



ESA Climate Change Initiative Phase-II

Sea Surface Temperature (SST)

www.esa-sst-cci.org

Comparison of AMSR2 Sea Surface Temperature Retrievals with in-situ Data

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Data Sources

Retrievals

- RSS
- JAXA v2 SST retrievals (starting July 24 2012)
- UoR developmental OE retrievals as part of ESA SST CCI Phase 2 based on JAXA v1 BTs.

- AMSR2 overpasses matched to *in situ* observations within 4 hours to produce a matchup database (Brockmann Consult).
- Comparison carried out over the period 1 July 2012 - 30 June 2014.

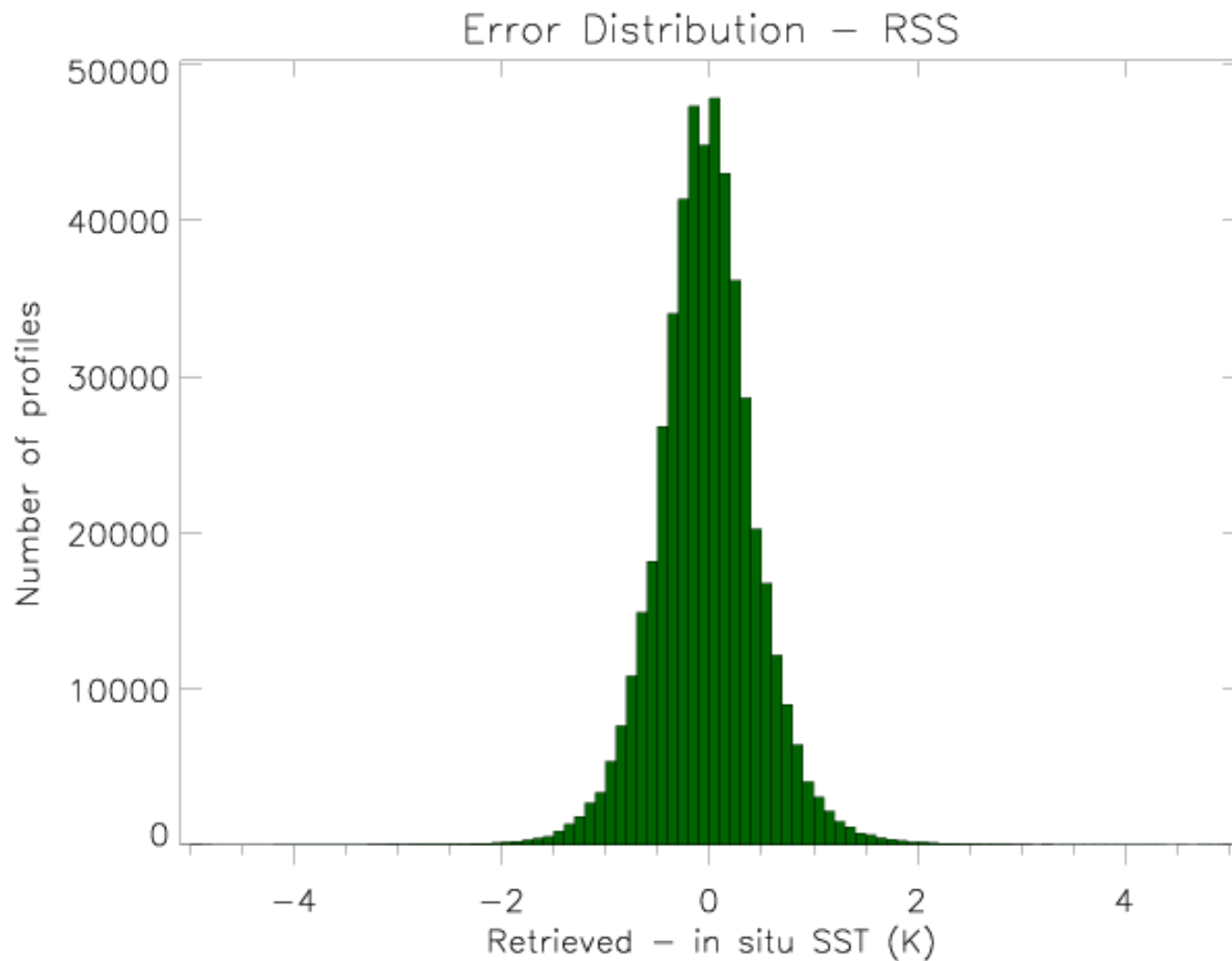
Data Sources

In-situ data in Matchup Database

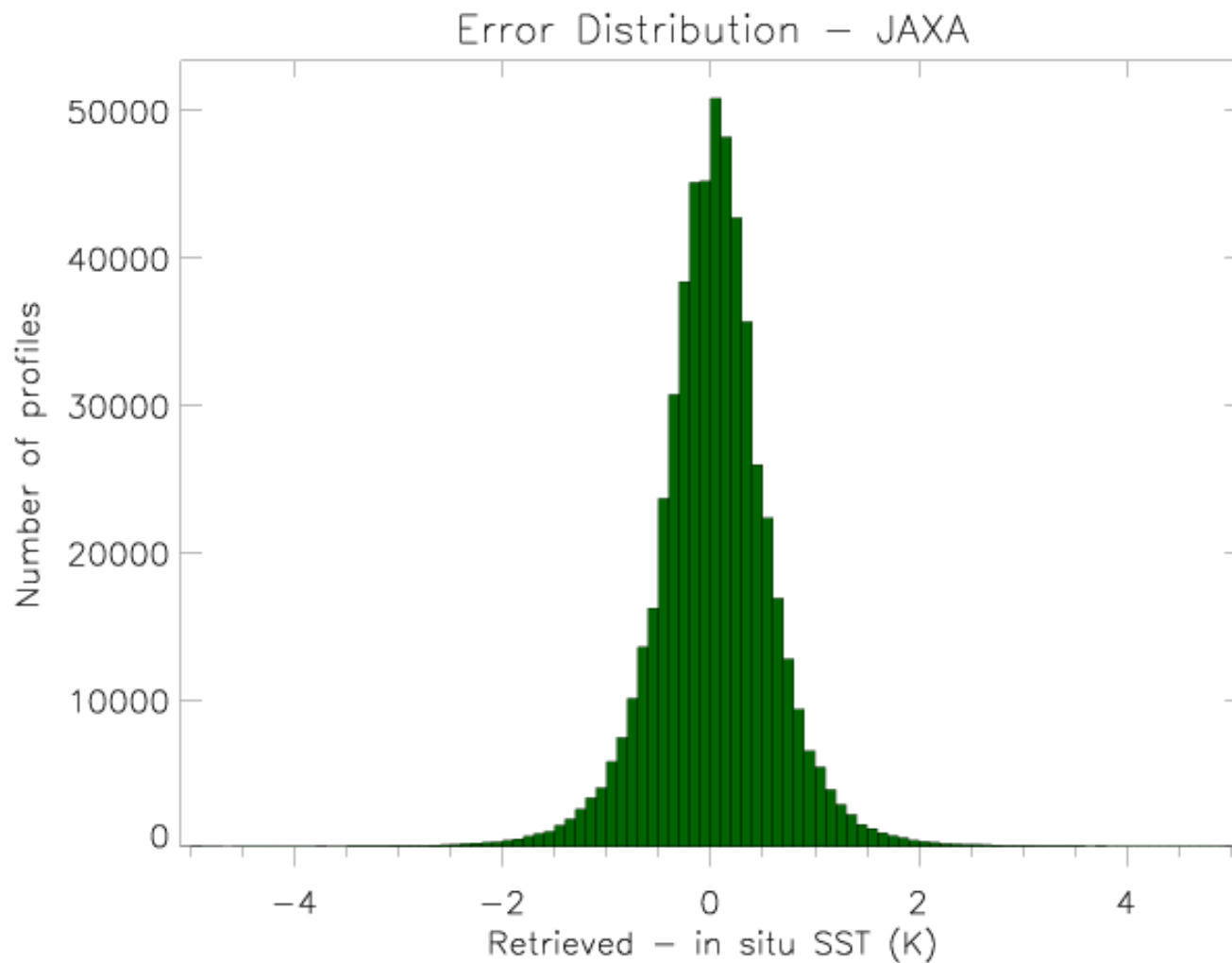
- Hadley Centre Integrated Ocean Database – ICOADS for surface obs, Ensembles dataset v4 (EN4) for profile obs. (includes ships, bottles, CTD, buoys, floats, instrumented animals etc.)
- GTMBA downloaded directly PMEL and added with no extra QC.
- Post-matching, additional QC performed on data and 3 data sources extracted: drifting buoys, GTMBA and Argo floats.

	All matches	After QC
All Sources	935 361	920 805
Drifting Buoys	812 842	803 991
GTMBA	18 579	12 910
Argo	63 060	63 024
Total Used	894 481	879 925

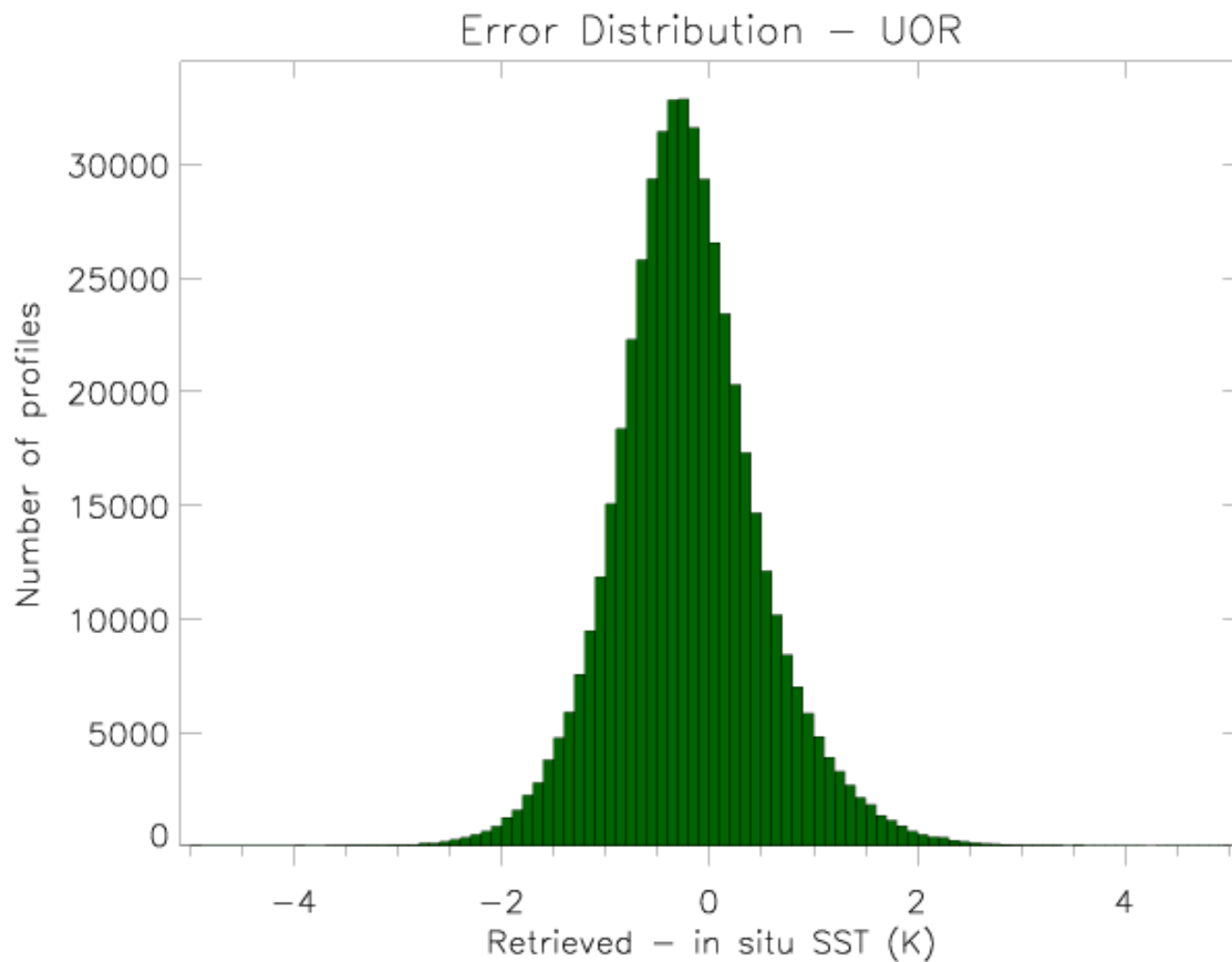
Error Distribution - RSS



Error Distribution - JAXA



Error Distribution - UoR



Summary Statistics

- For all 935 361 match locations:

	JAXA	RSS	UoR
Good Retrieval	568 761	517 671	511 716
Matching Good Buoys	549 864	501 304	495 506
Mean Error	0.035	-0.028	-0.21
Std. Dev.	0.63	0.59	0.75
MAD (equiv. SD)	0.31 (0.45)	0.29 (0.43)	0.42 (0.62)
Common Good	365 997		
Matching Good Buoys	355 394		

Summary Statistics

- For the “Common Good” retrievals:

	JAXA	RSS	UoR
Good Retrieval	365 997	365 997	365 997
Matching Good Buoys	355 394	355 394	355 394
Mean Error	0.033	-0.039	-0.26
Std. Dev.	0.54	0.55	0.71
MAD (equiv. SD)	0.28 (0.41)	0.26 (0.39)	0.40 (0.59)
Common Good	365 997		
Matching Good Buoys	355 394		

Bad Quality Flags

- Eliminating first month for this test only leaves 899 676 retrievals

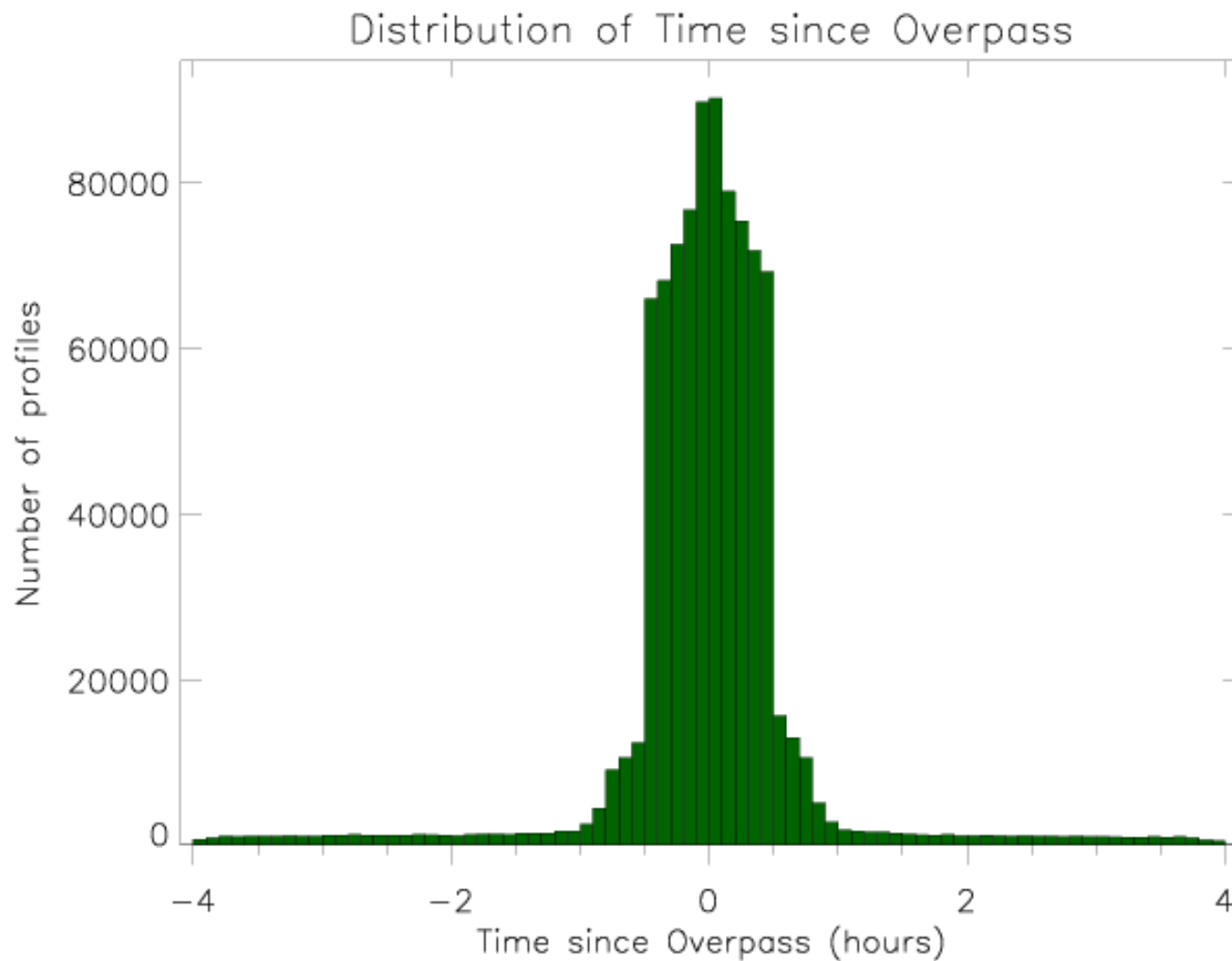
	JAXA	RSS	COMMON
Excluded Retrievals	337 556	400 056	301 760
Land	66 142	31 465	30 844
Ice	55 184	49 111	39 117
Rain	146 106	222 814	118 937
Wind	16 987	-	-
Other	48 225	163 352	-
Sun glint	-	42 681	-
RFI	-	1 938	-
Missing	4 912	1	-
Warnings	-	204 502	-

“Other”

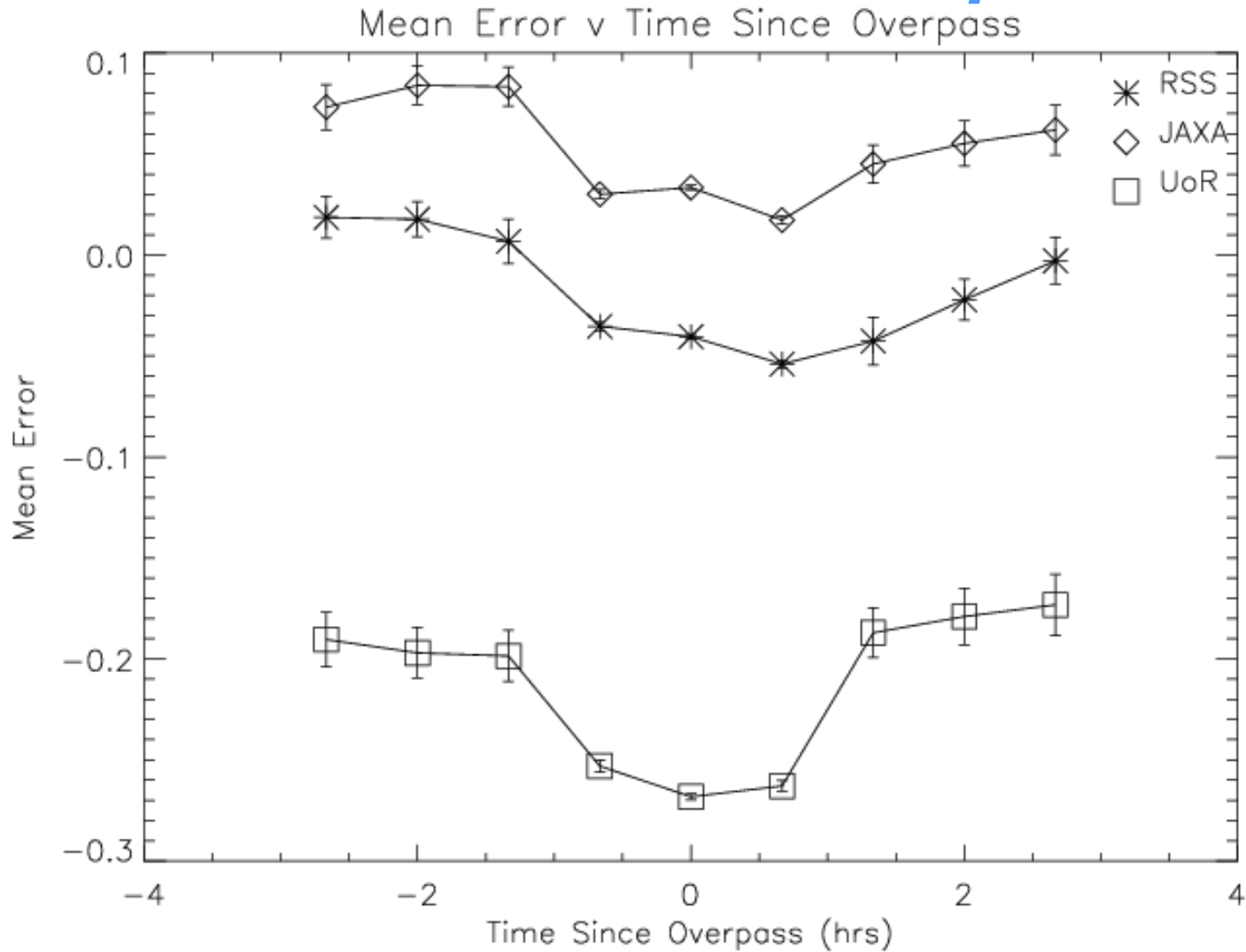
JAXA: Error Flag

RSS: Additional near land, ice, edge of swath, SST out of range, high wind...

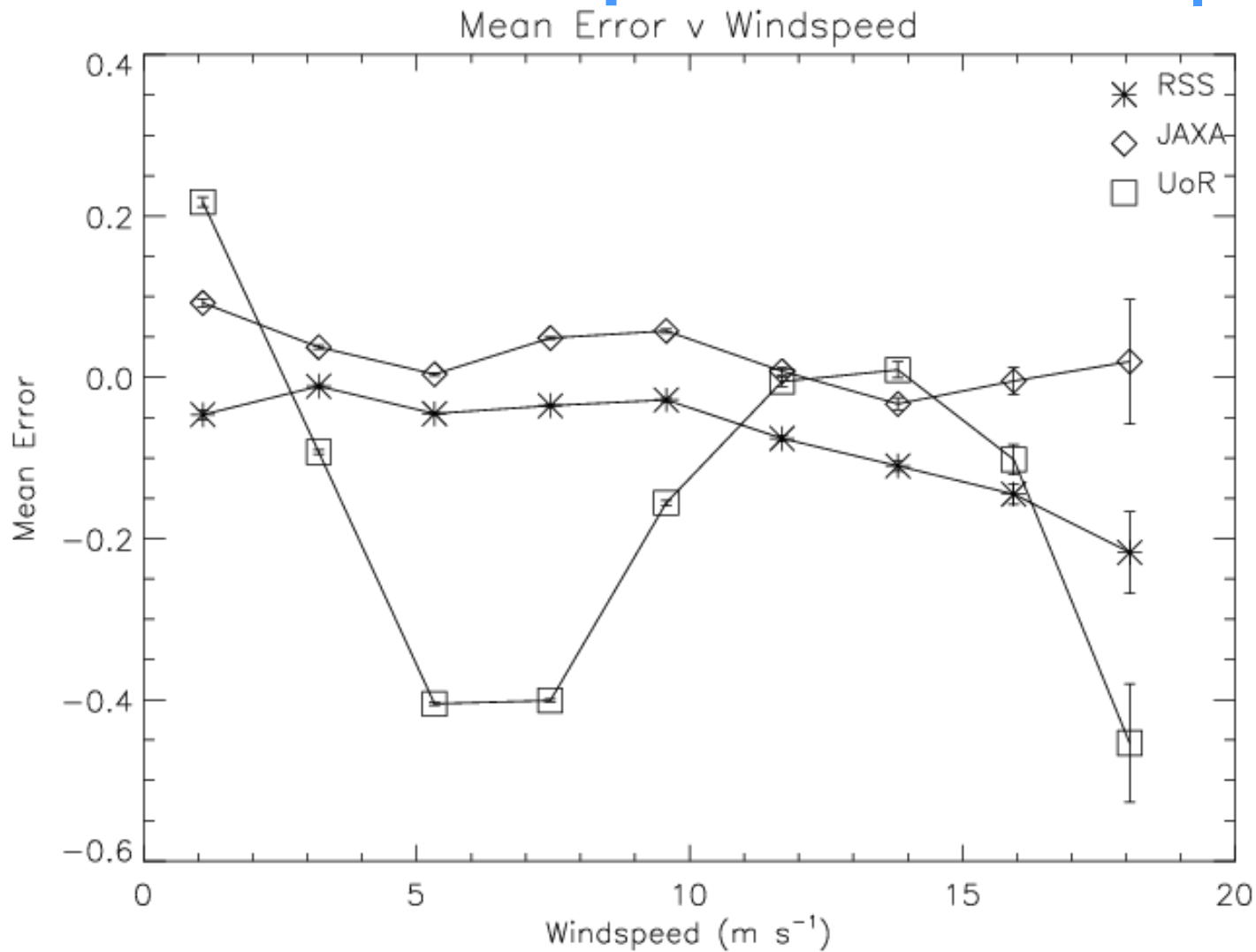
In situ Time Since Overpass



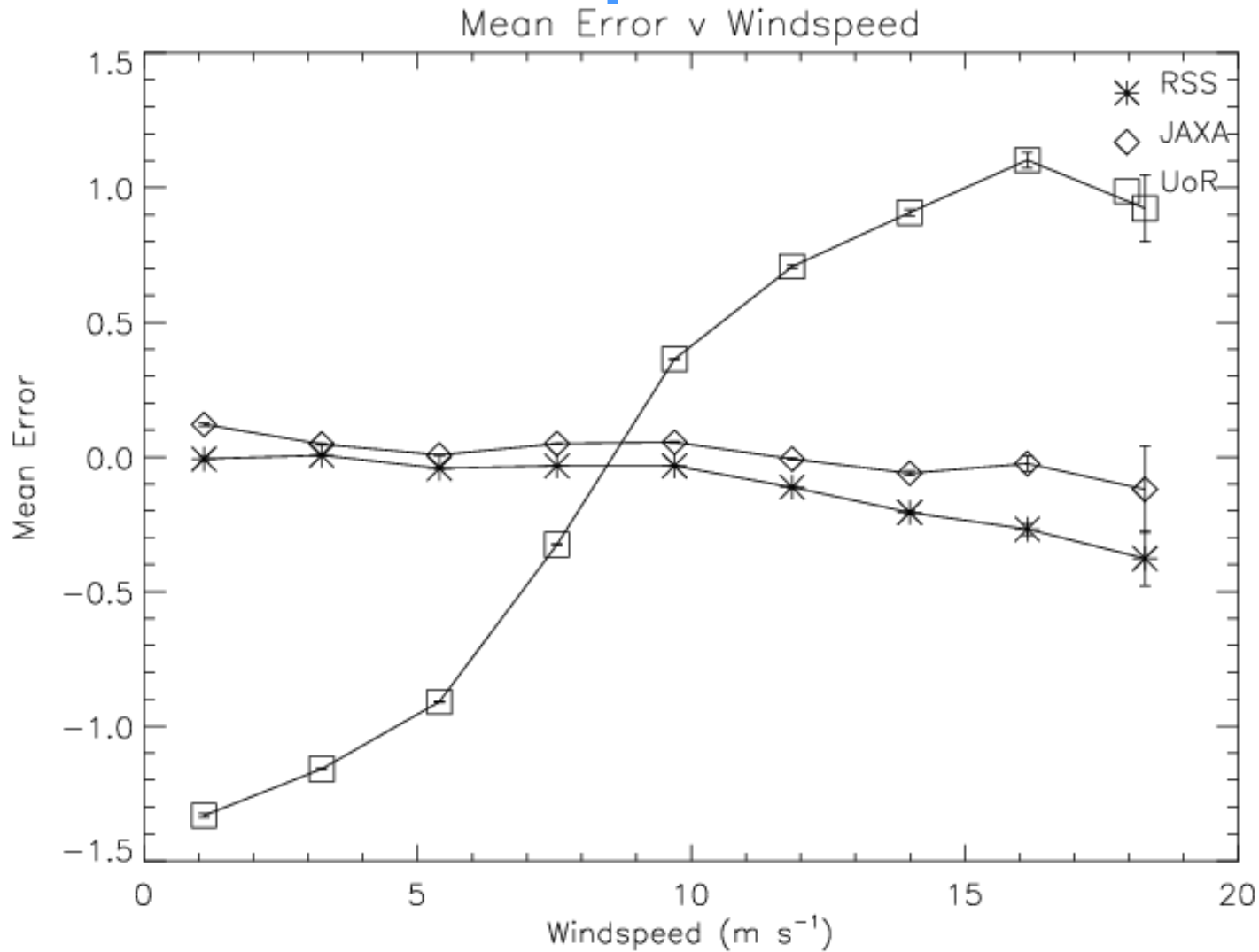
Mean Error v Time Since Overpass



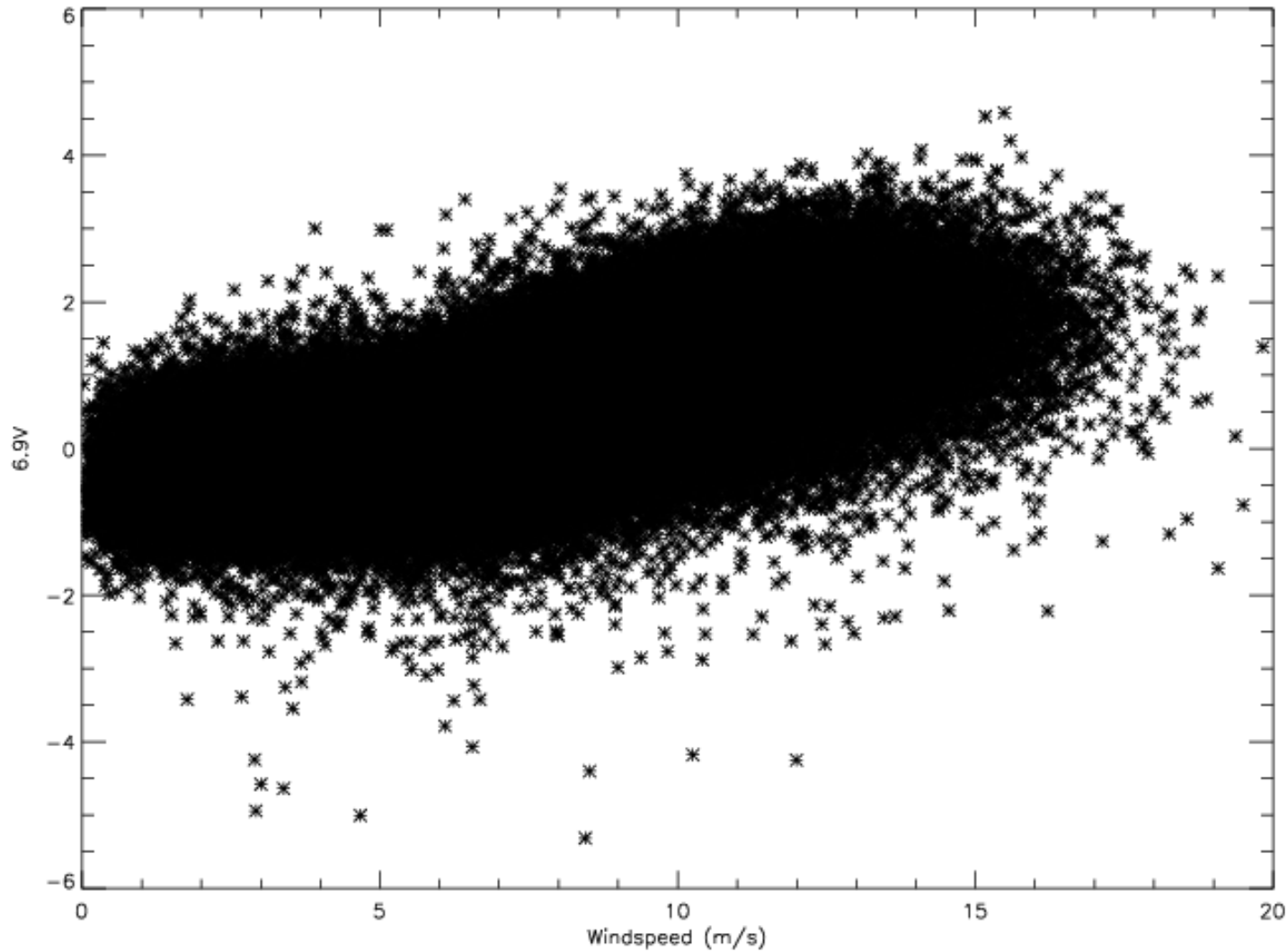
Mean Error v Windspeed – bias= $a+b|U|$



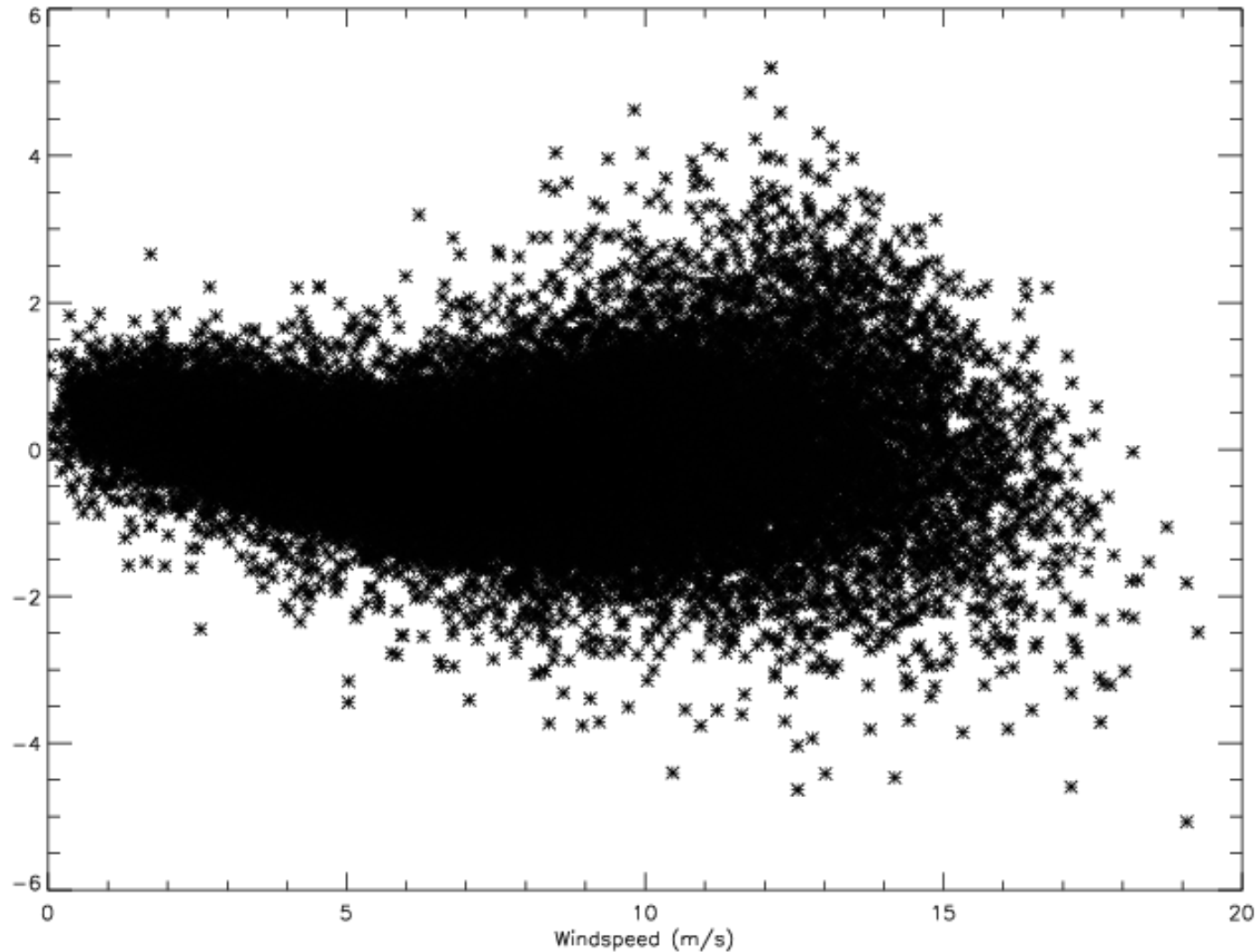
Mean Error v Windspeed – constant bias



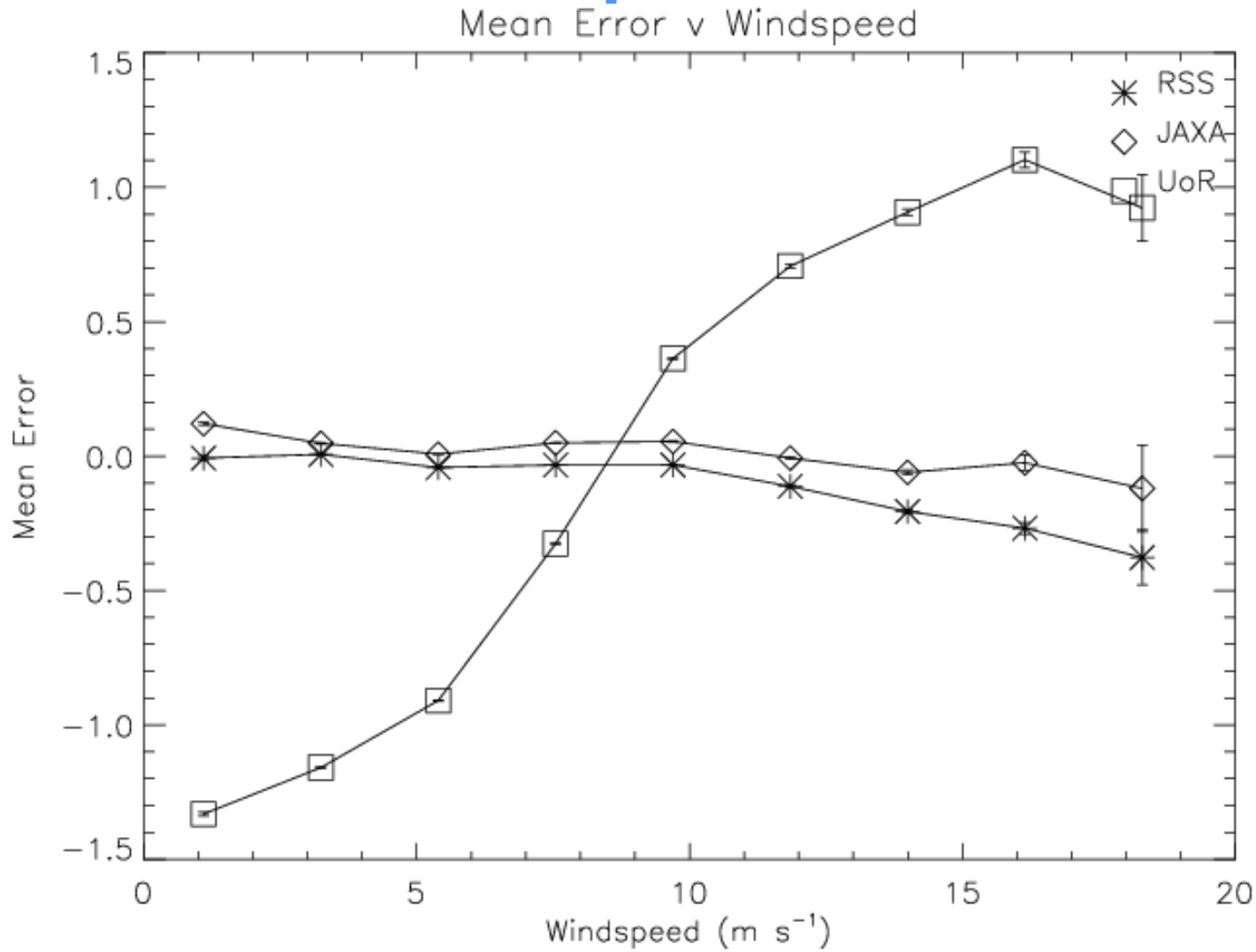
$\Delta BT(6.9V)$ v Windspeed - Uncorrected



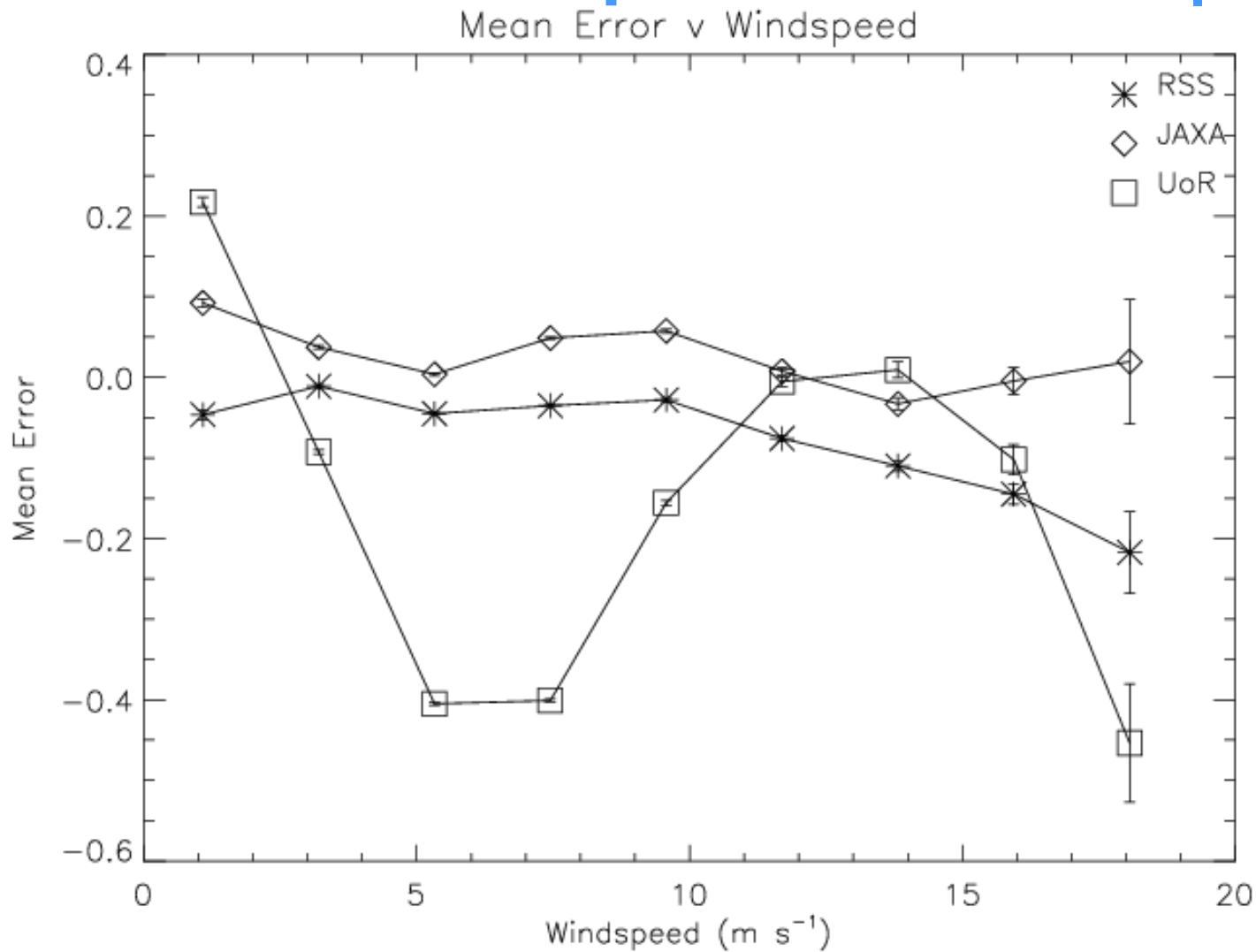
$\Delta BT(6.9V)$ v Windspeed – linear, corrected



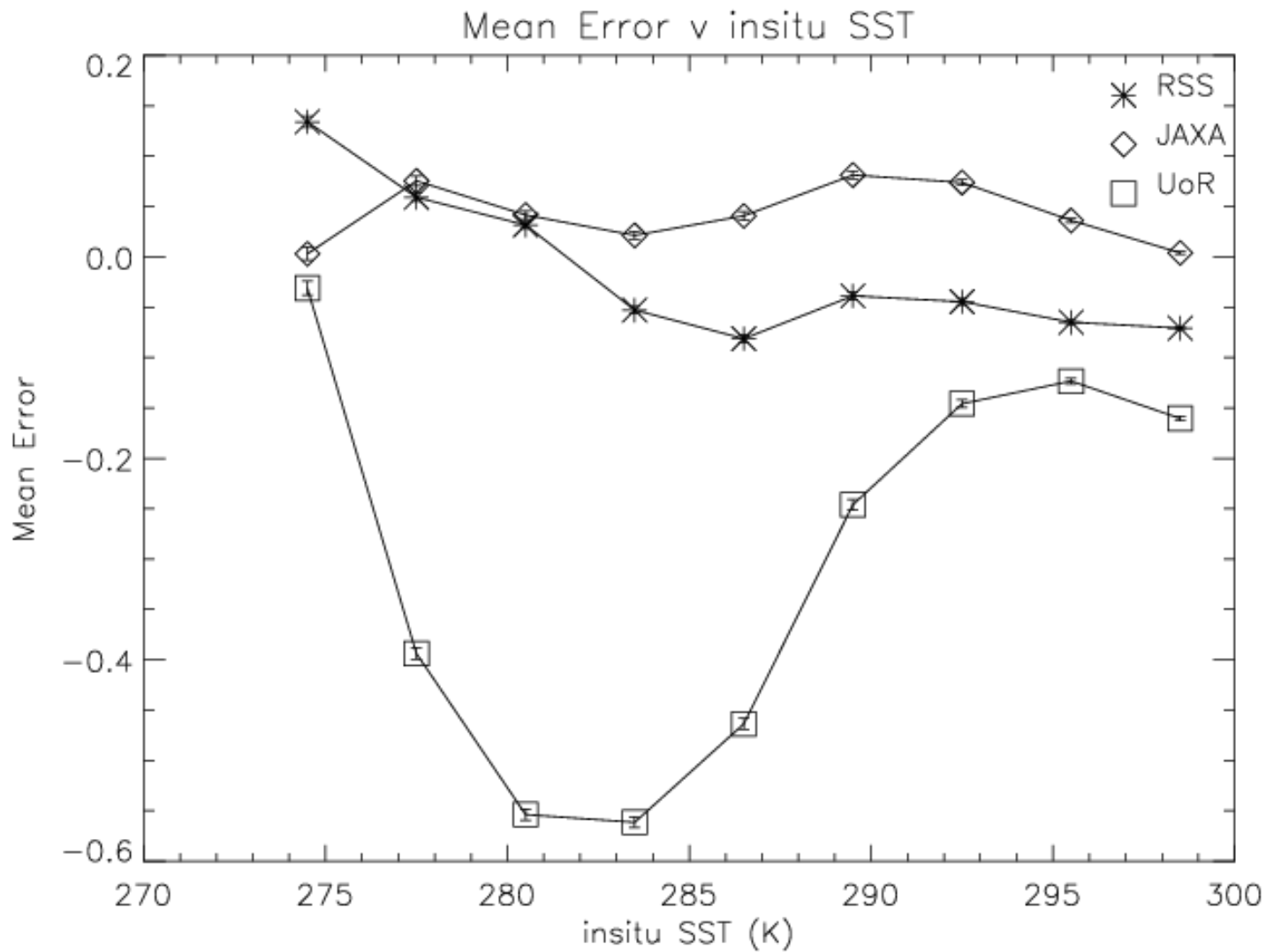
Mean Error v Windspeed – constant bias



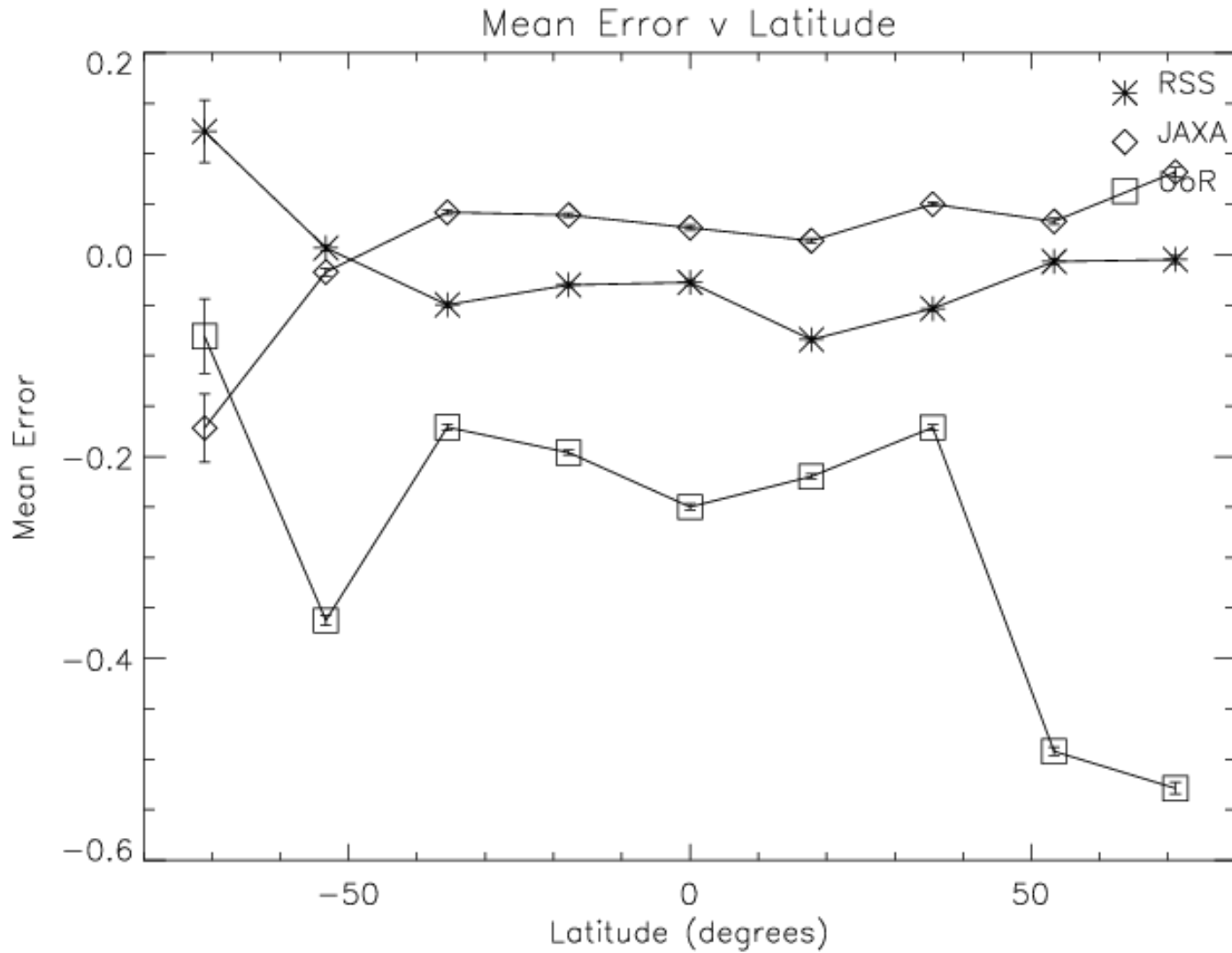
Mean Error v Windspeed – bias= $a+b|U|$



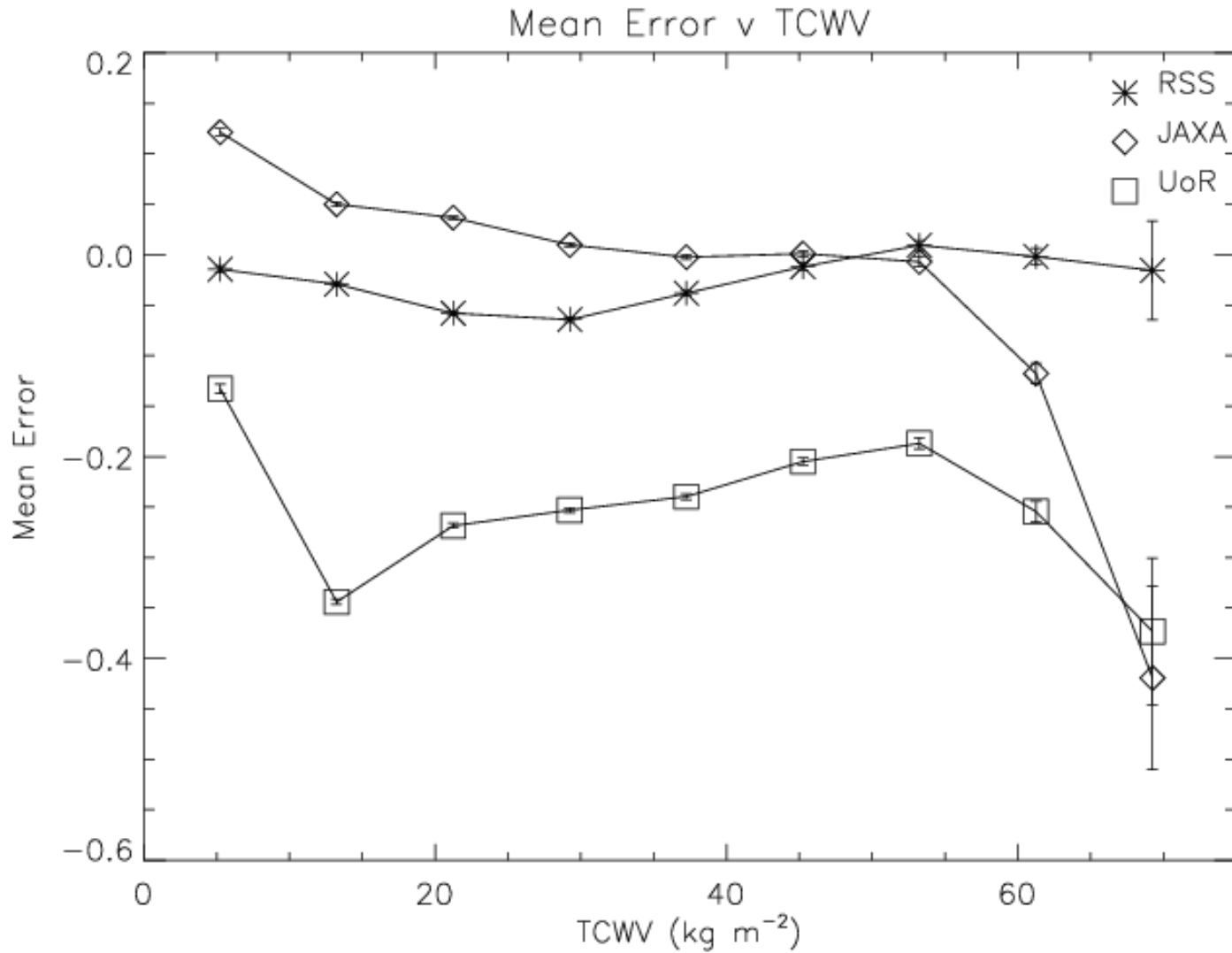
Mean Error v *in situ* SST



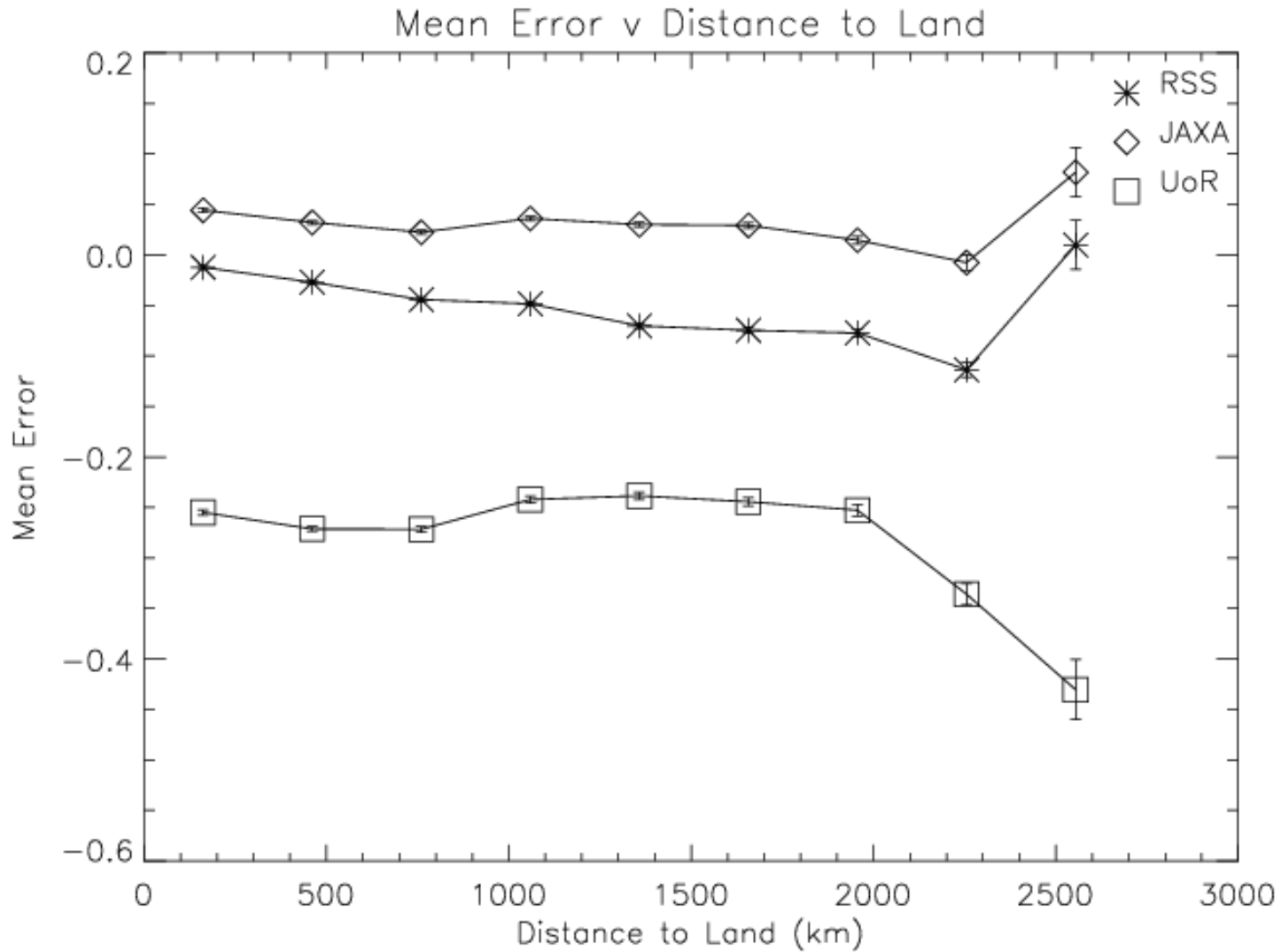
Mean Error v Latitude



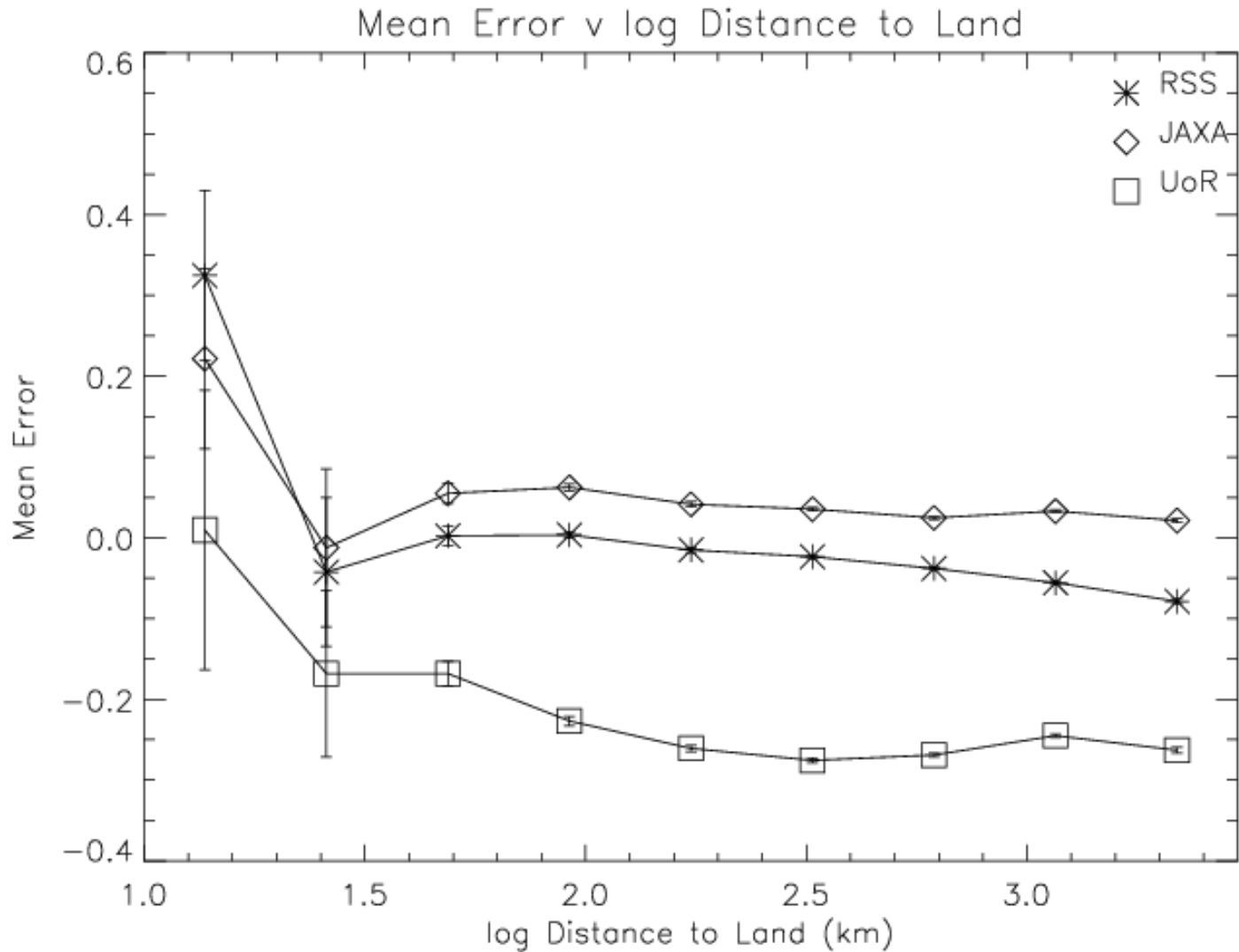
Mean Error v TCWV



Mean Error v Distance to Land



Mean Error v Distance to Land



Conclusions

- Significant rejection (~40%) of data due to contamination
- RSS, JAXA retrieval errors similar for common data.
- Bias correction important