Analysis of RS92-RS41 twin soundings available in GRUAN database

Alessandro Fassò - University of Bergamo, Italy

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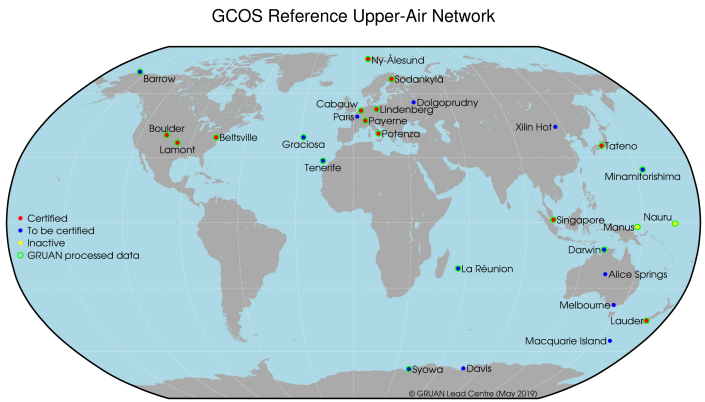
At ICM-10 I compared RS92-GDP & RS41-EDT1 showing

1. How to use GDP measurement uncertainty in statistical analysis
2. The role of vertical correlation and solar radiation
3. Inter-instrument/inter-processing bias assessment using heteroskedastic local polynomial least squares.
4. Bias adjustment and harmonisation

GRUAN Dataset of dual soundings

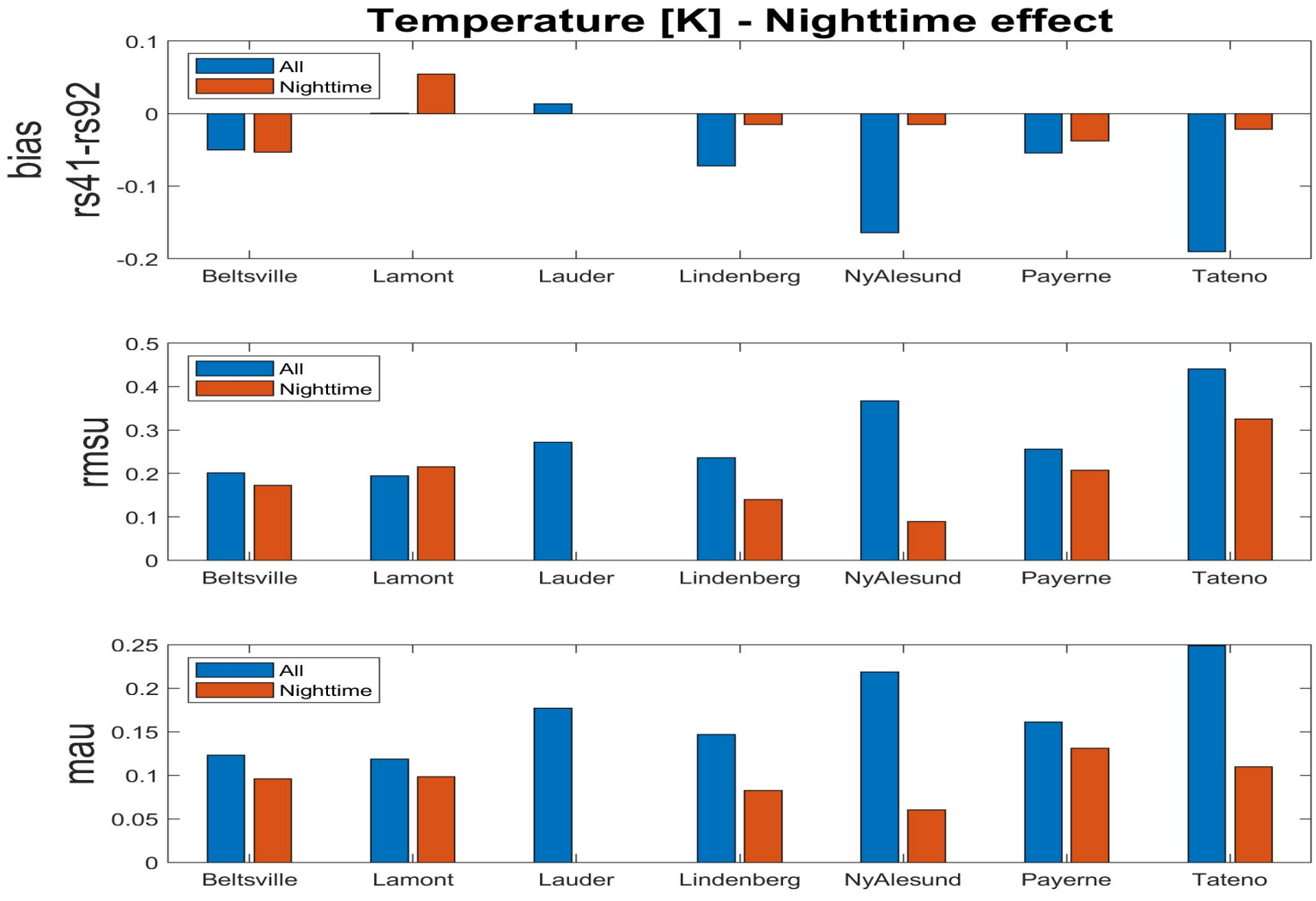
RS41-EDT.1 vs RS92-EDT.1



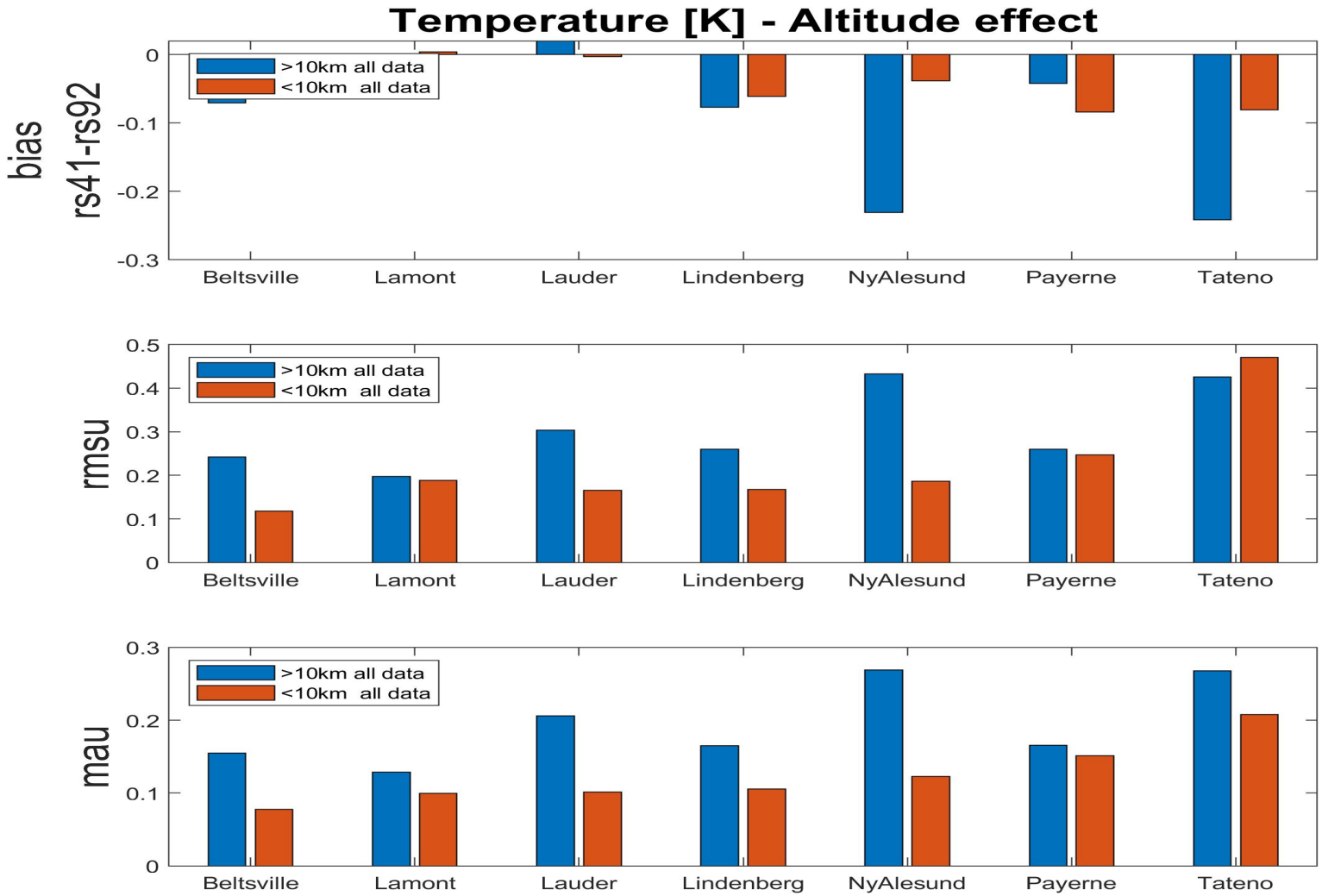
Site		Twin launches			
		ALL	Night	Outliers	Update
BEL	Beltsville	105	49	3	02/03/19
SGP	Lamont	19	7	1	08/06/14
LAU	Lauder	53		2	17/11/16
LIN	Lindenberg	388	146	12	07/05/19
NYA	NyAlesund	120	16	4	27/03/18
PAY	Payerne	107	54	3	12/12/17
TAT	Tateno	10	5		16/10/17

RIVAL are coming ...

Temperature - Nighttime effect



Temperature - Altitude effect
(all data)



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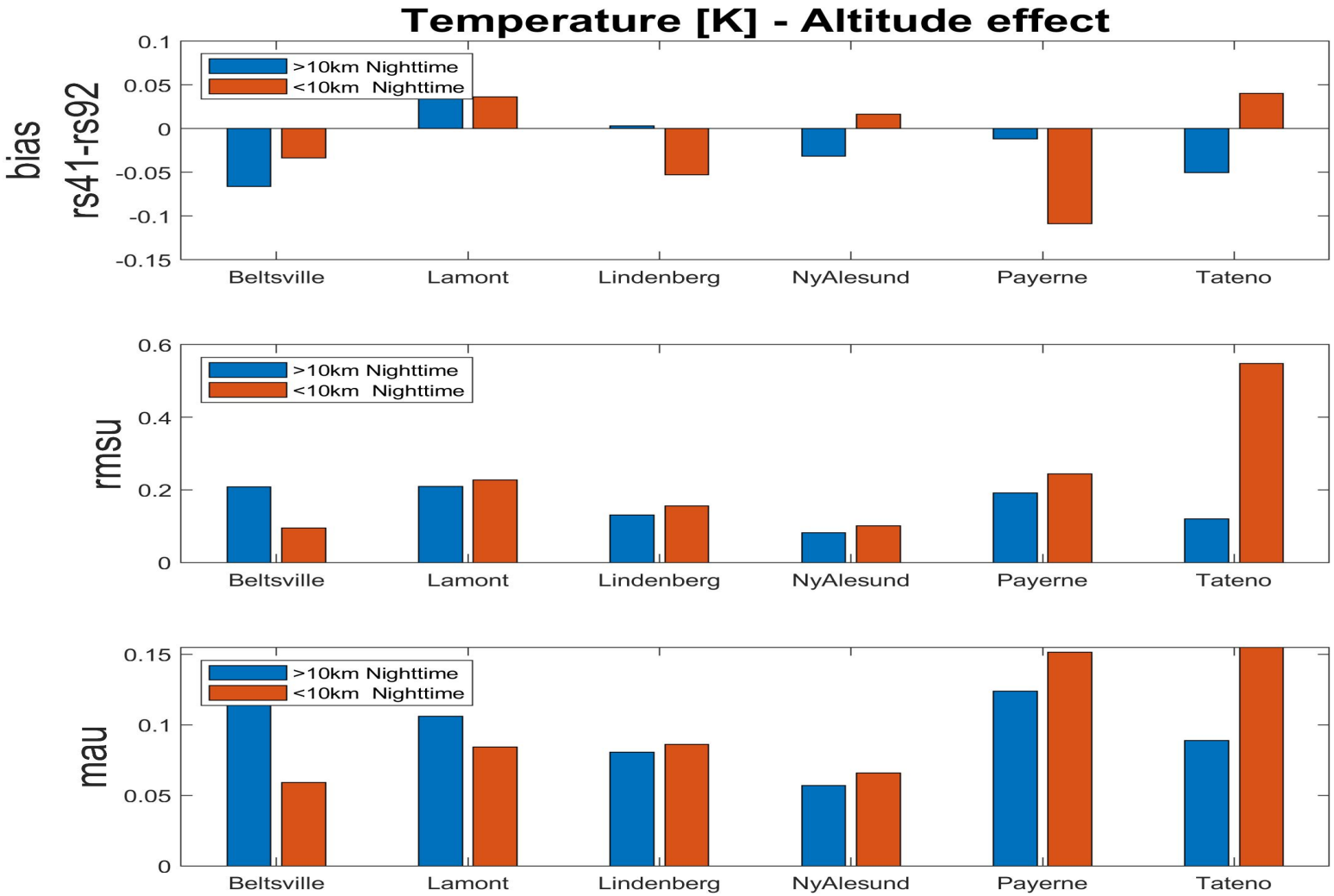
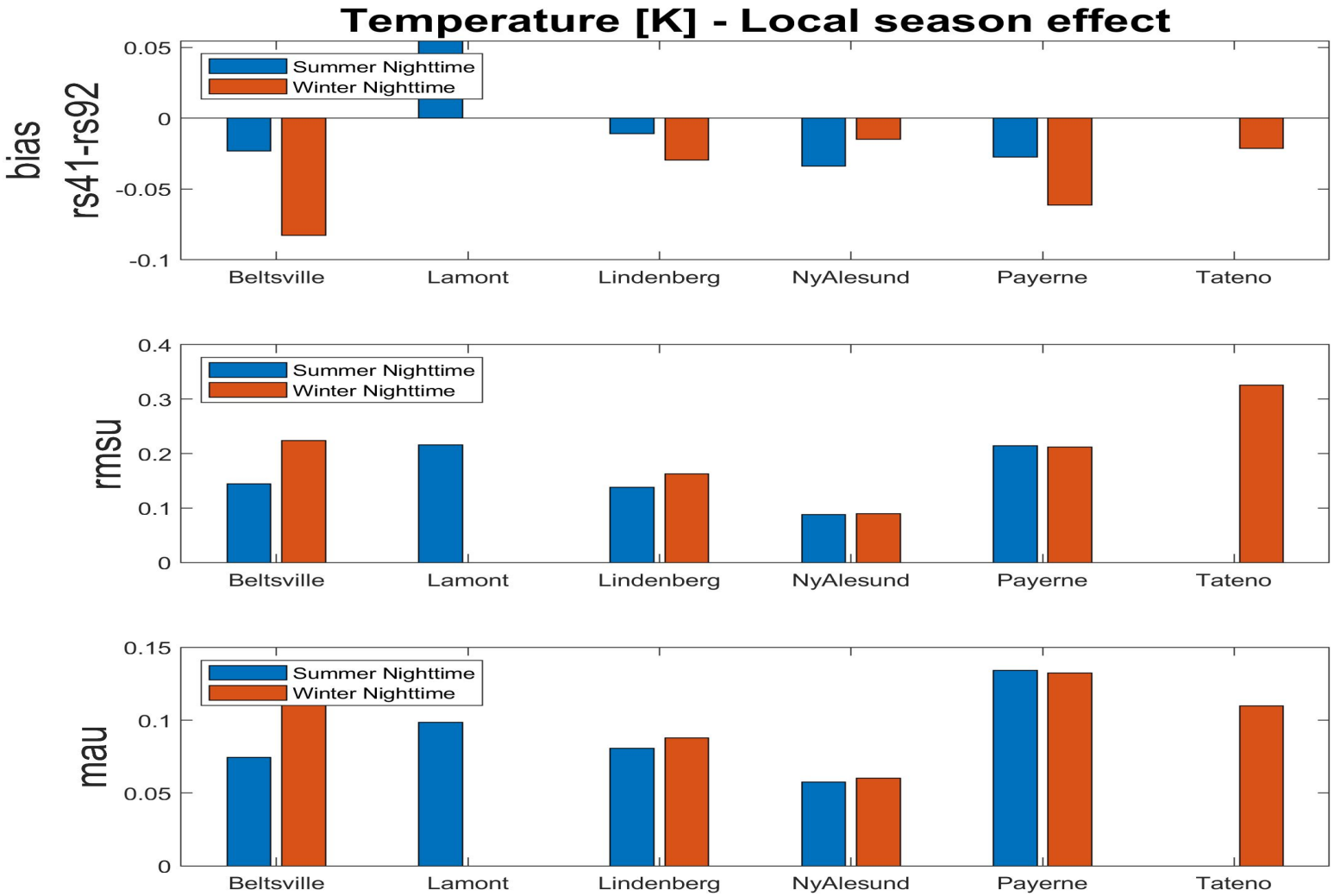
(Nighttime data)

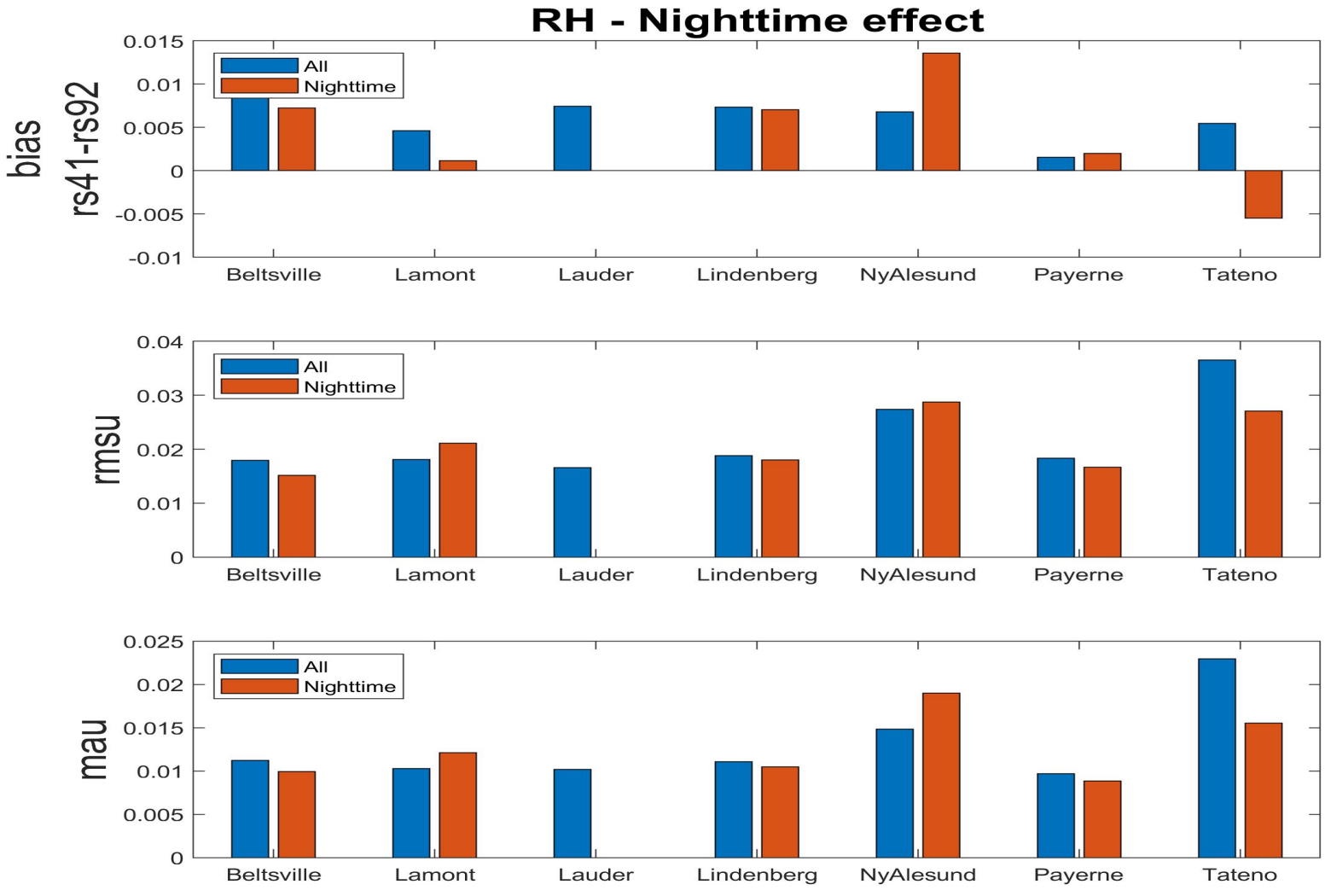


Temperature - Season effect

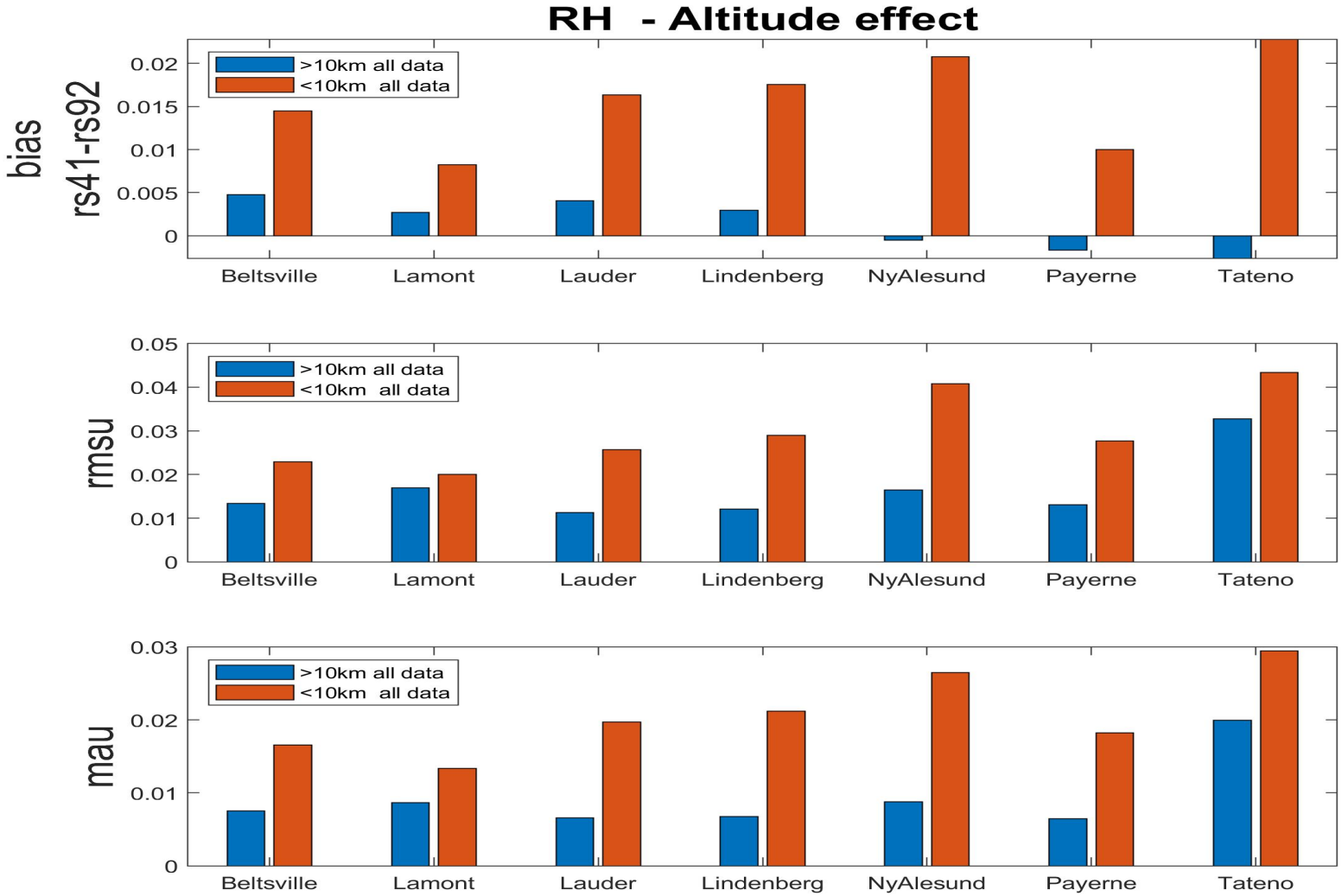
(Nighttime data)



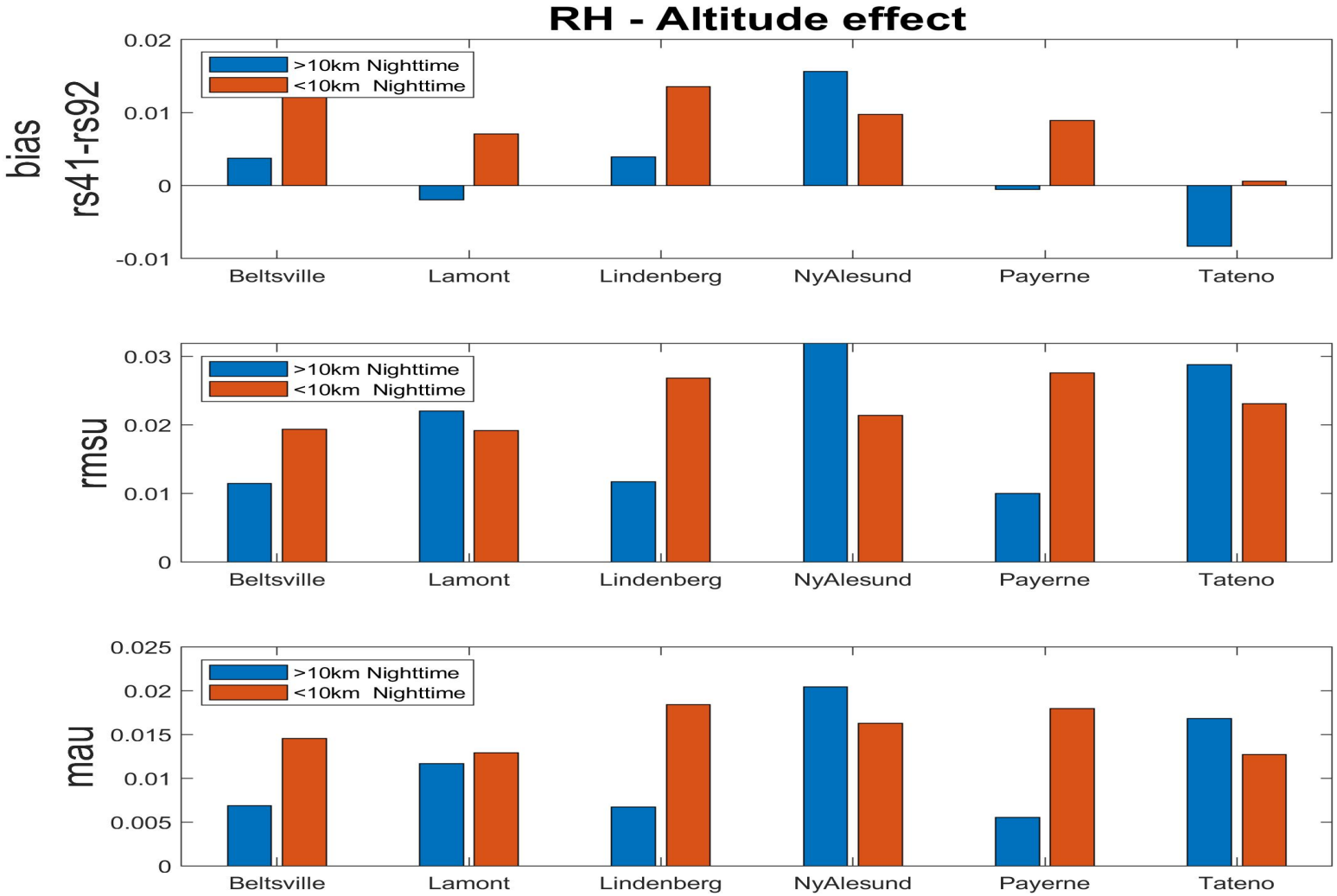
Humidity - Nighttime effect



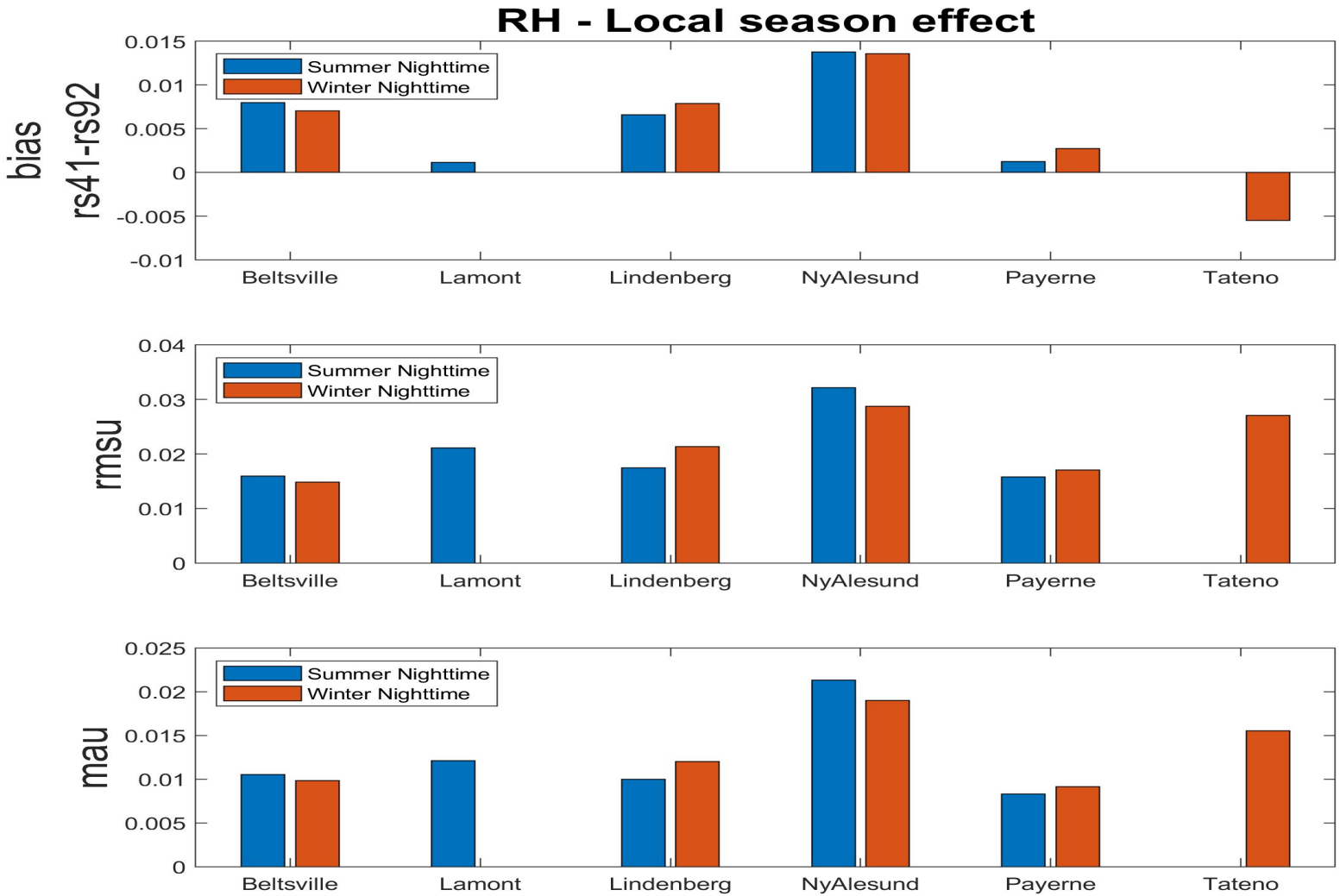
Humidity - Altitude effect (alldata)



Humidity - Altitude effect (Nighttime)

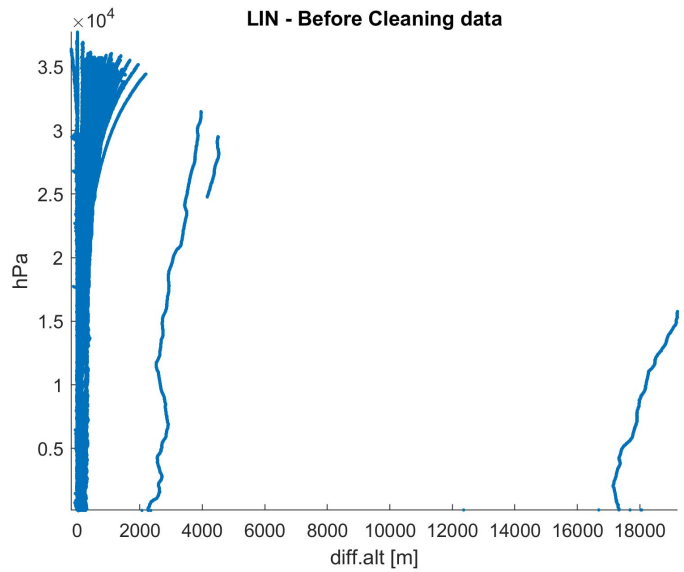


Humidity - Season effect

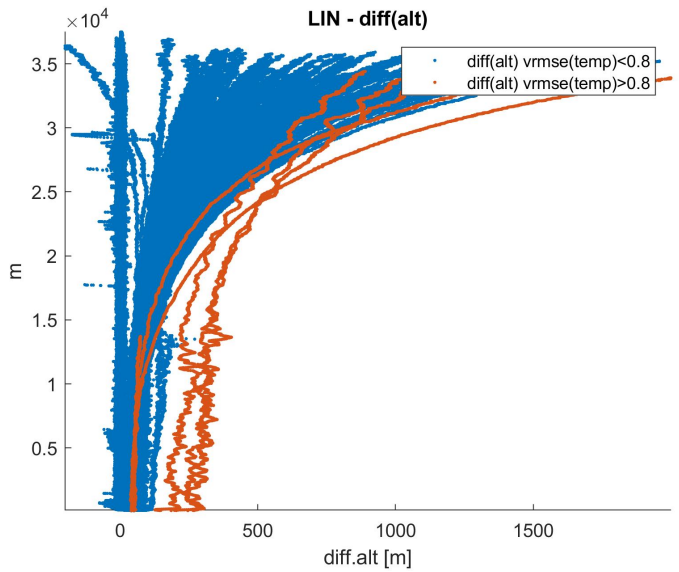


Altitude: quality & uncertainty

$alt\,(RS41) - alt\,(RS92\ )$@ LIN

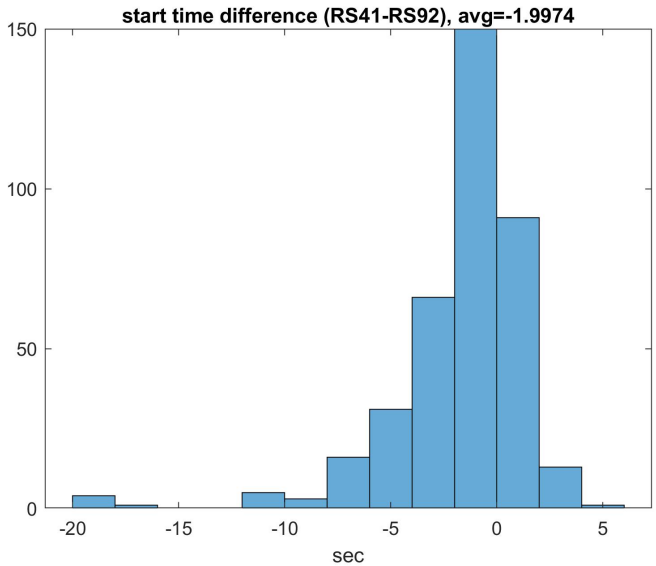


All profiles



alt & temp uncertainty

Sincronisation



Start time difference:

avg$\cong$-2s

(except 4 profiles $>$ 400sec)

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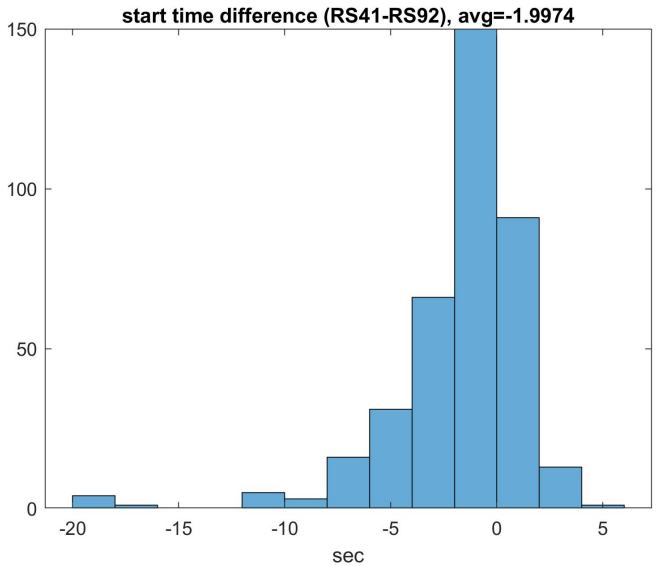

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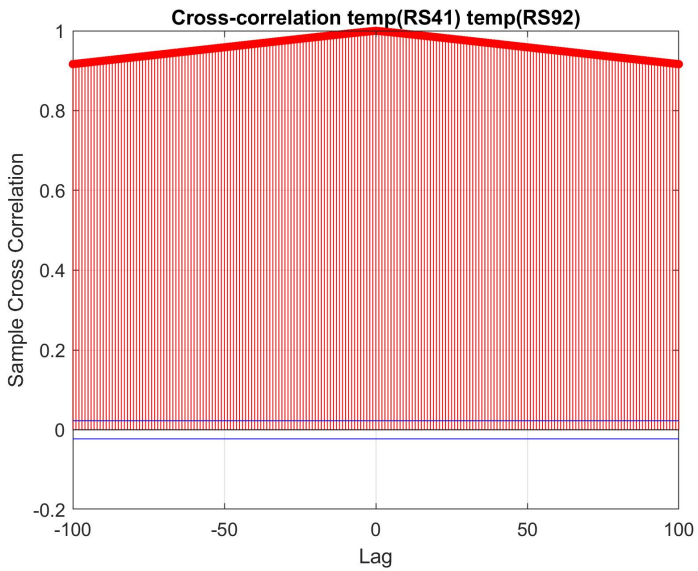
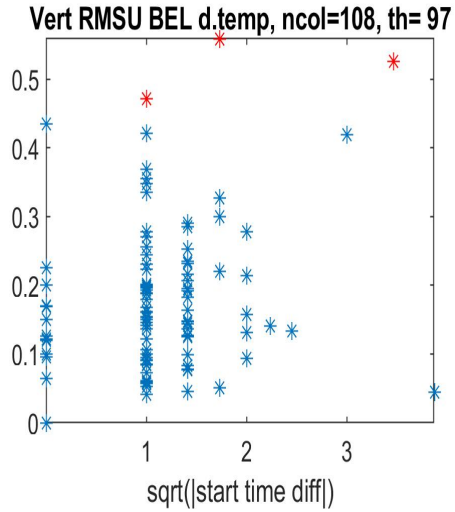
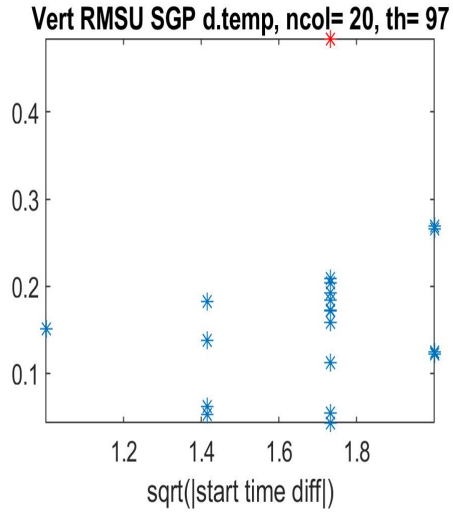
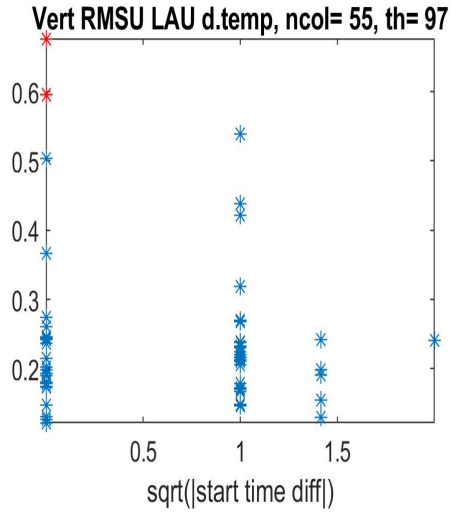


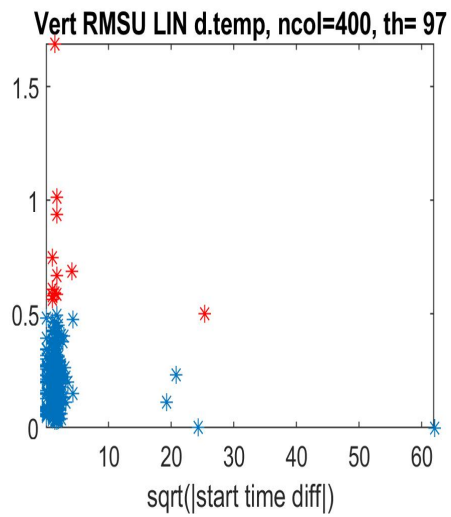
temperature crosscorrelation
max at $lag = 0$
for all profiles

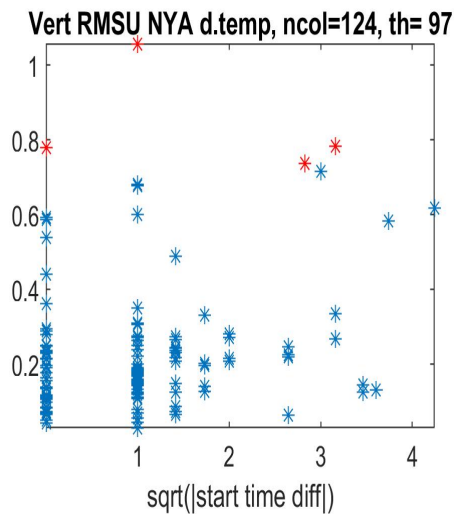
RMSU and outlier profiles

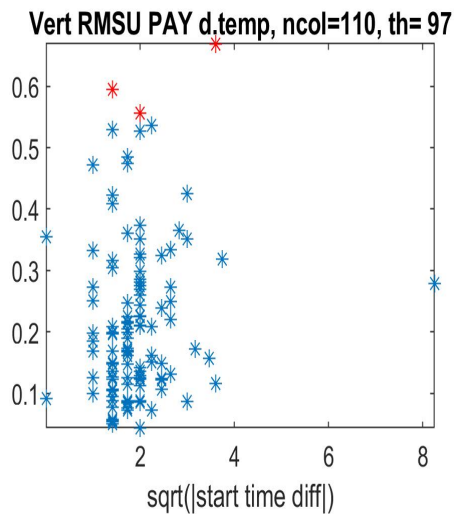




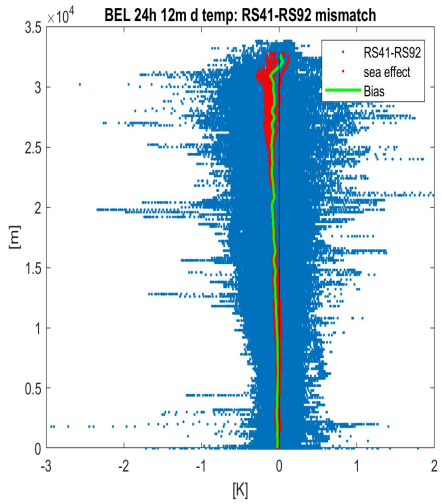


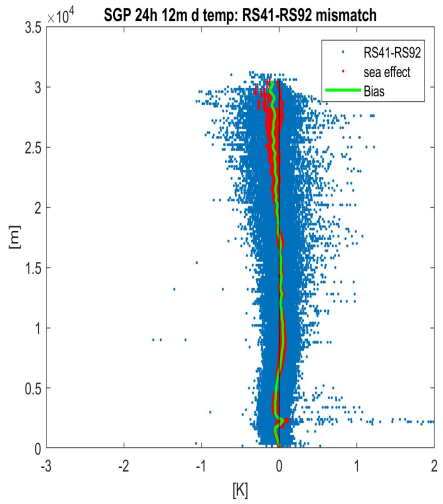


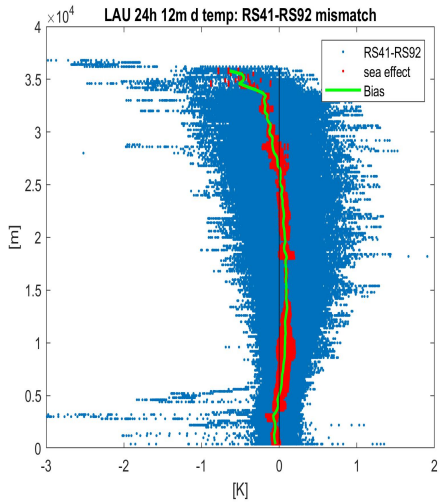


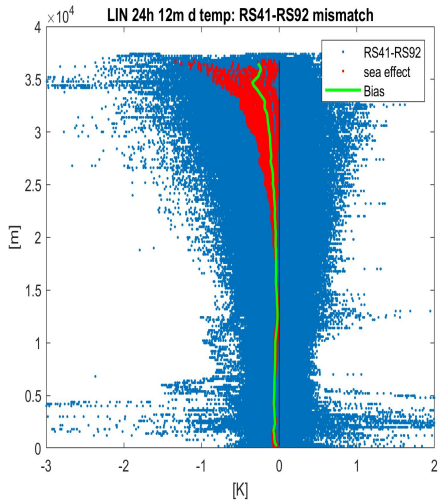


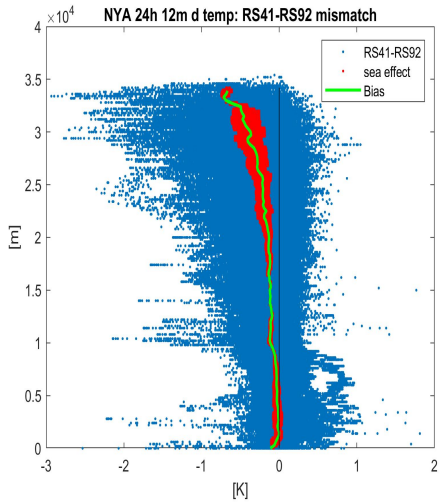
Temperature - Solar effect

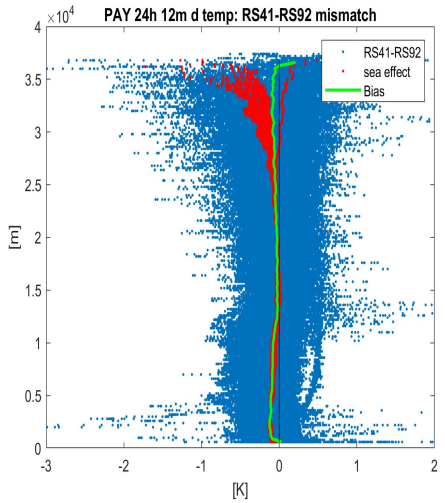




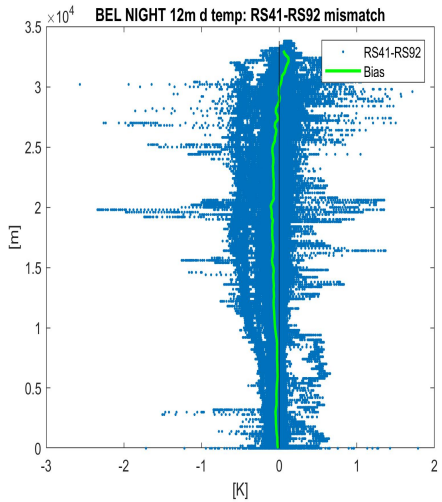


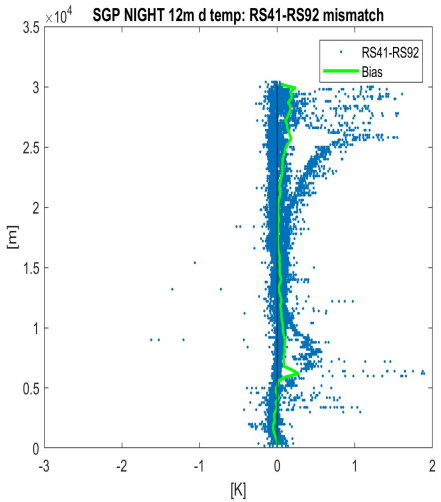


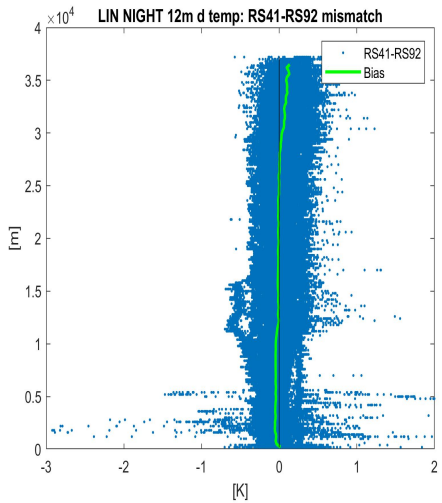


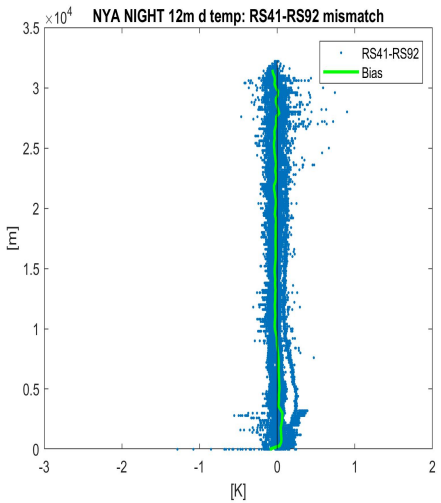


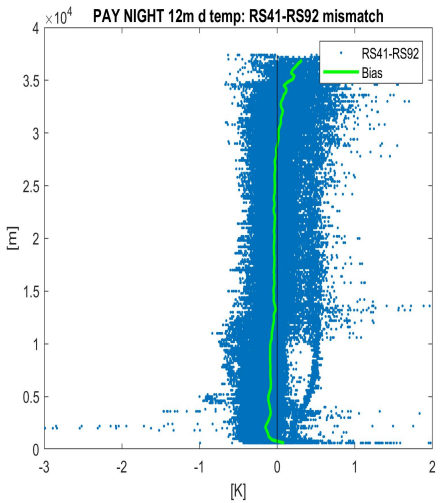
Temperature - Nighttime











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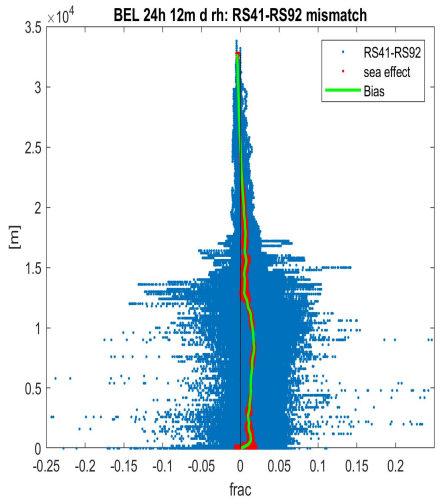
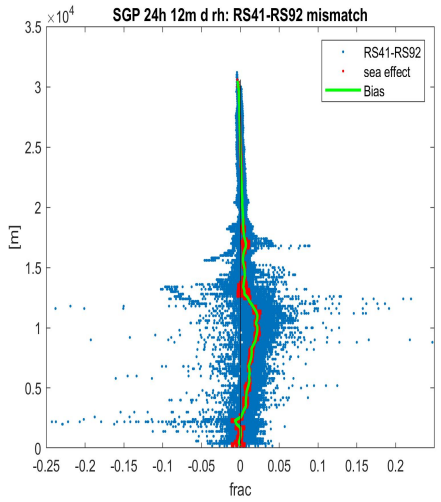
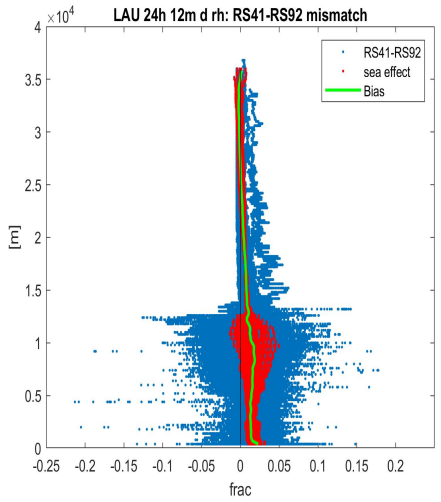
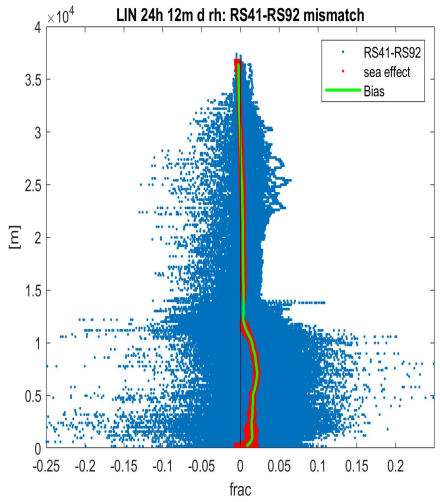
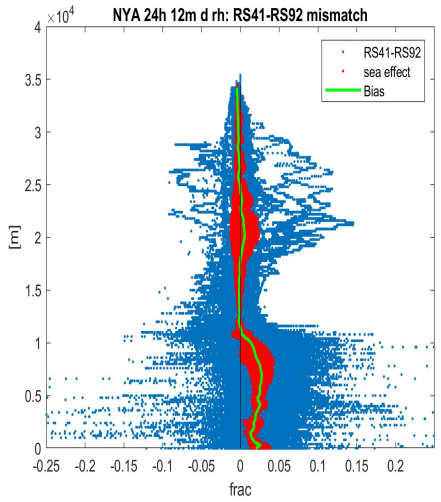
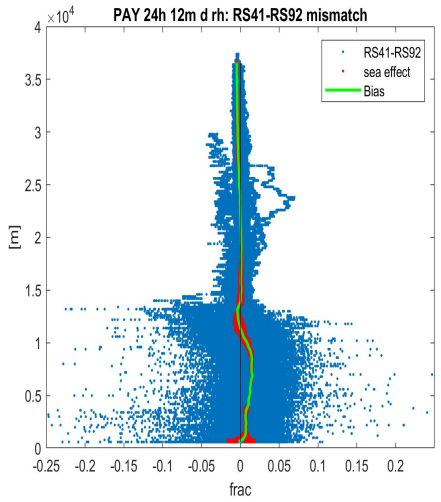




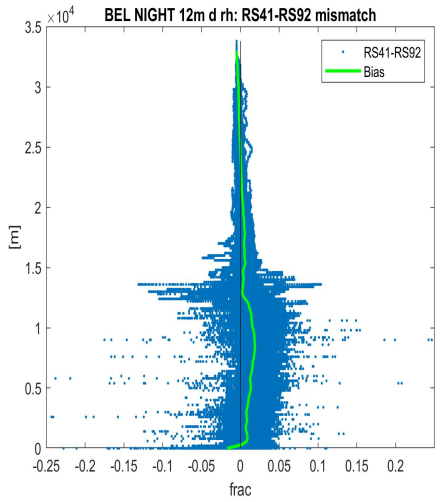


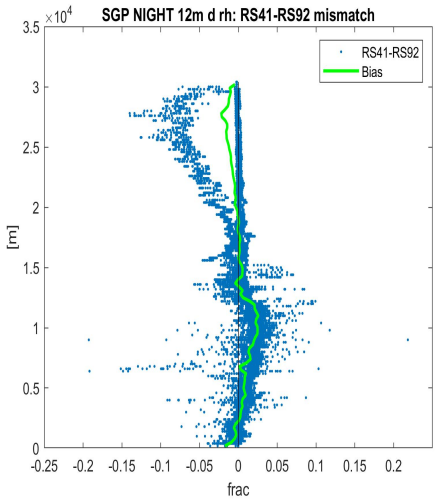


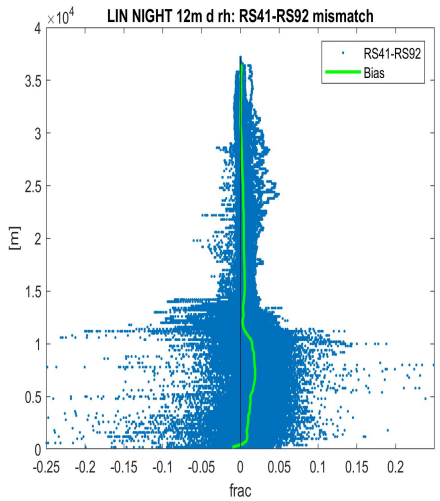


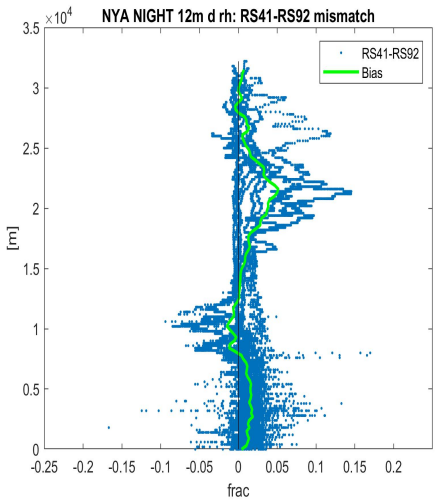


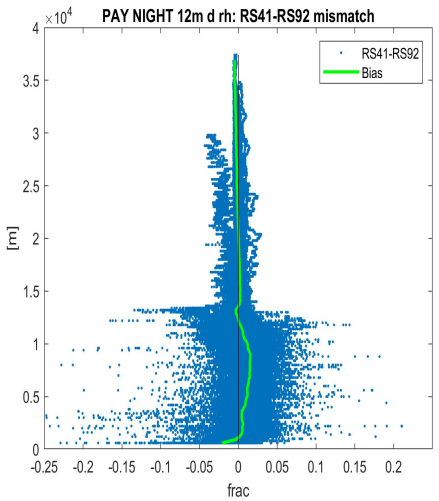
Humidity - Nighttime











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3. Humidity:
   generally, RS41 is wetter $(0.005 - 0.01)$
   Total uncertainty: $RMSU \cong 0.01 - .02$
4. Above uncertainties could be overestimated due to ALTITUDE UNCERTAINTY
   $\Rightarrow$ In general, $RS41$ is higher than $RS92$
   $\Rightarrow$ but this deserves more attention.

Conclusions & further actions (2/2)

Waiting for Godots (three guys here!) .

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2. unified and updated GRUAN database
3. GDP availability & comparison!

THANK YOU !!