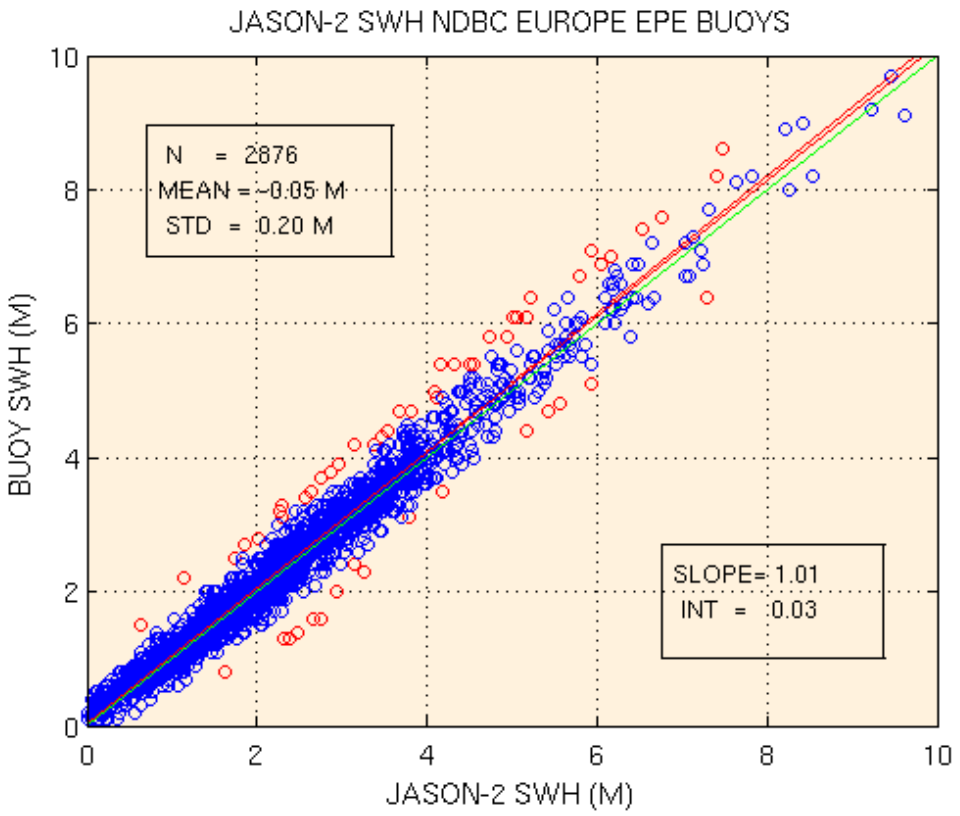
Contents

Validation & calibration, updated results

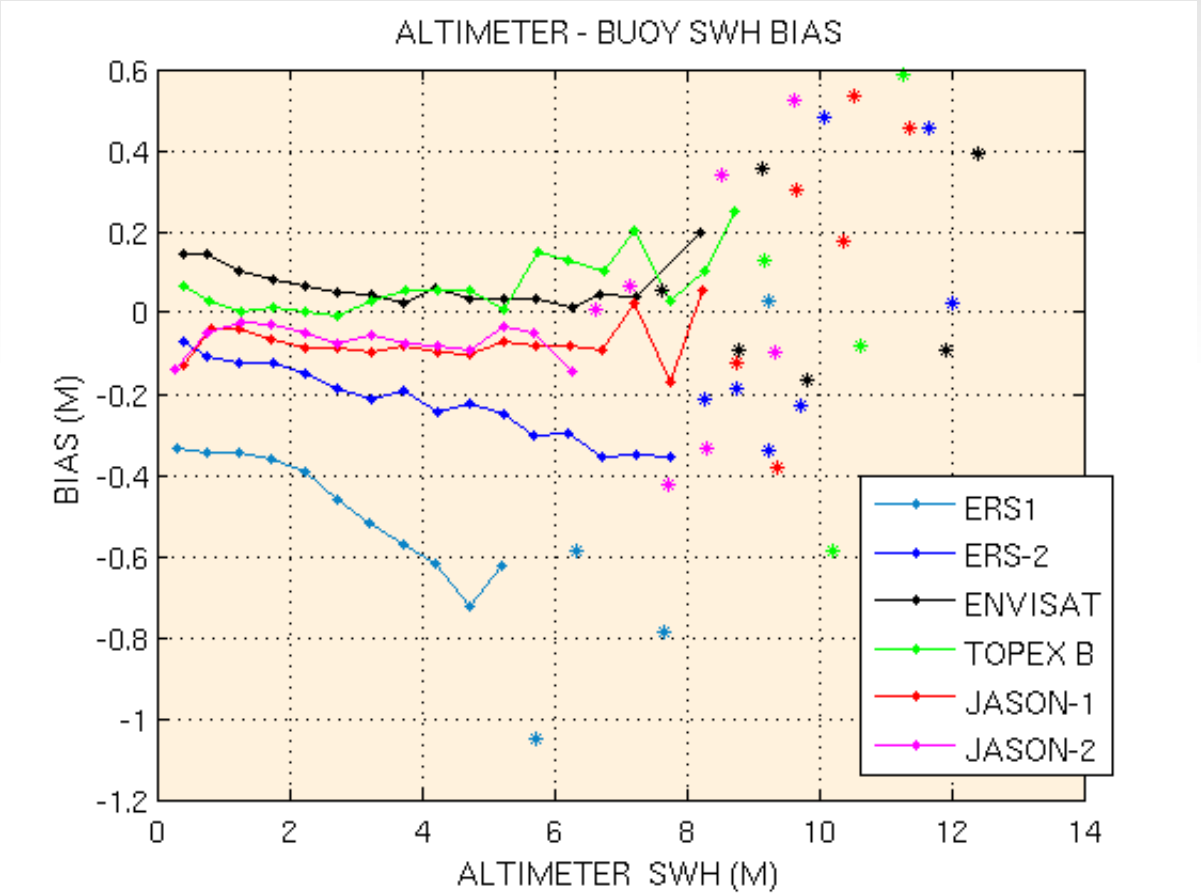
- *SWH*
- Backscatter coefficient and wind speed

Altimeter buoy *SWH* comparison

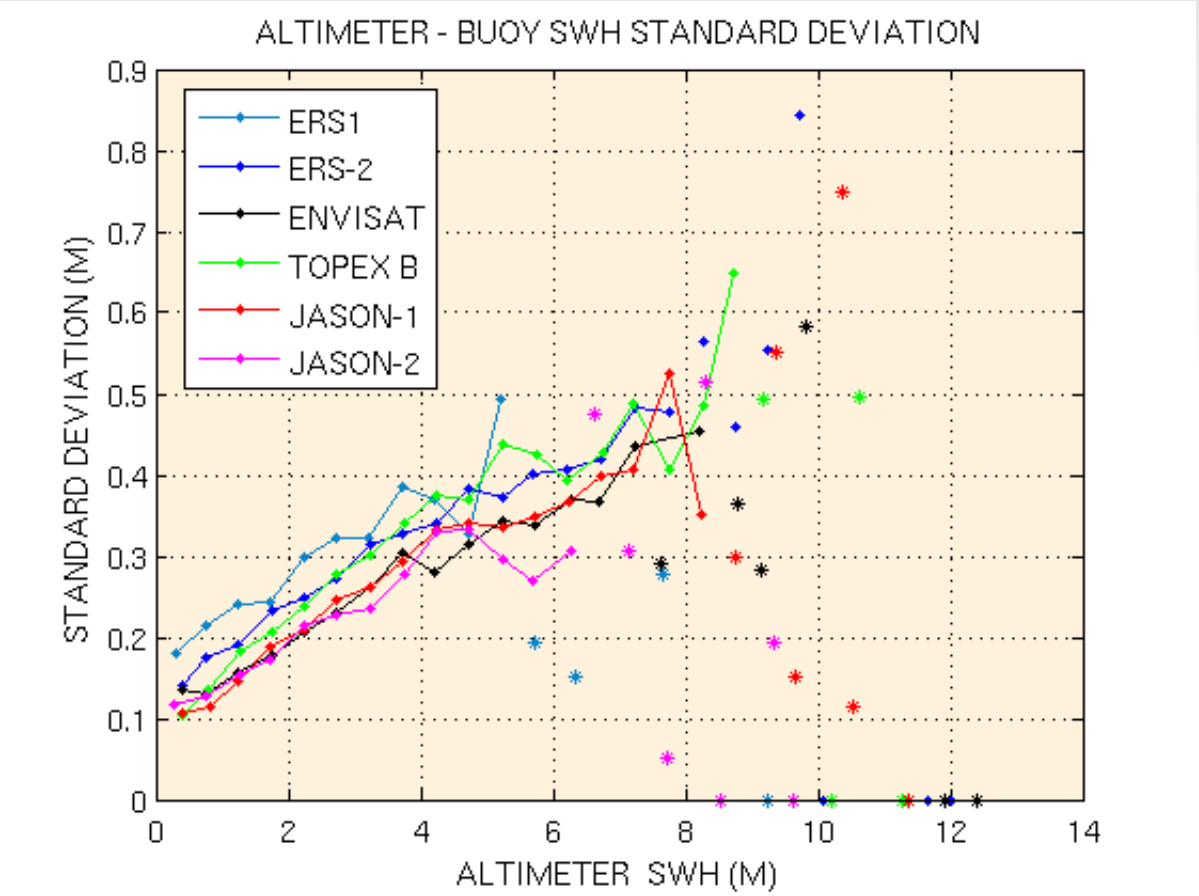




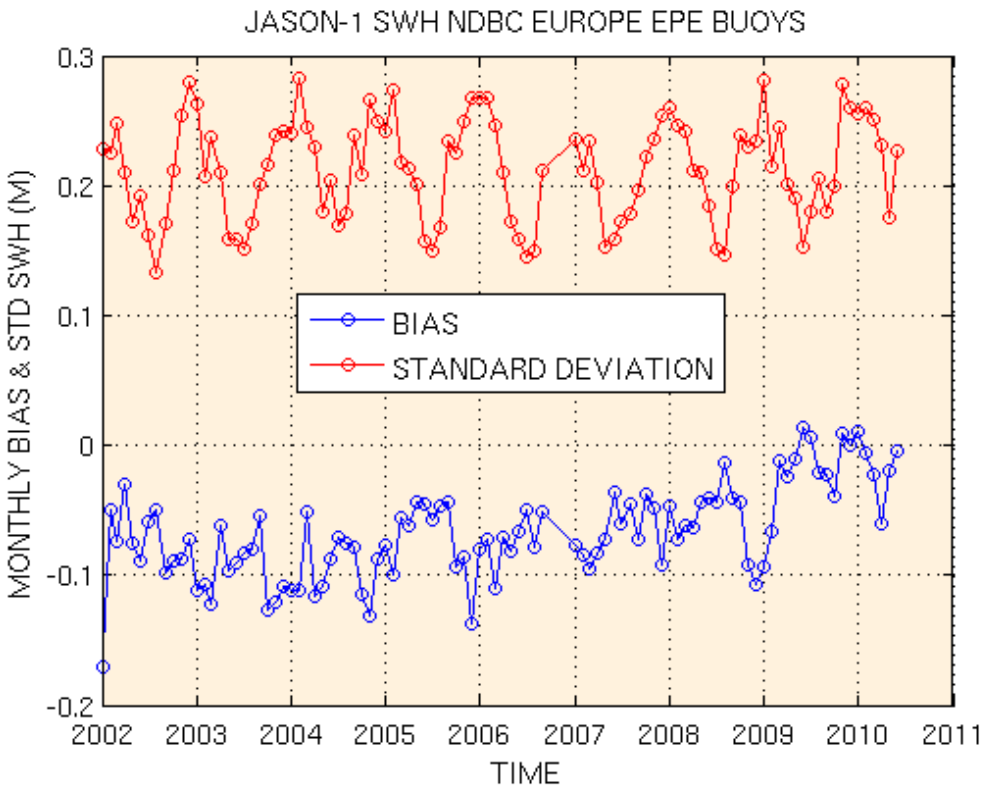
GDR *SWH* altimeter accuracy - bias

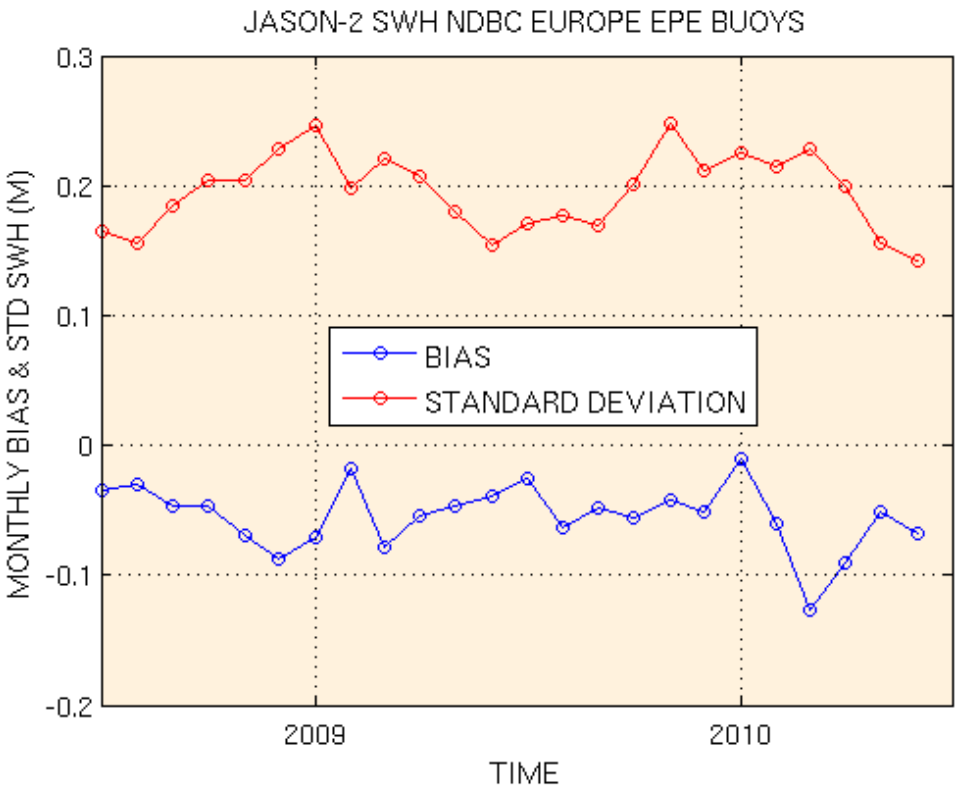


GDR *SWH* altimeter accuracy - std

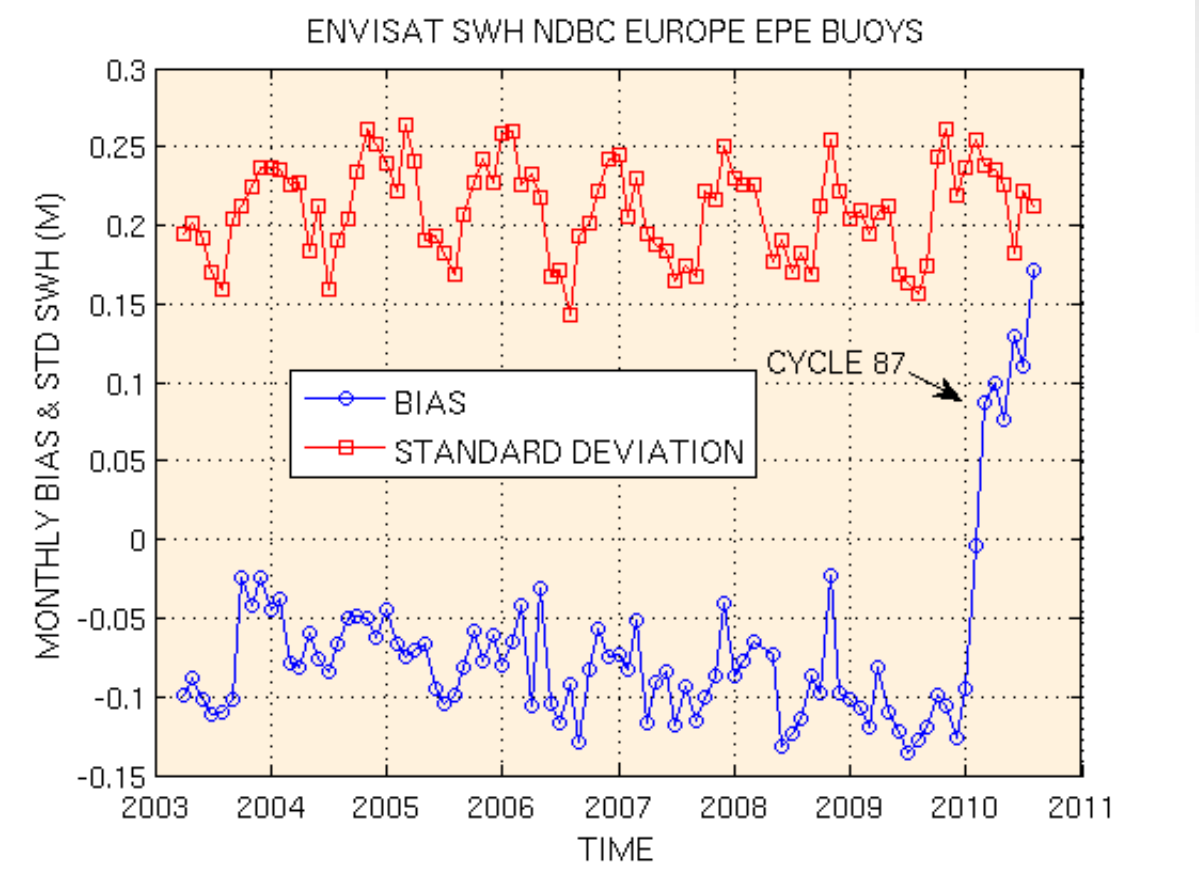


GDR *SWH* altimeter accuracy as a function of time

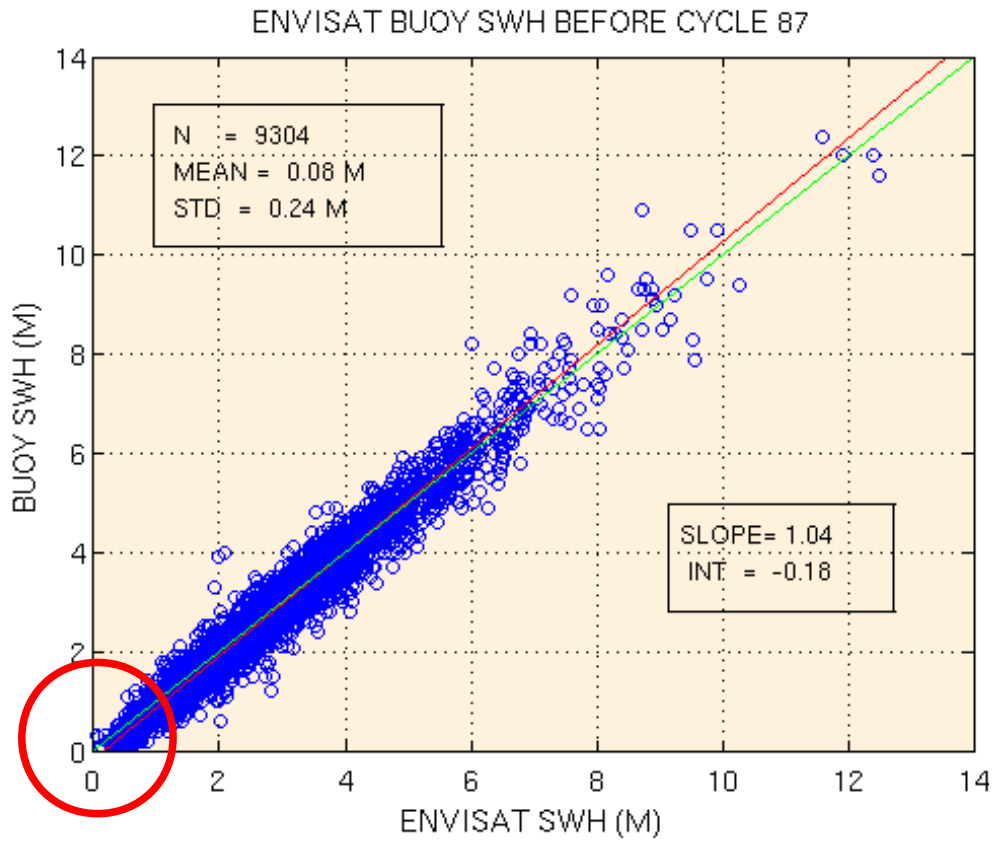


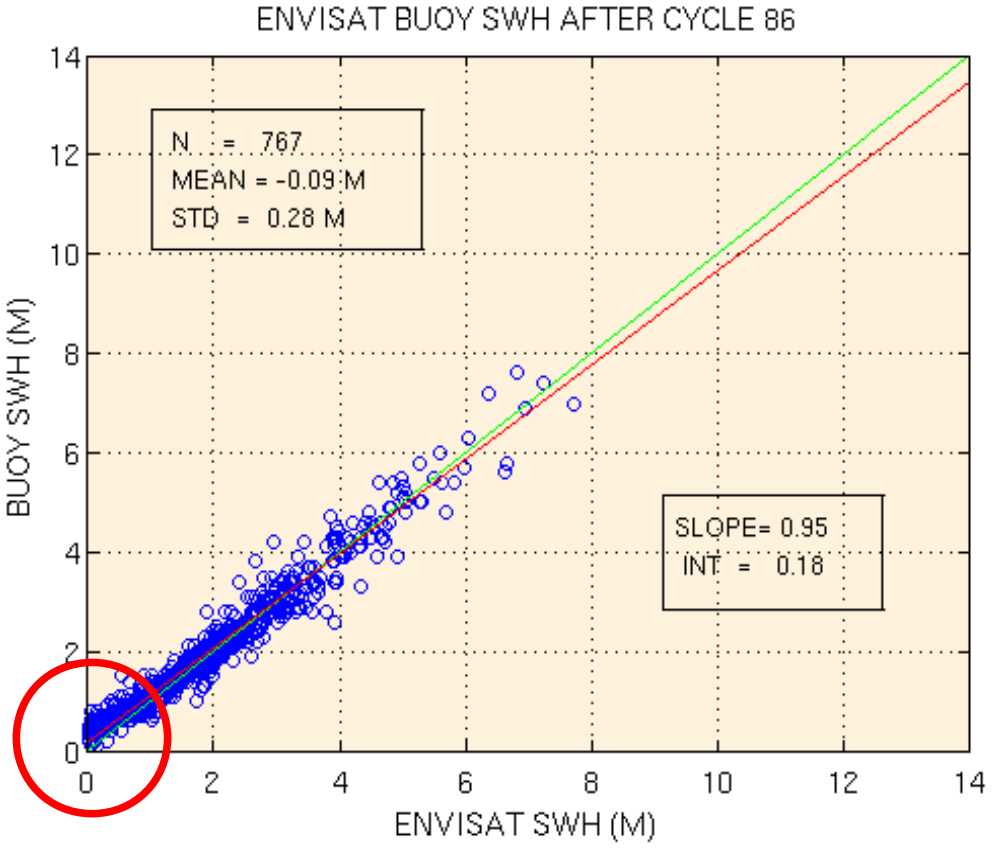


GDR *SWH* altimeter accuracy as a function of time

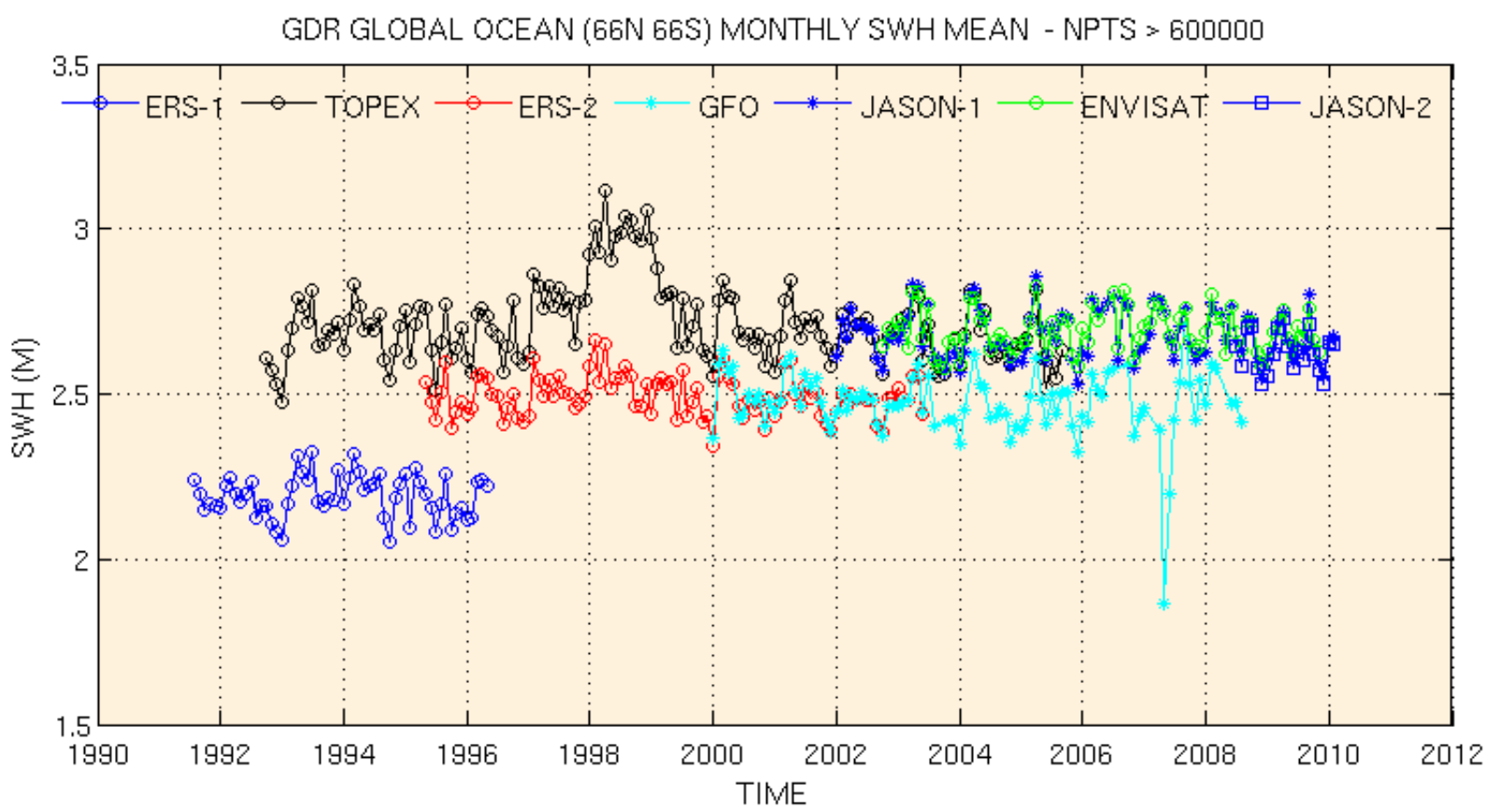


GDR *SWH* altimeter accuracy as a function of time

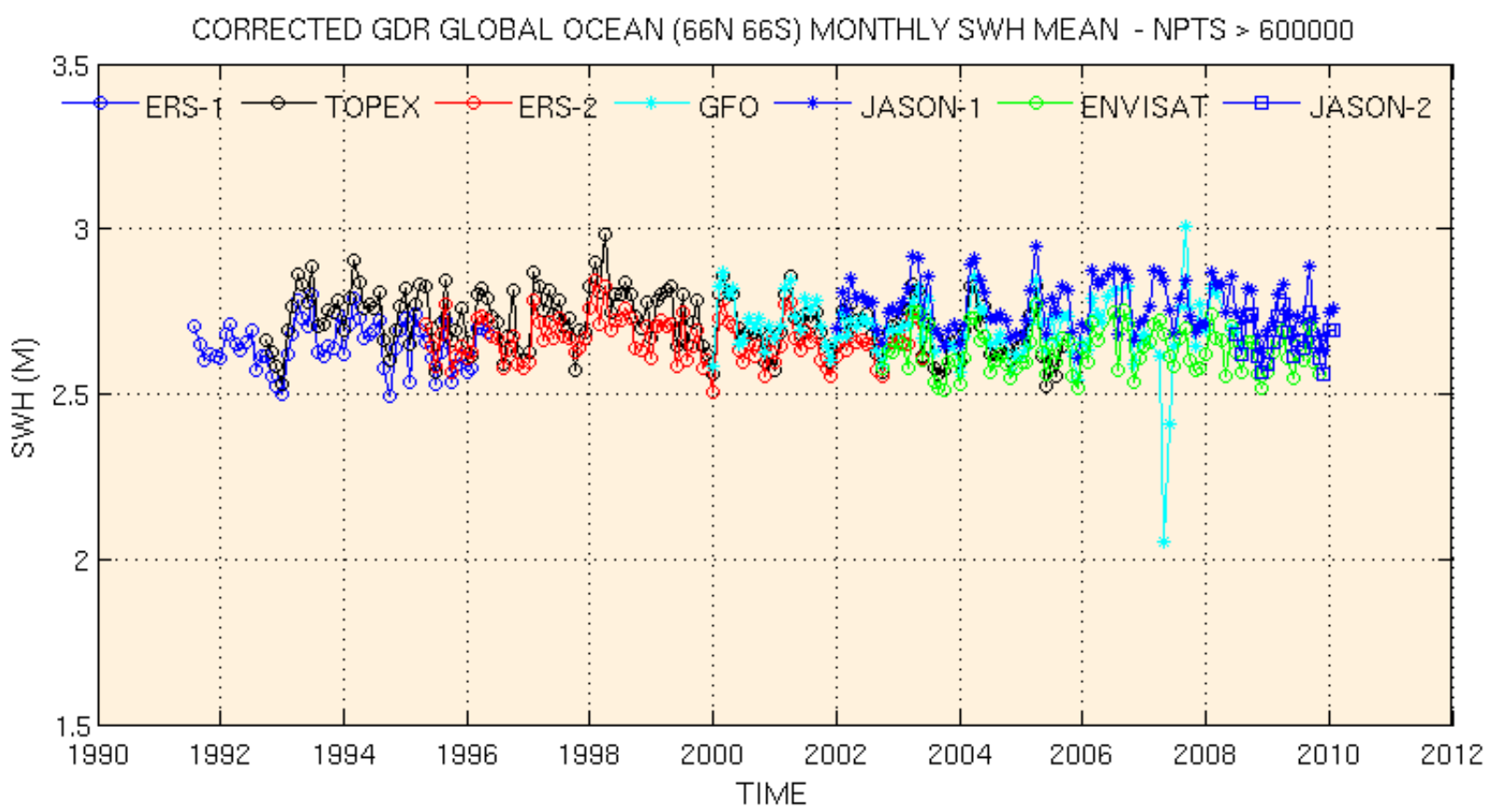




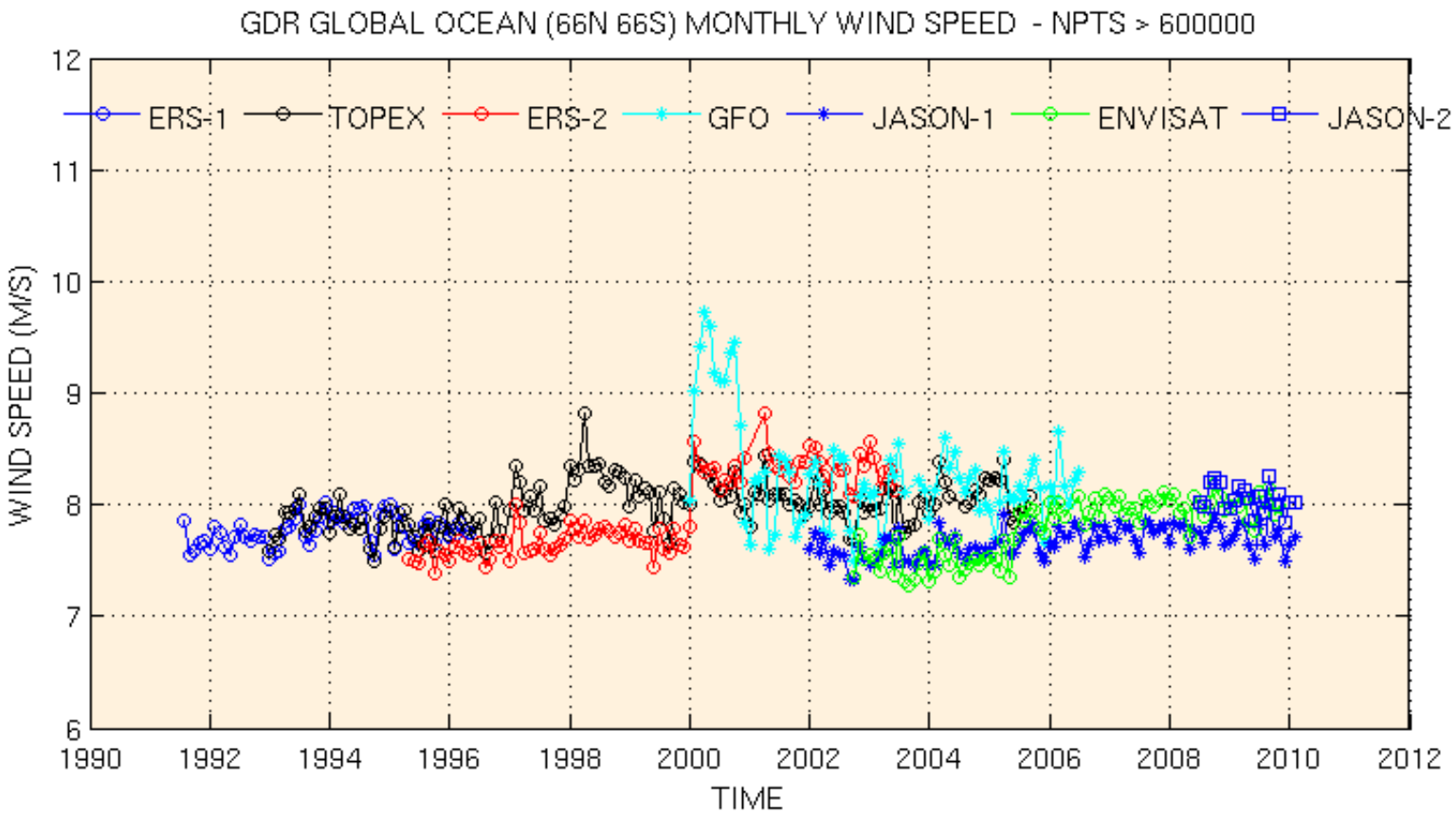
GDR Monthly mean *SWH*
Global oceans 66° N – 66° S



GDR Monthly mean *SWH*
Global oceans 66° N – 66° S
Corrected data

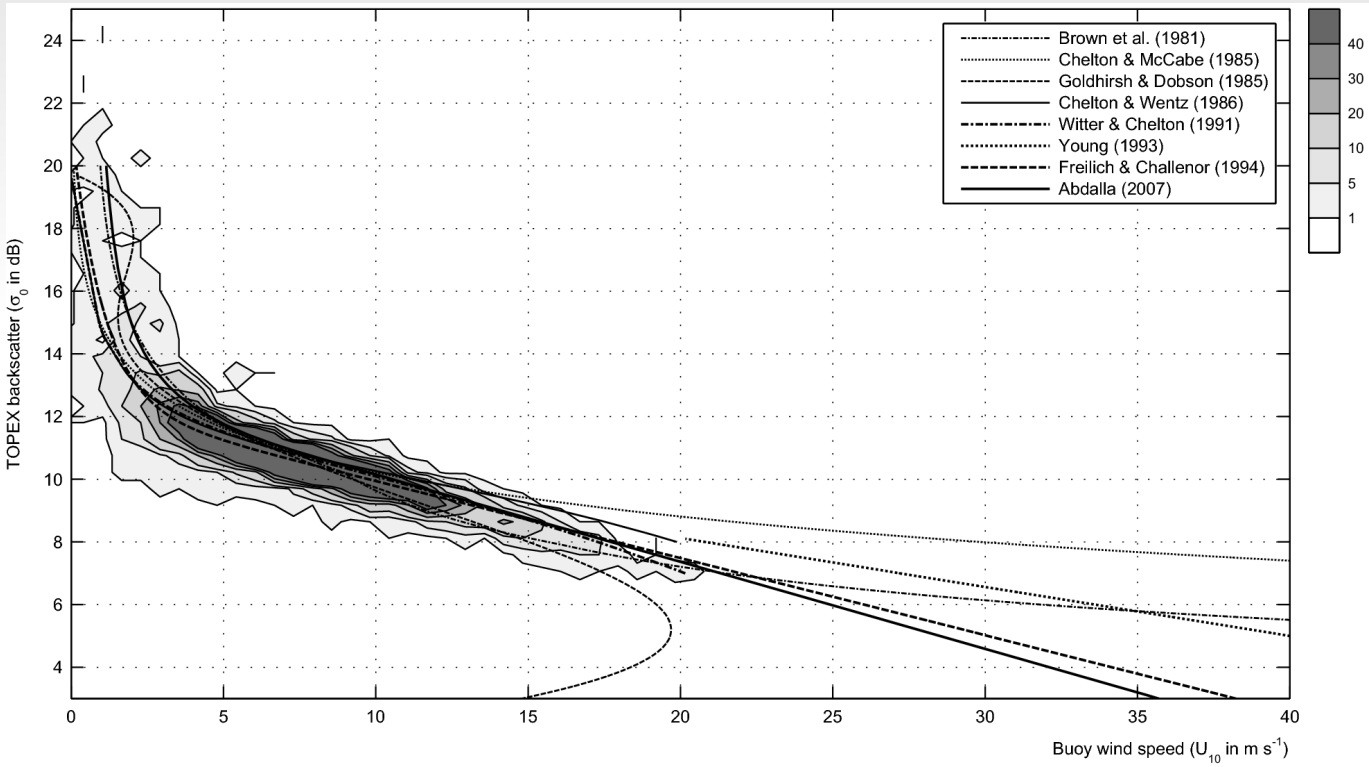


Wind speed calibration



Sigma0 and *wind speed* dependence

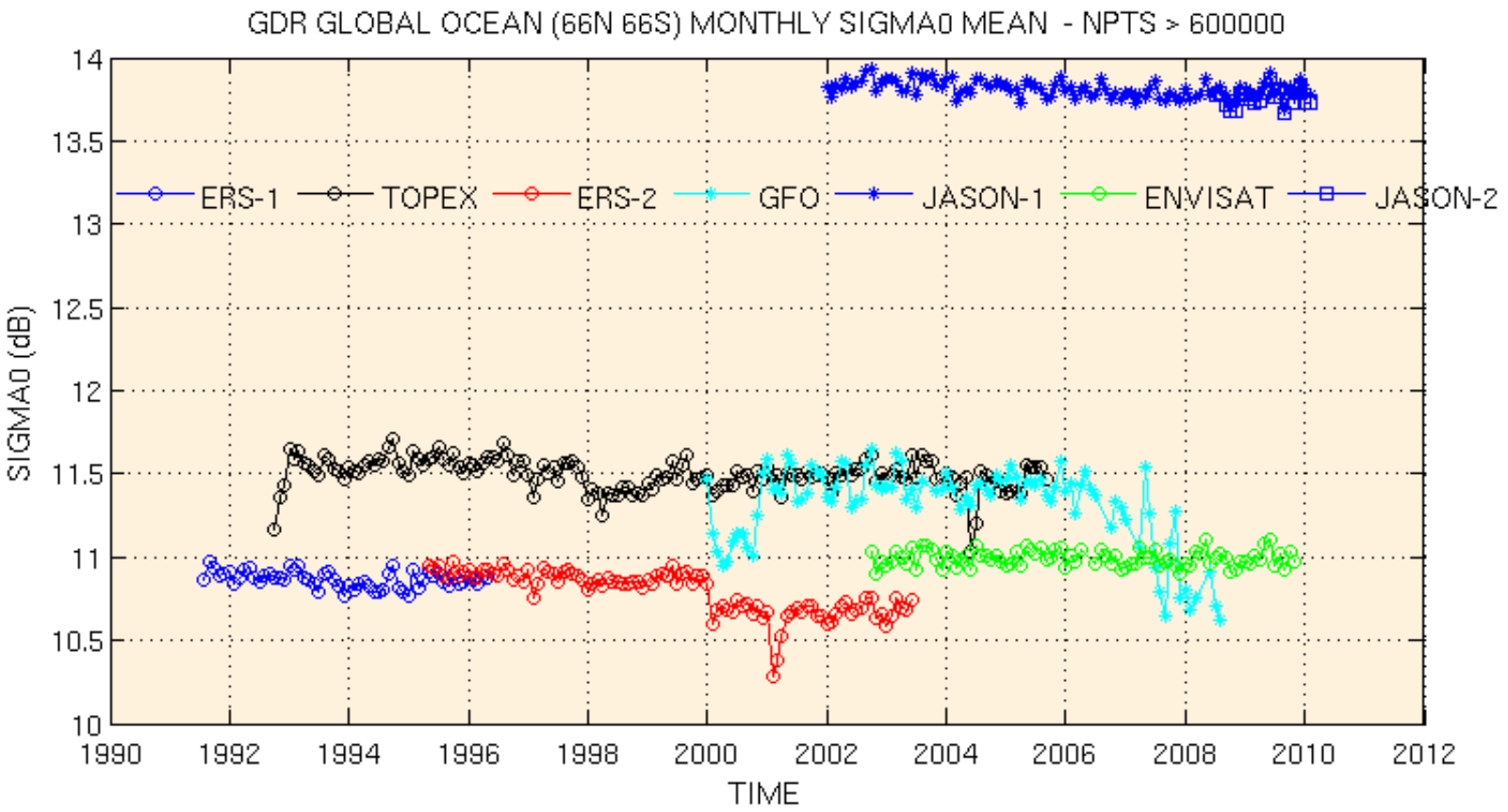
TOPEX sigma0 (dB)



Buoy wind speed (m/s)

From Zieger et al. 2009

GDR Monthly mean *sigma0*
Global oceans 66° N – 66° S



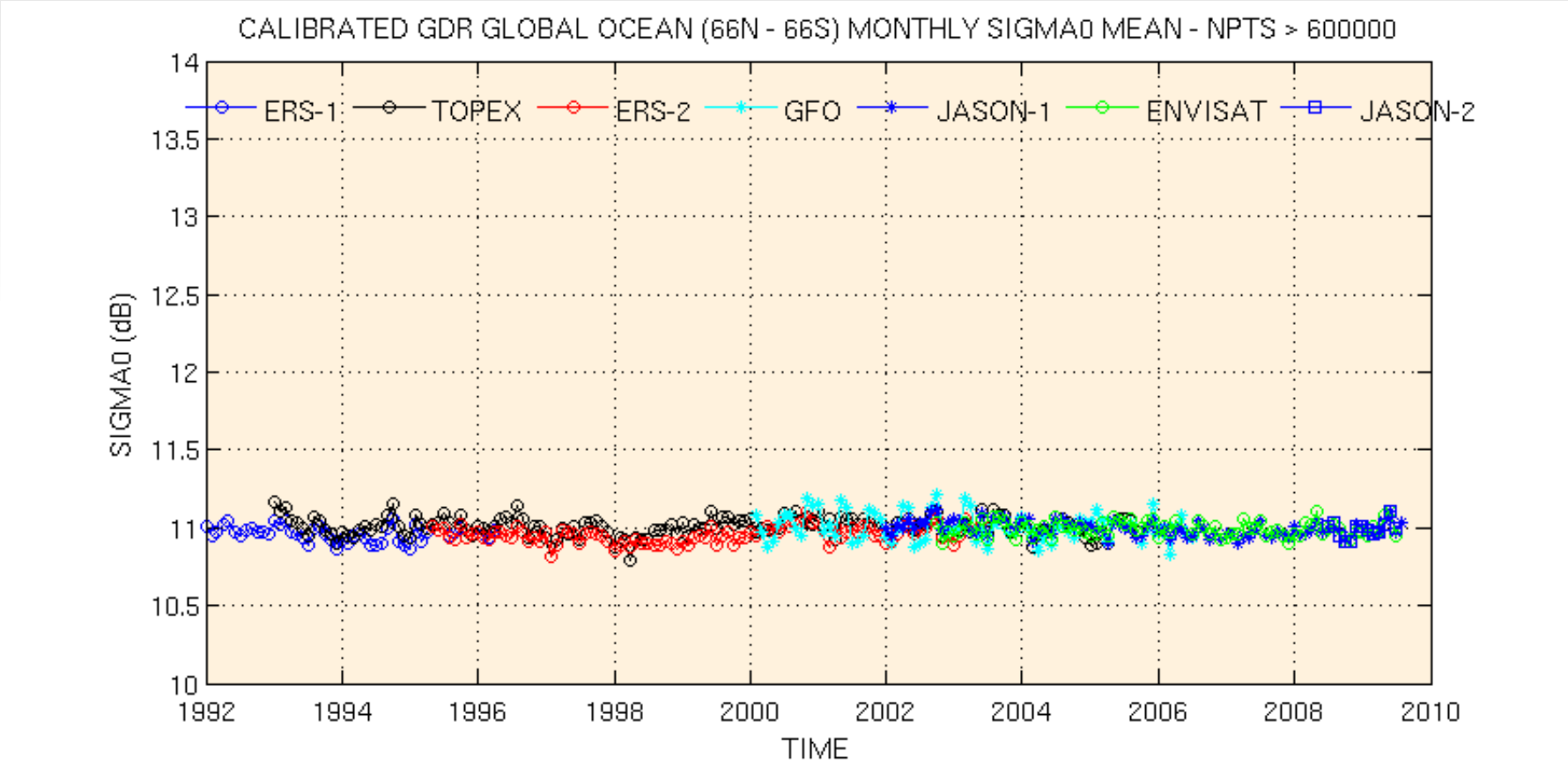
GDR *sigma0* Calibration
sigma0 offset

- Calibration tables for TOPEX (Hayne and Hancock 1999, Lockwood et al. 2006)
- Various corrections to ERS-2 after January 2000 gyro problems, Extra Backup Mode (Dorandeu et al. 2000, Scharroo, pers. com.)
- GFO (Sharroo, pers. com.)
- Identification of time periods with low sigma0 accuracy: TOPEX 10 first cycles , miss-pointing, GFO after August 2006 ...

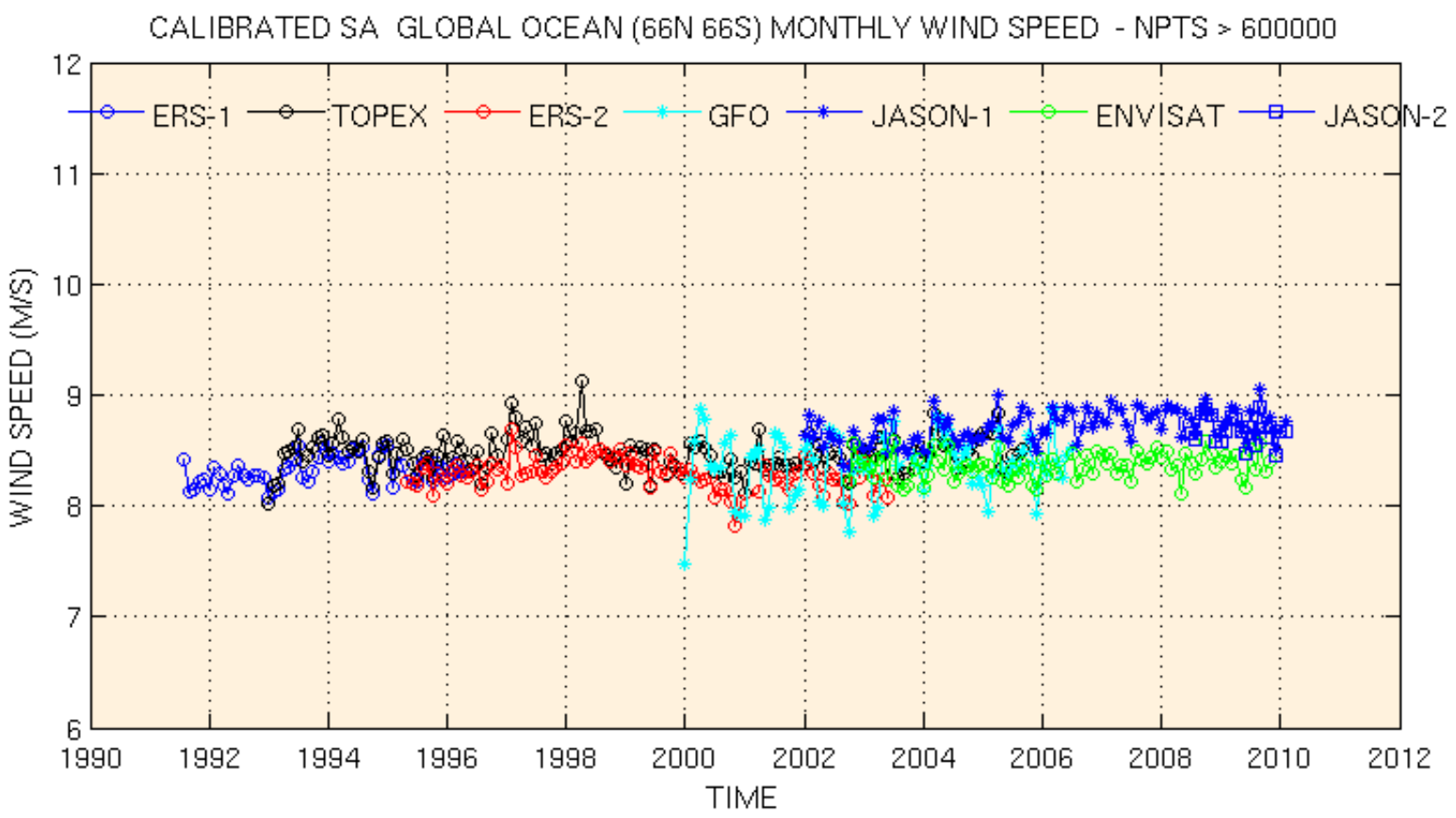
GDR *sigma0* Calibration Adjustment on ENVISAT sigma0

- ERS-1: + 0.10 dB
- ERS-2: + 0.05 dB
- TOPEX: - 0.47 dB
- GFO: - 0.43 dB
- JASON-1: - 2.82 dB
- JASON-2: - 2.77 db

Calibrated GDR Monthly mean *sigma0*
Global oceans 66° N – 66° S

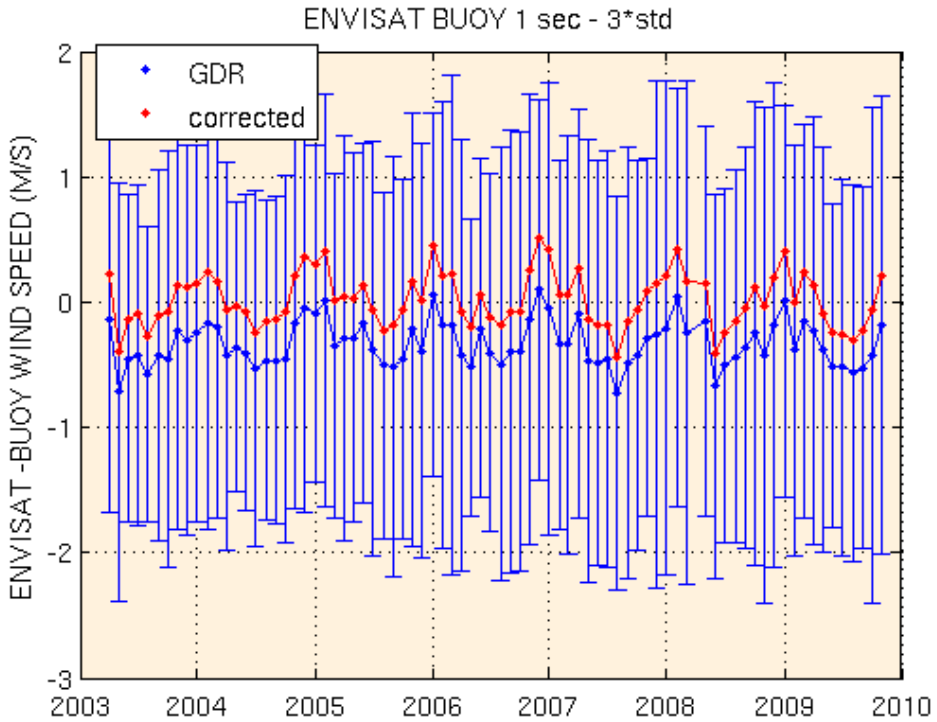


Monthly mean *Wind Speed* global oceans 66° N – 66° S from calibrated & corrected sigma0

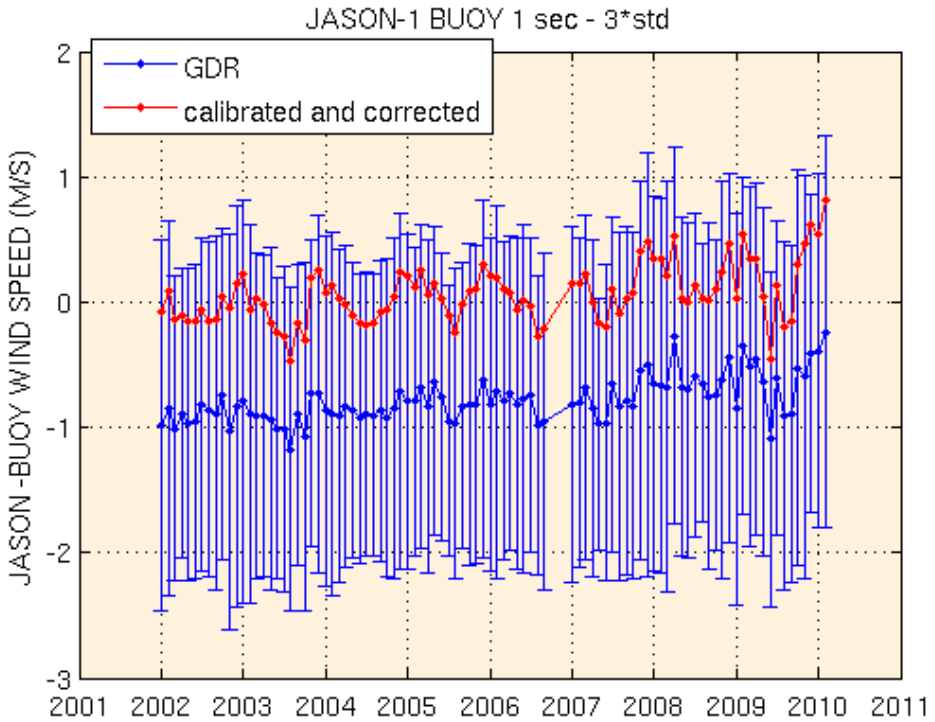


Jason-1 *sigma0* trend?
Versus buoys

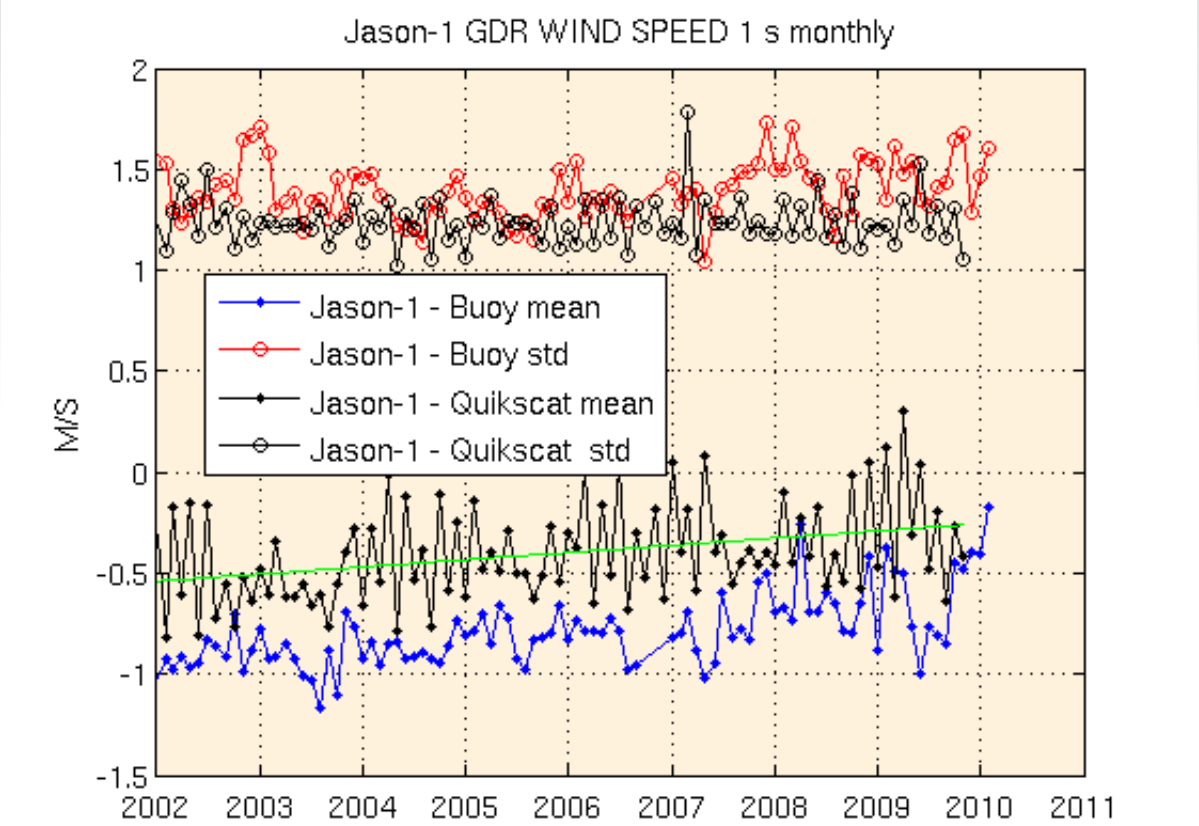
ENVISAT – buoy wind speed



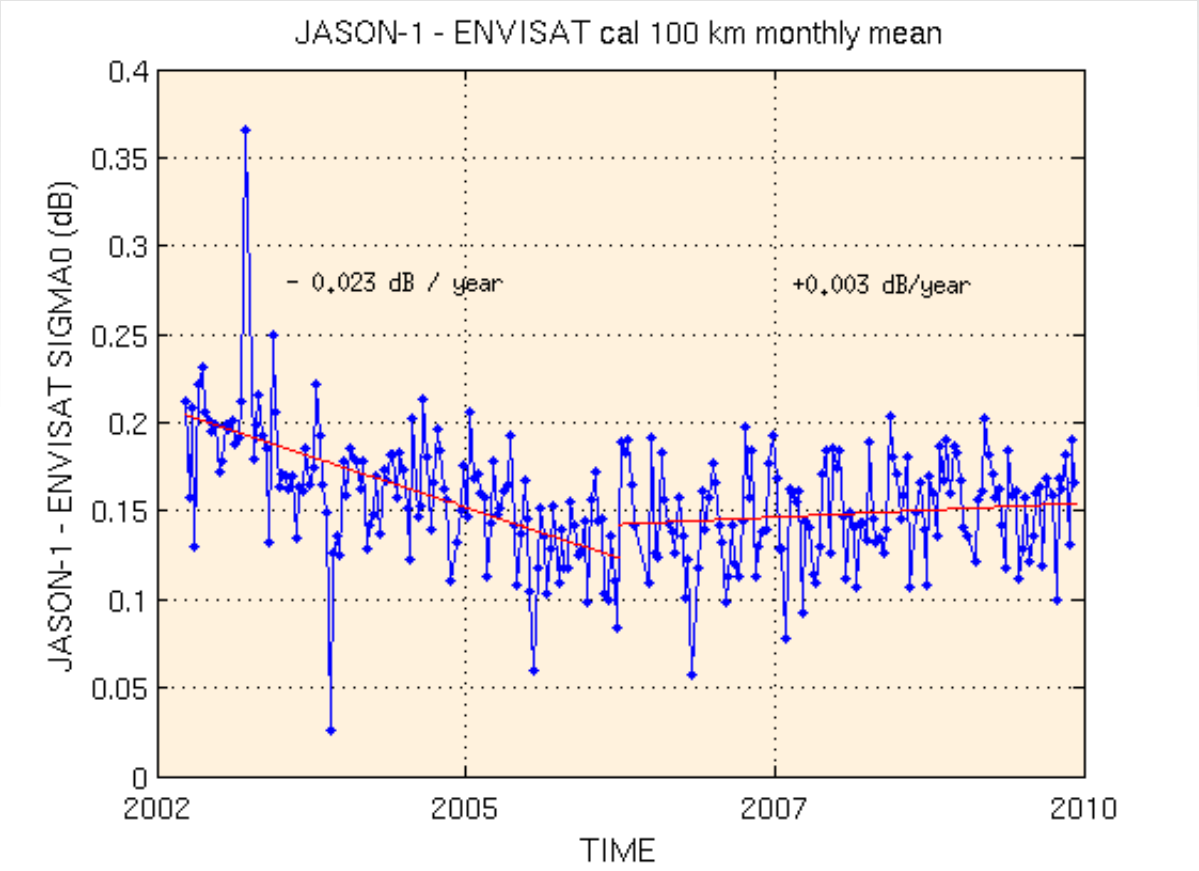
JASON-1 – buoy wind speed



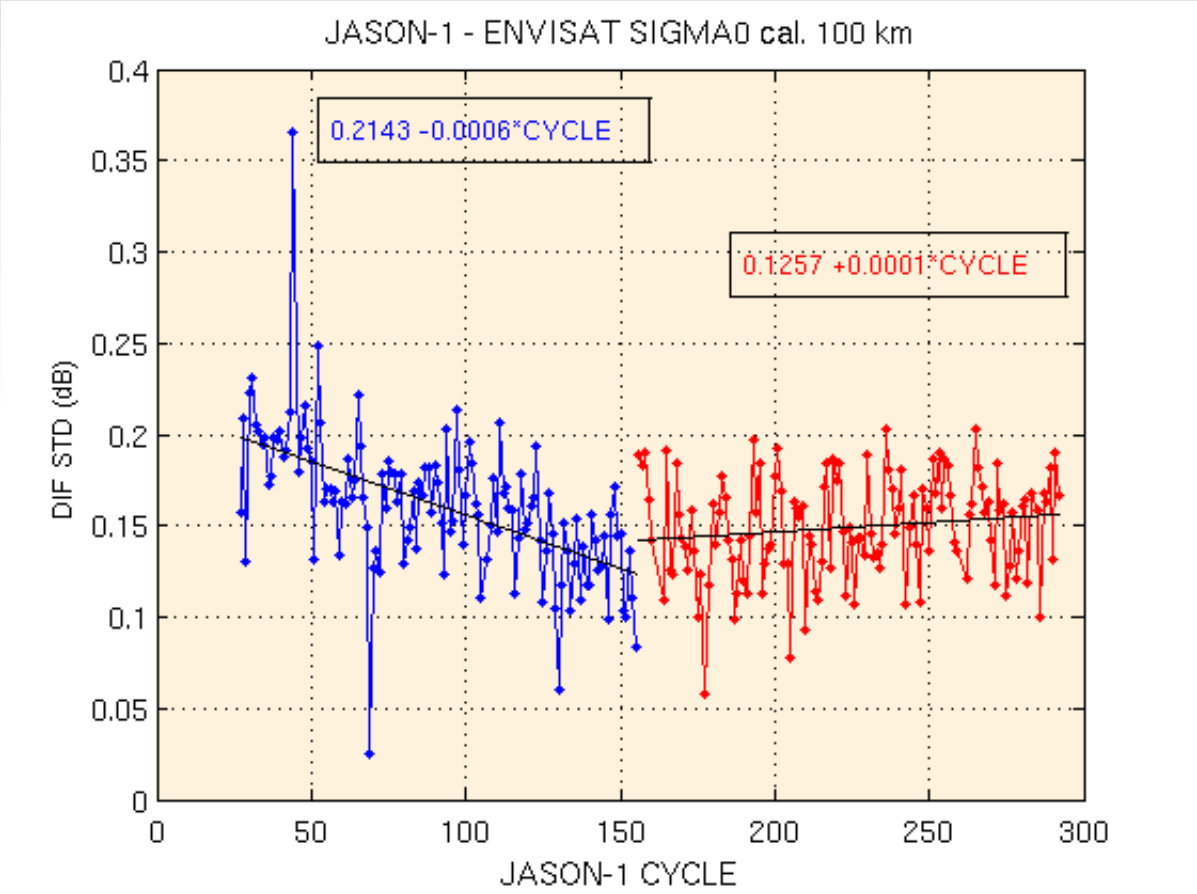
Jason-1 *sigma0* trend?
Versus QuikScat



Jason-1 *sigma0* trend correction Versus ENVISAT

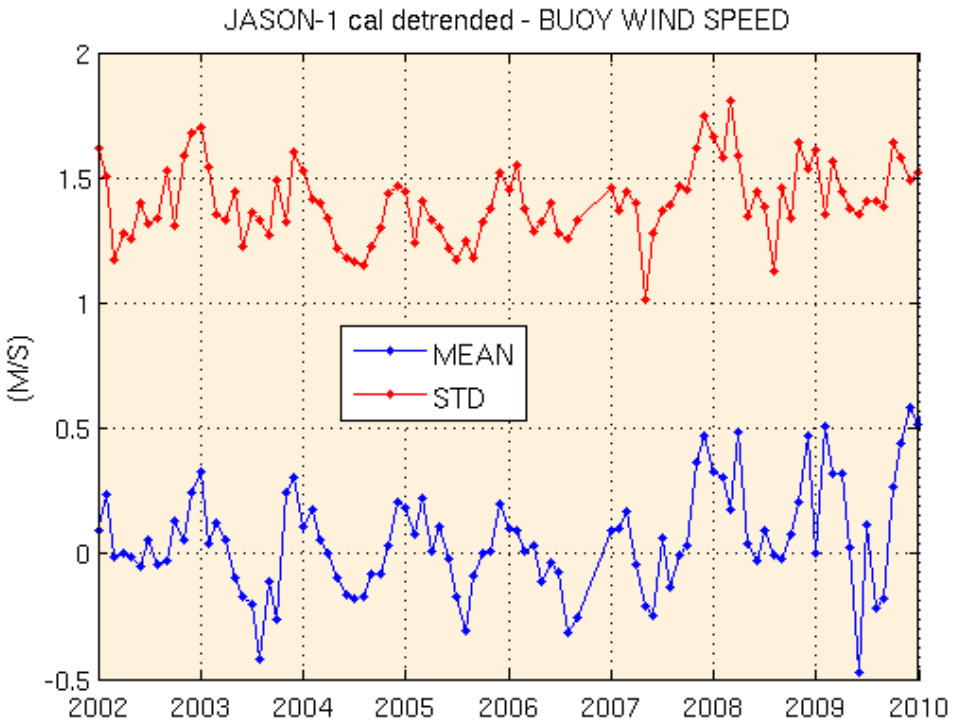


Jason-1 *sigma0* trend correction Versus ENVISAT

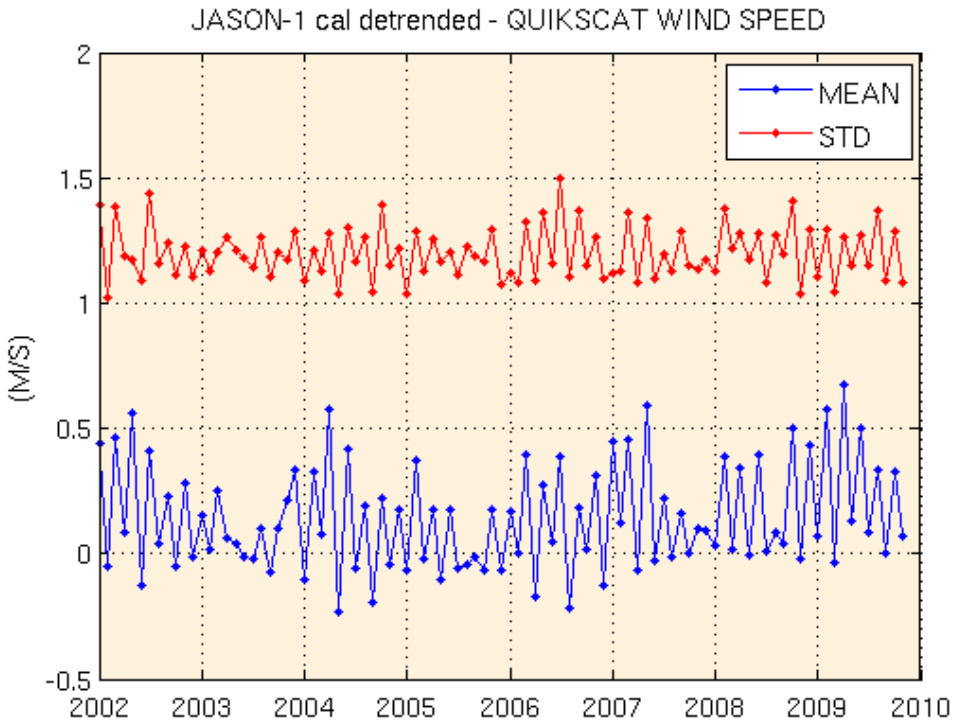


Jason-1 corrected *sigma0* trend
Wind speed comparisons

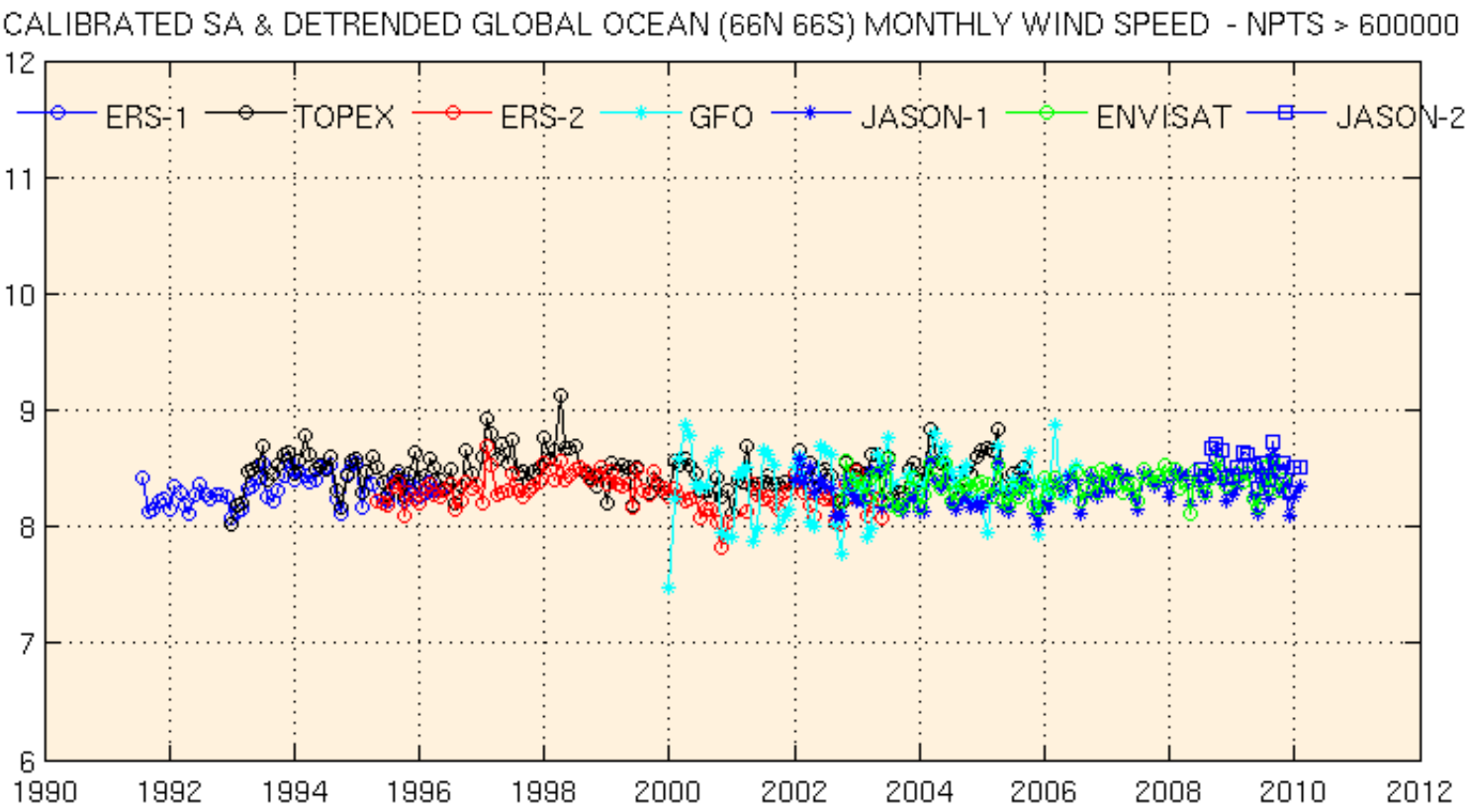
JASON-1 – buoy wind speed



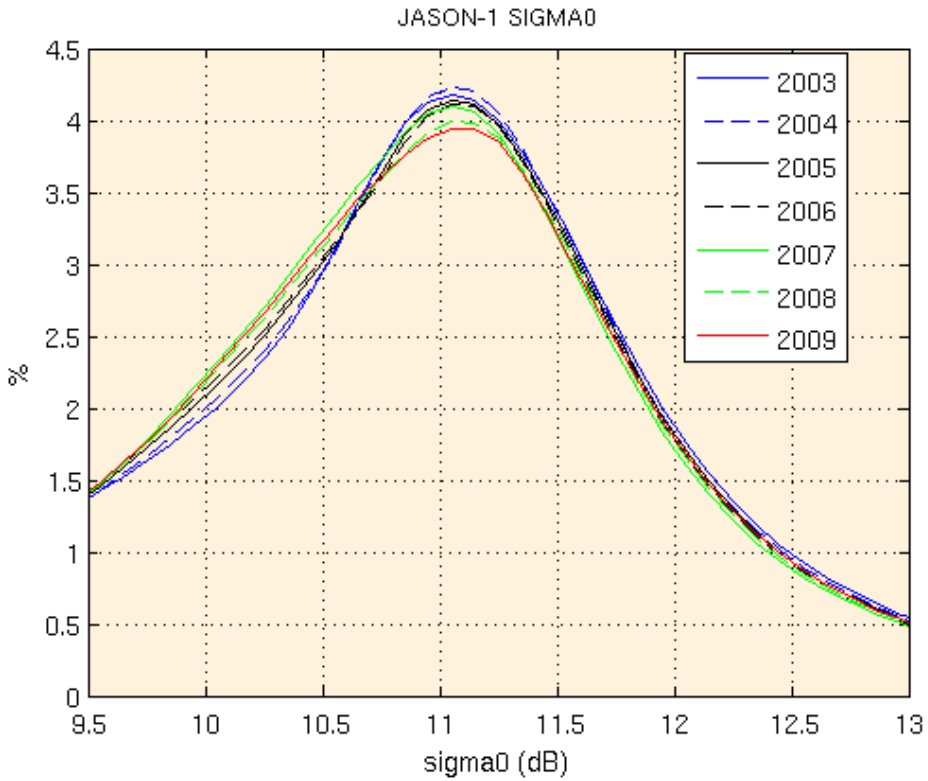
JASON-1 – QuikScat wind speed

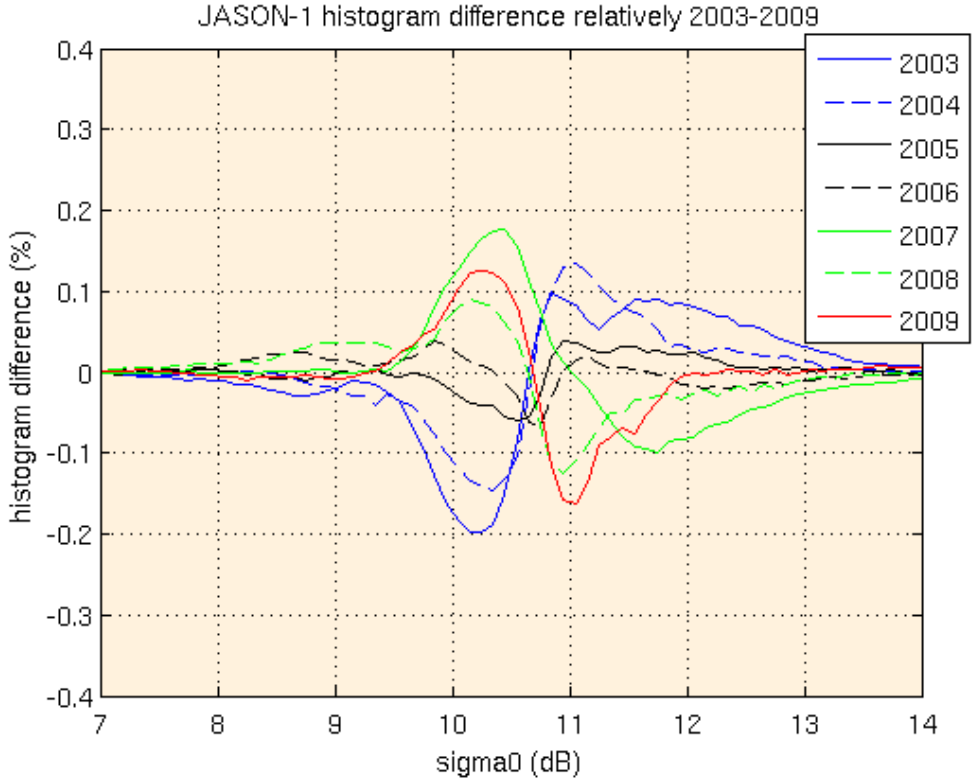


Monthly mean *Wind Speed*
global oceans 66° N – 66° S
from calibrated, corrected & detrended *sigma0*



Jason-1 year to year *sigma0* distributions





Conclusions

- SWH
  - GDR altimeter data have to be corrected
  - Good agreement, once corrected
  - ENVISATswh bias increase after cycle 86 ?
  - Altimeter SWH accuracy at very high wave height ?
- Sigma0
  - The proposed method improves the consistency of altimeter Ku-band sigma0 measurements
  - Still some calibration issues on Jason-1 and GFO
  - When reprocessing global altimeter missions it would be suitable to carefully calibrate Ku-, C- and S-band sigma0!
  - Application not only for wind, but for wave modeling and sea surface roughness applications