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RS41-RS92 Intercomparison Campaign at Darwin (plus some RS41-RS92 dual ozonesonde flights)

Matt Tully

(with thanks to Douglas Cheetham, Samuel Sanders and Lance Passamani)

GRUAN ICM-11, 20th-24th May 2019, Singapore.

GCOS Reference Upper-Air Network



Darwin intercomparison campaign

- Darwin 12.4° South , 130.9° East
- Month-long campaign - 41 dual RS92 – RS41 soundings analysed here
- June 2018 (dry season)
- Launches were performed with a “Remote Balloon Launcher”
- All data submitted to GRUAN Lead Centre
- Launches at 05:15 Z, 11:15 Z and 23:15 Z
- (Darwin 9.5 hours ahead of UTC)





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Data analysis

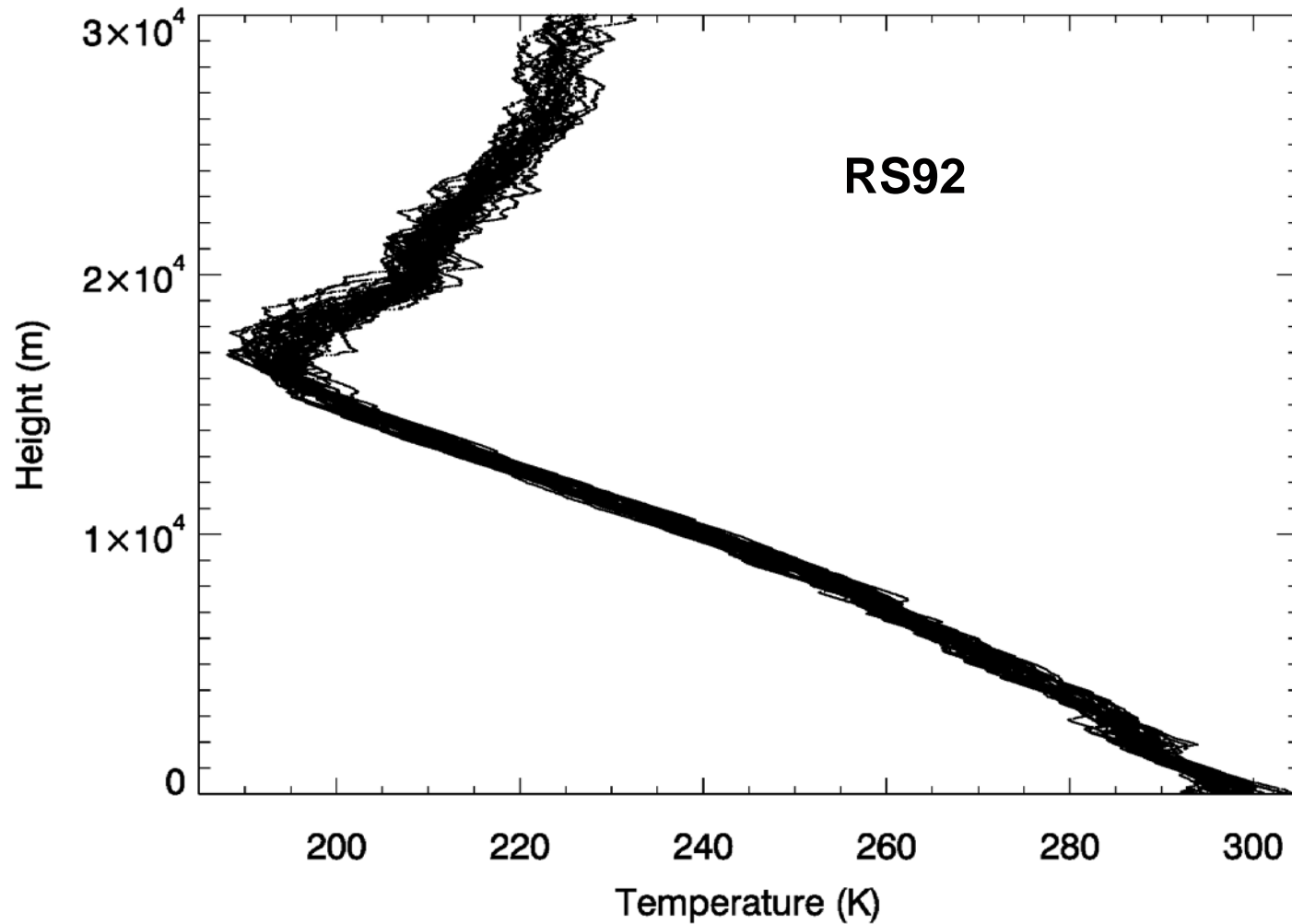
- Analysis presented here uses only Vaisala processed data (EDT files) not raw values
- RS92 algorithm improvement resulting from Yangjiang China intercomparison (“WMO 2010 correction”) has not been applied
- Preliminary results – happy to receive guidance and suggestions



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All temperature profiles

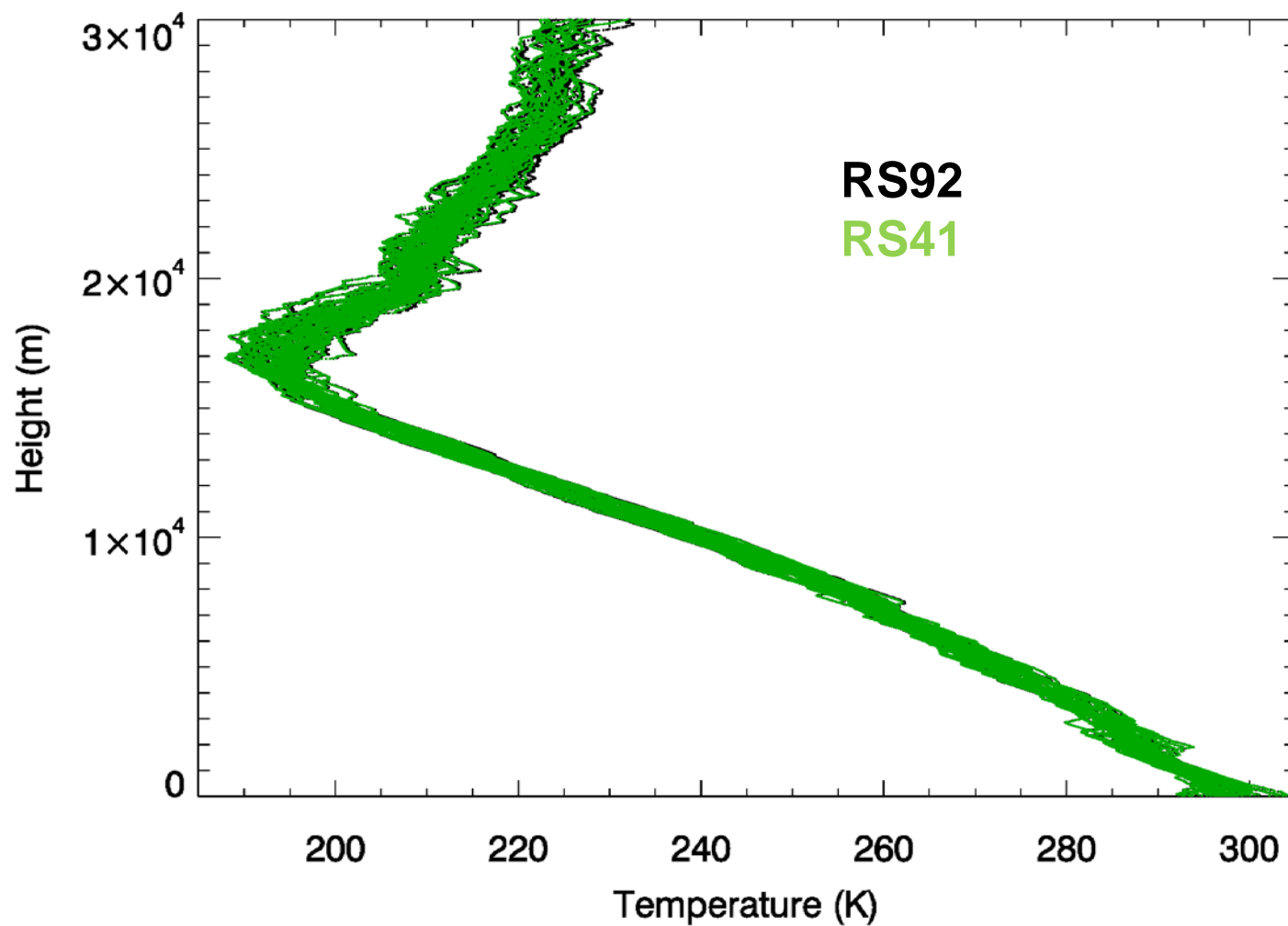




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All temperature profiles

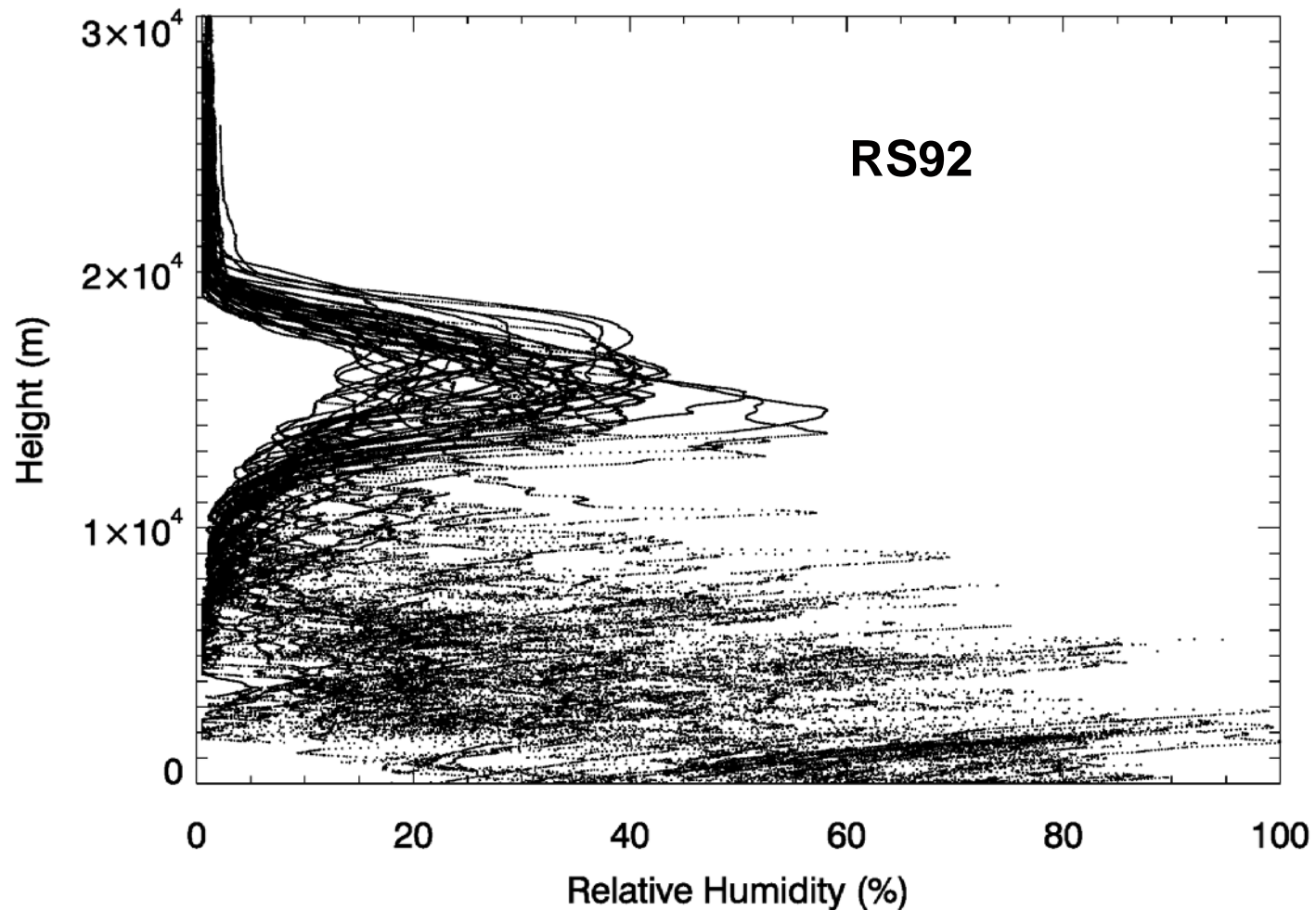




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All humidity profiles

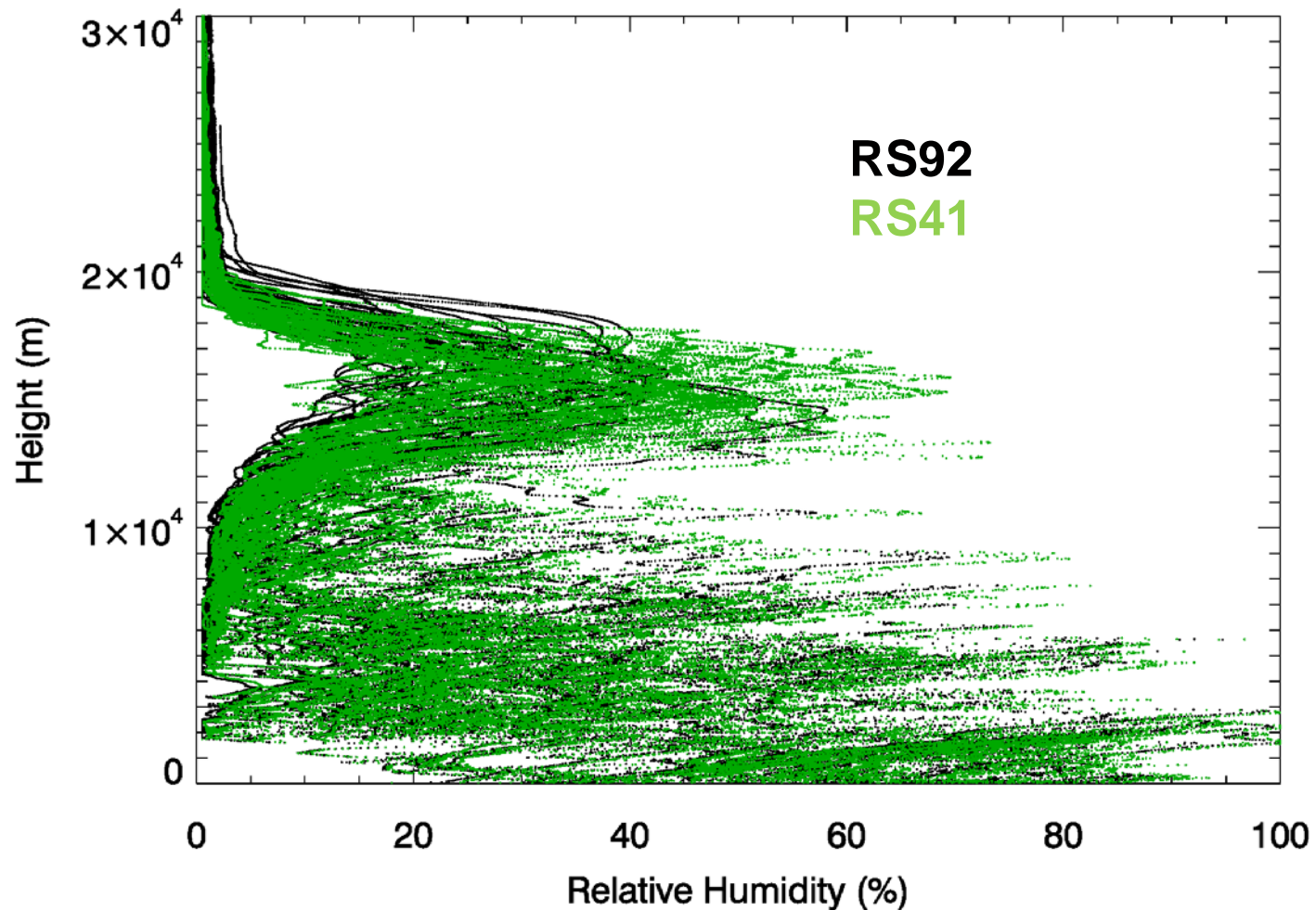




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All humidity profiles

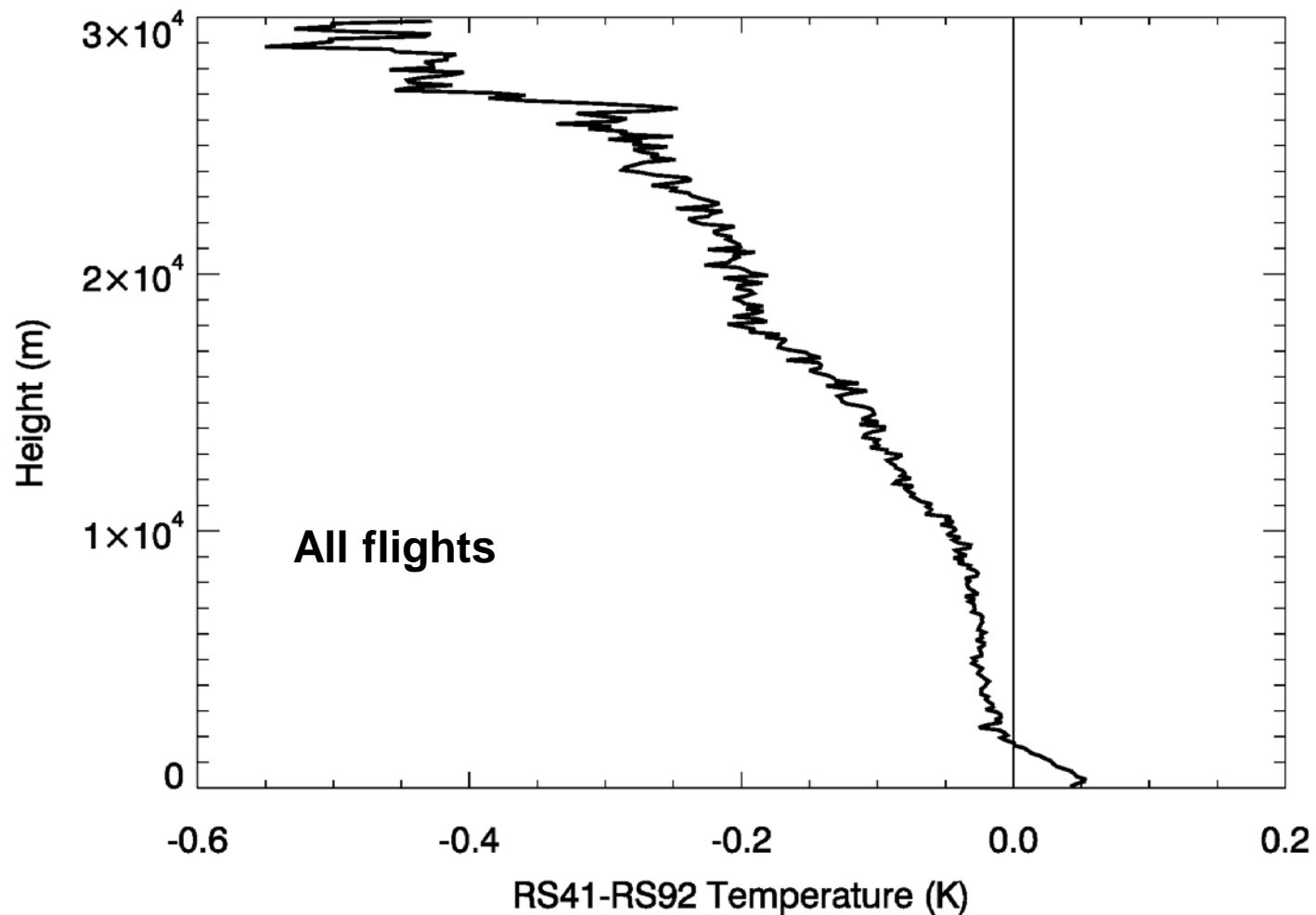




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Mean Temperature Difference

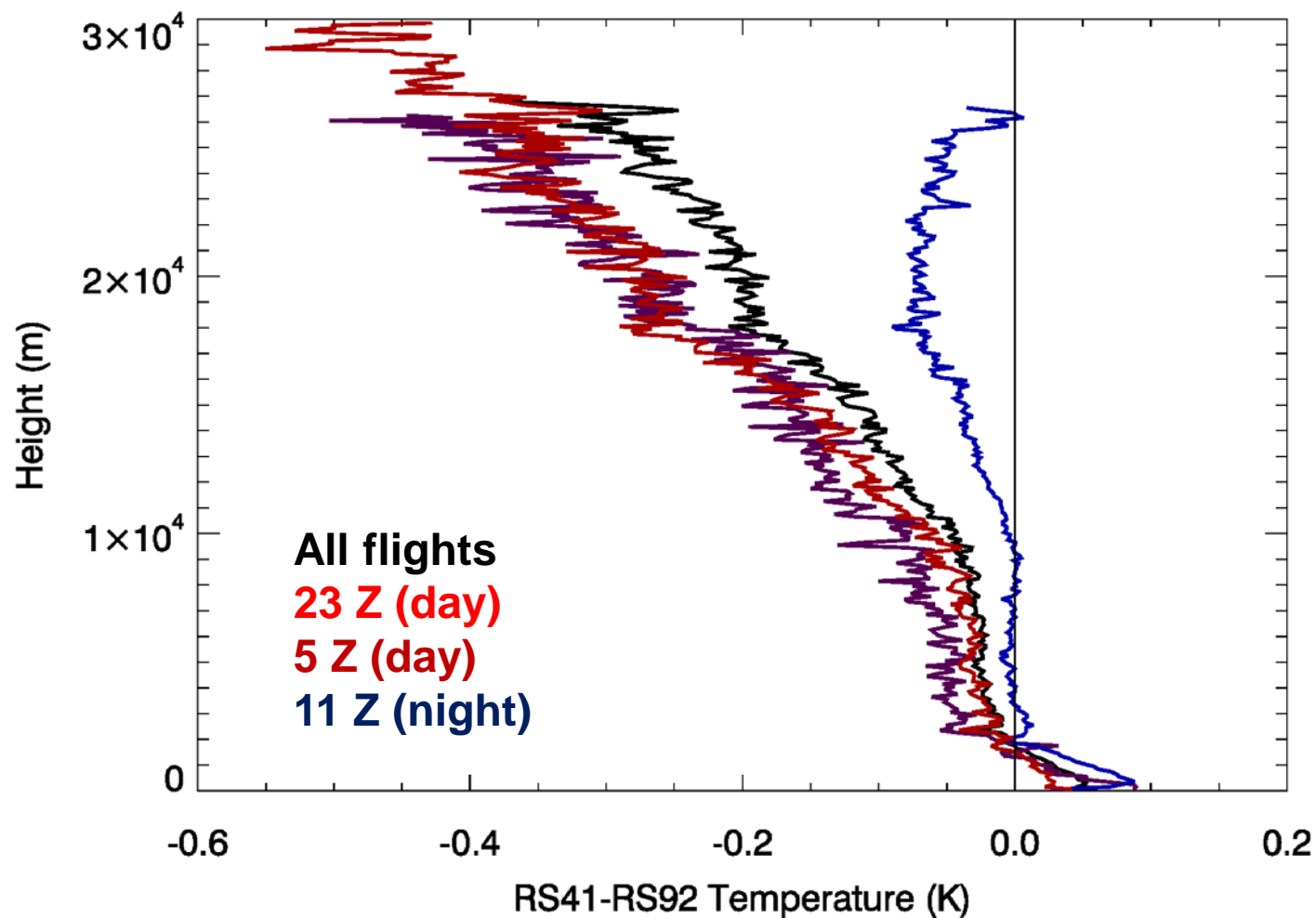




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Mean Temperature Difference

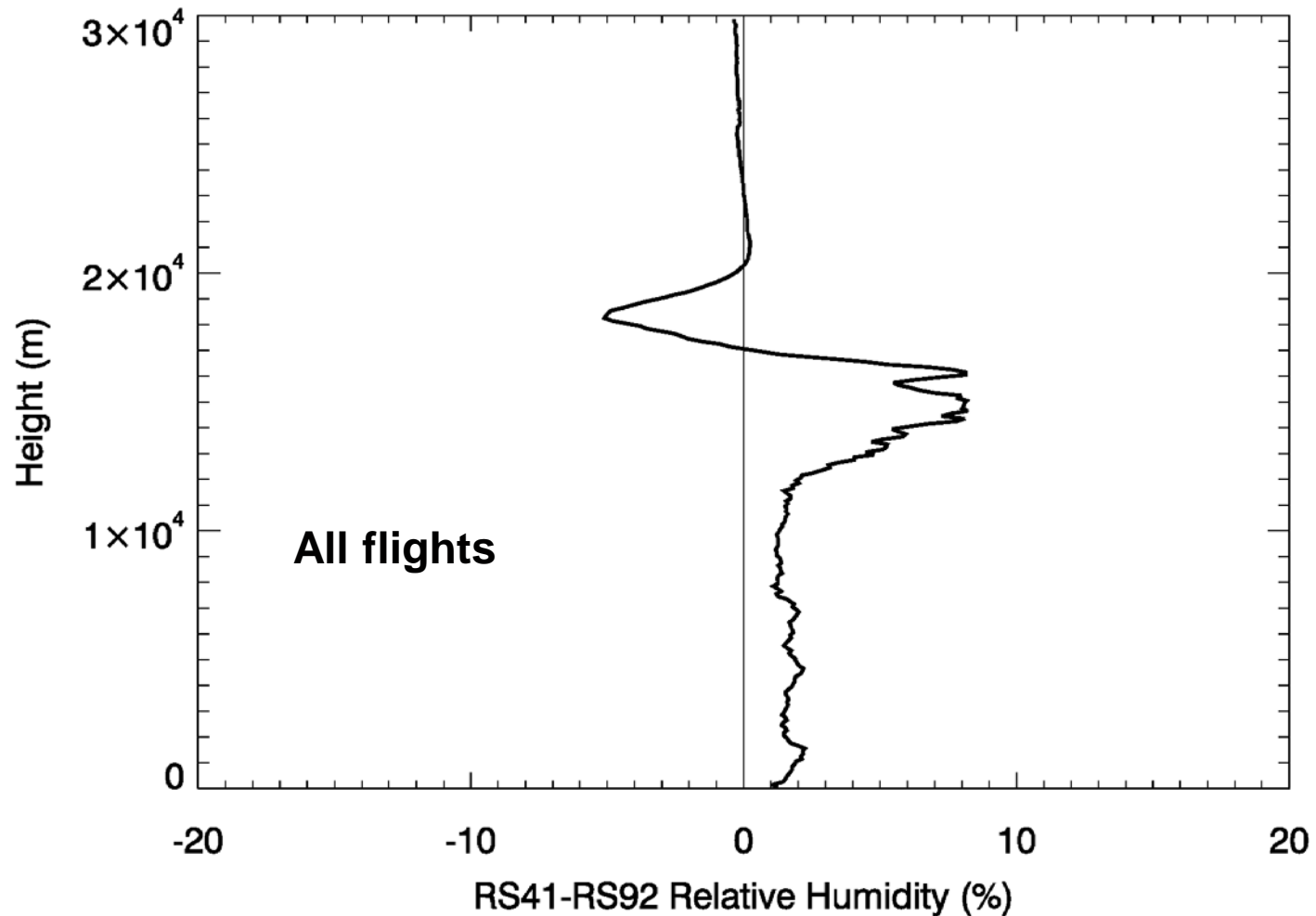




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Mean Humidity Difference

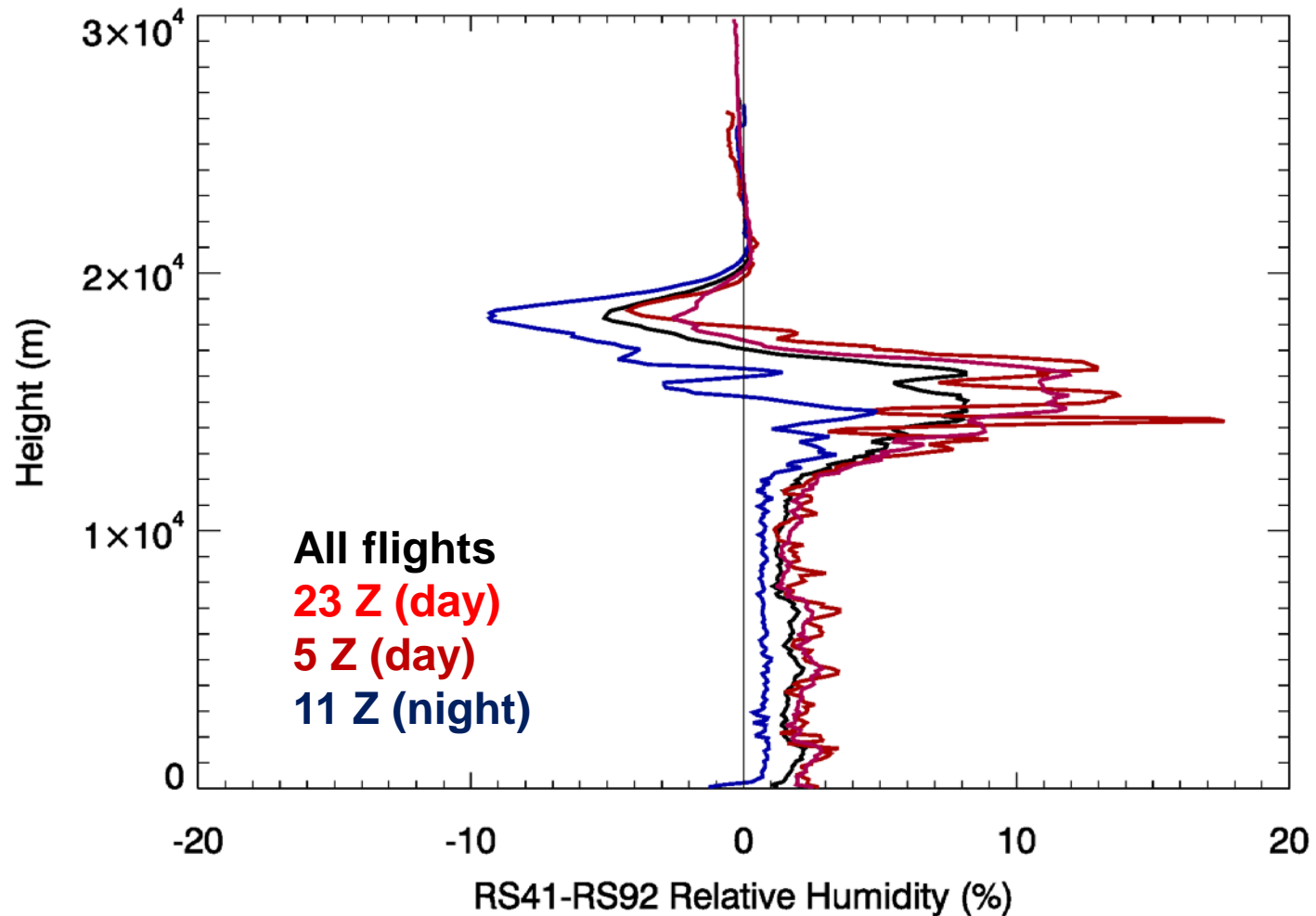




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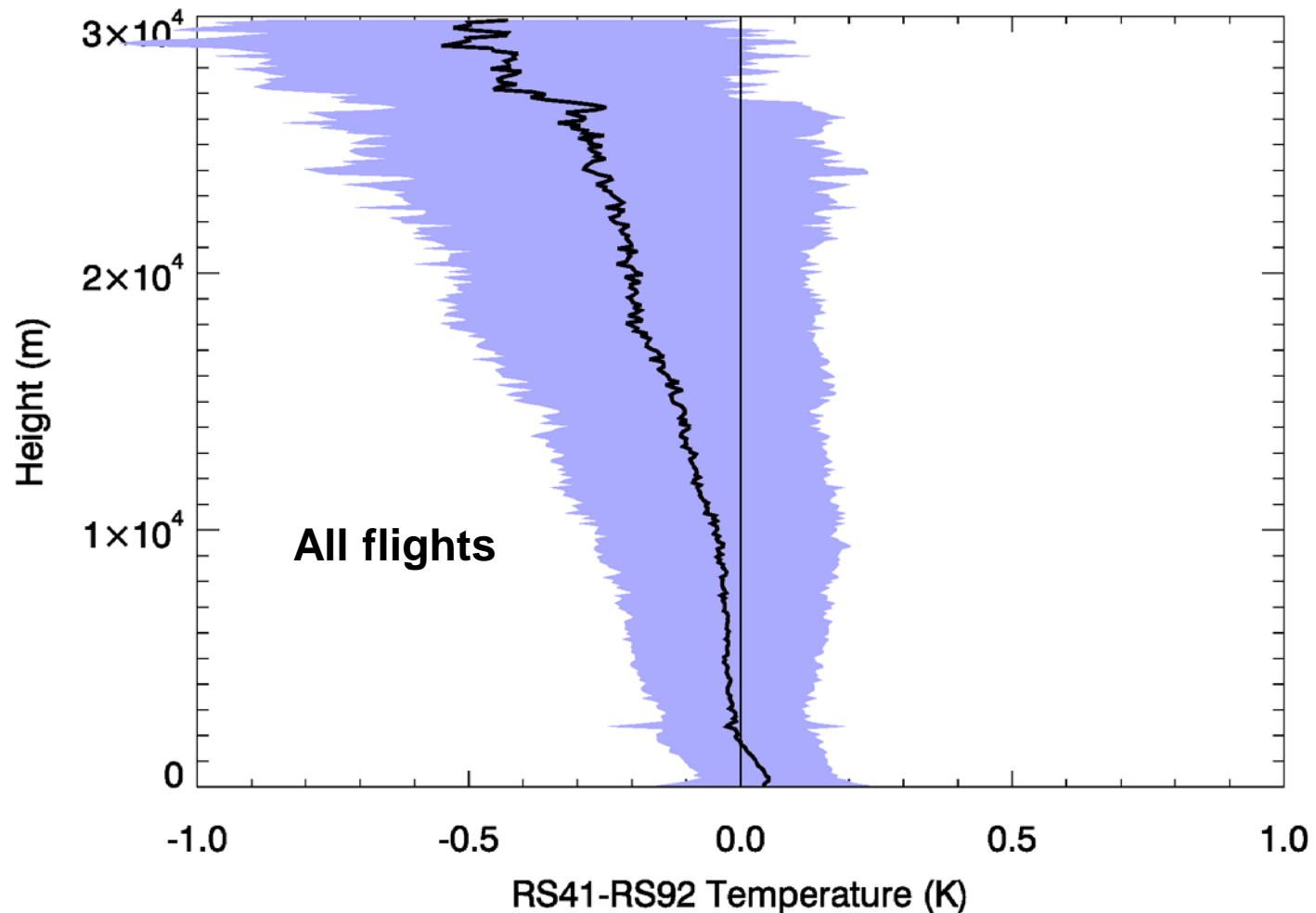
Mean Humidity Difference





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RS41-RS92 Temperature Difference Mean \pm 2 Standard Deviations

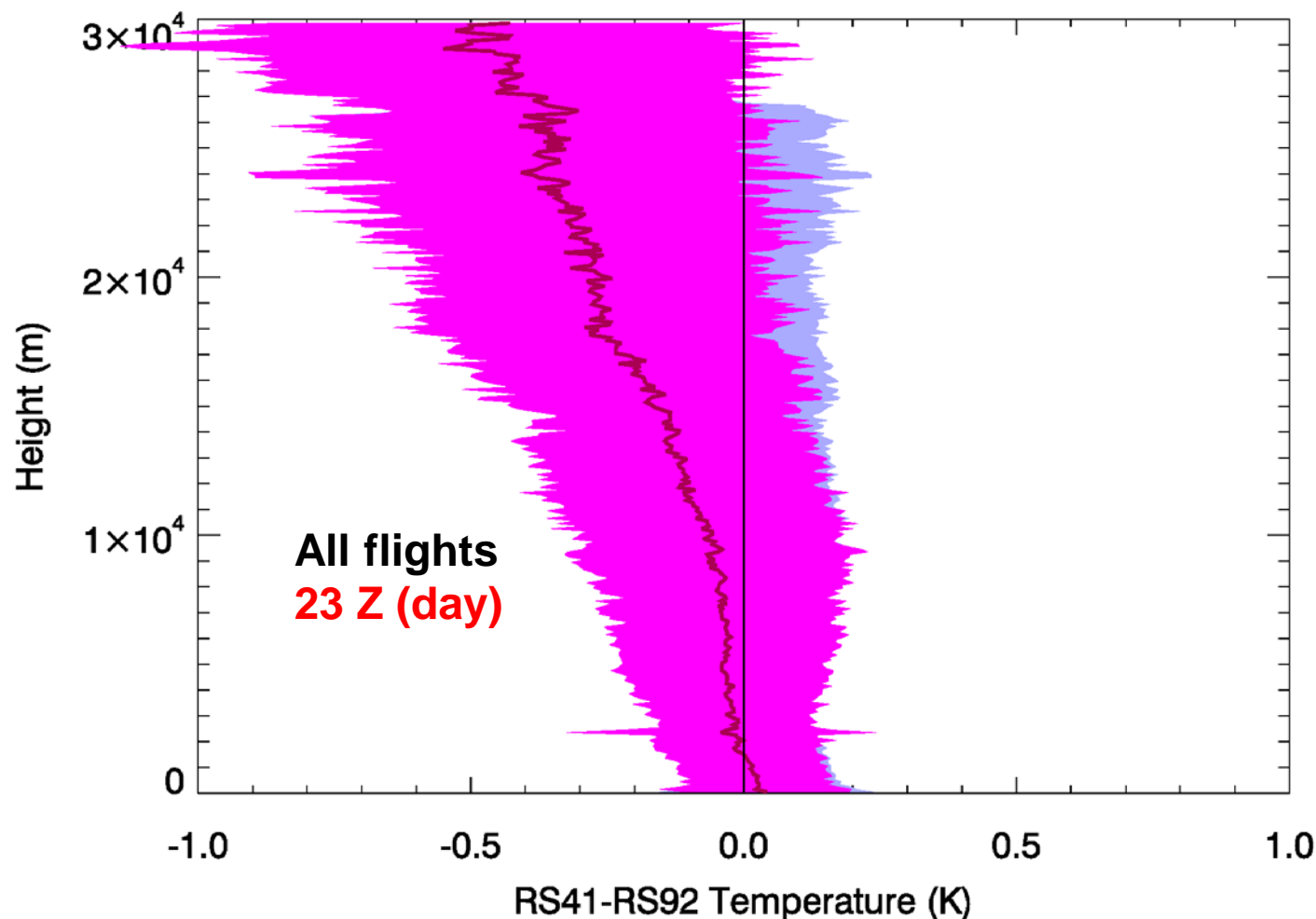




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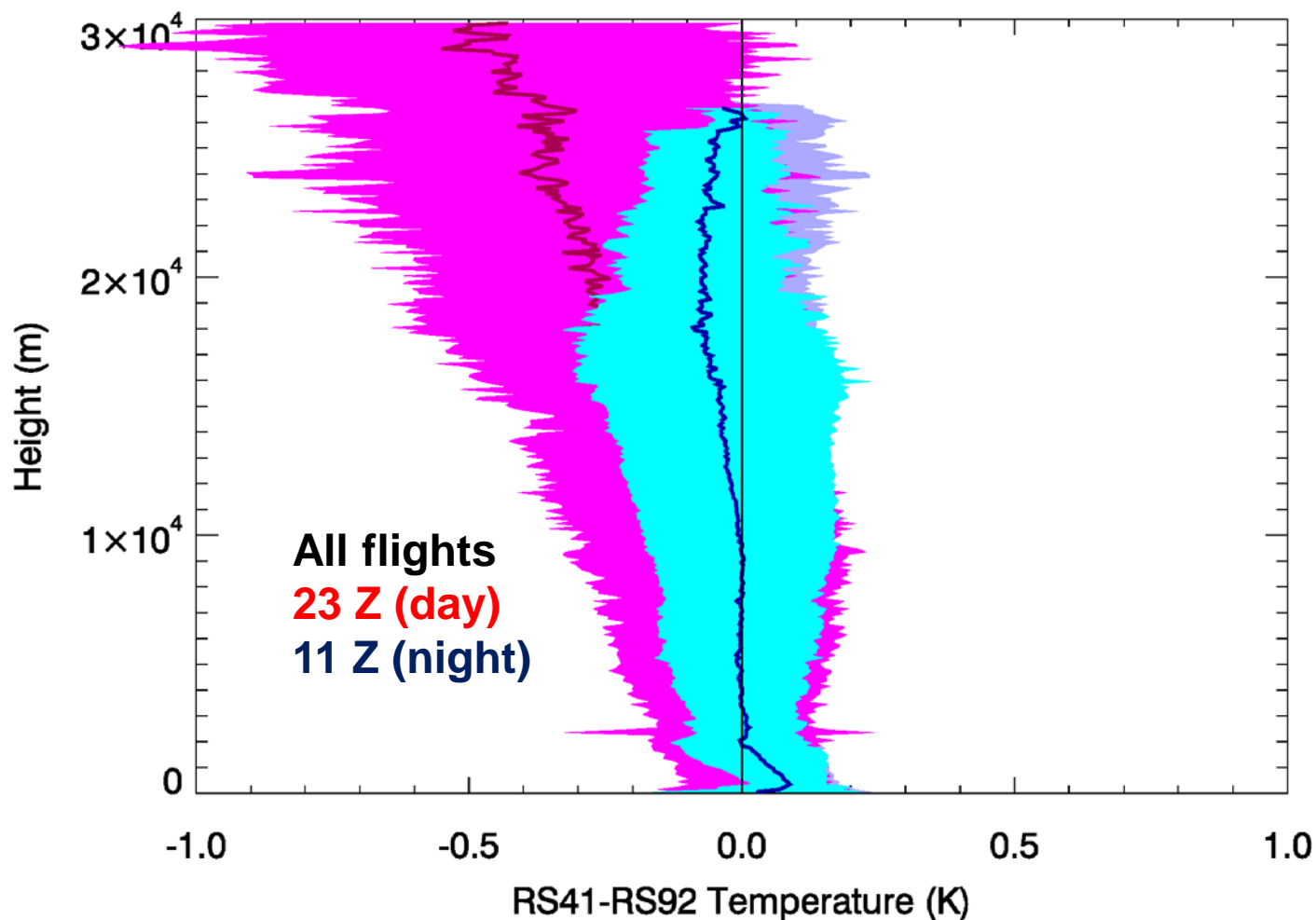
RS41-RS92 Temperature Difference Mean \pm 2 Standard Deviations





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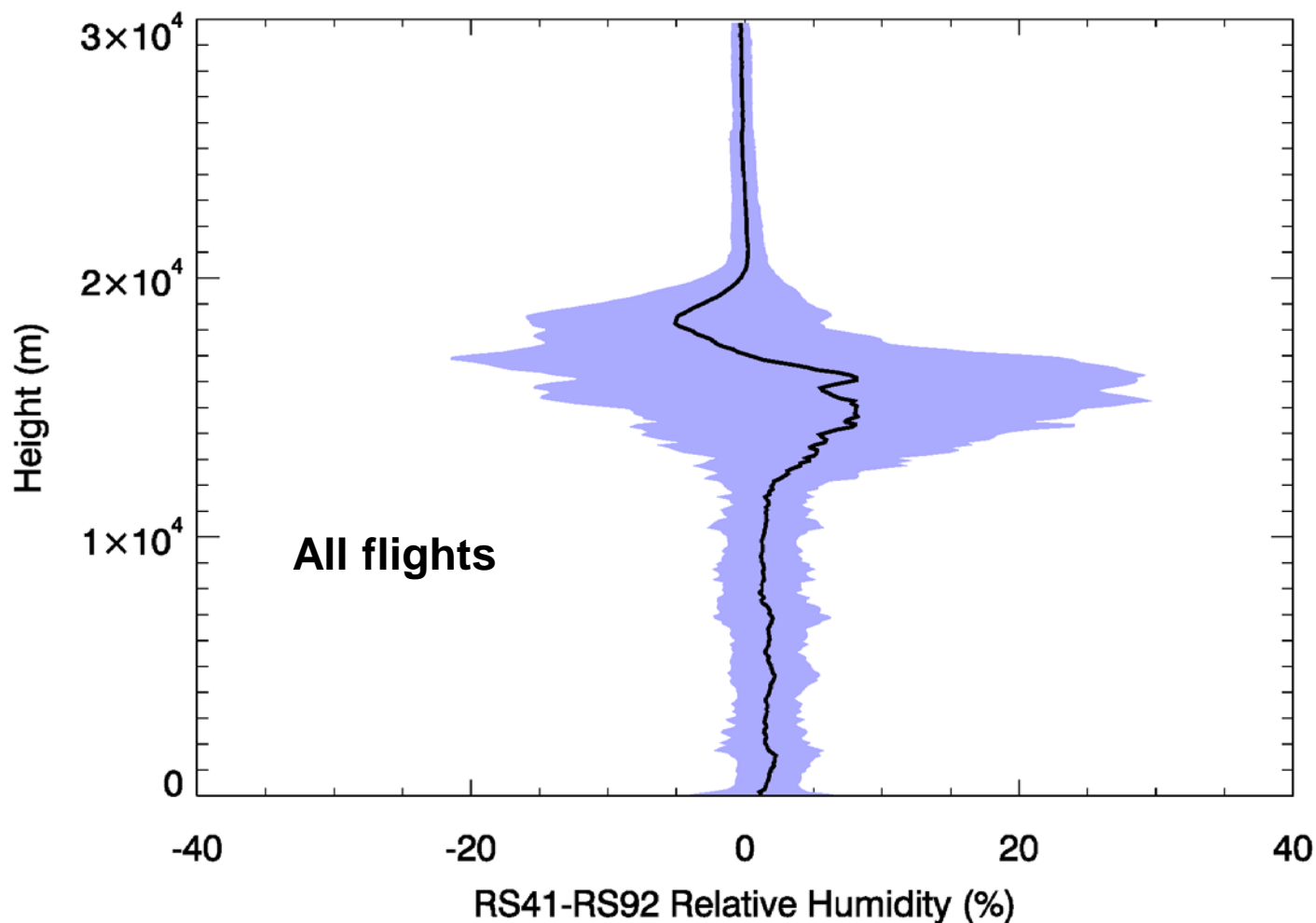
RS41-RS92 Temperature Difference Mean \pm 2 Standard Deviations





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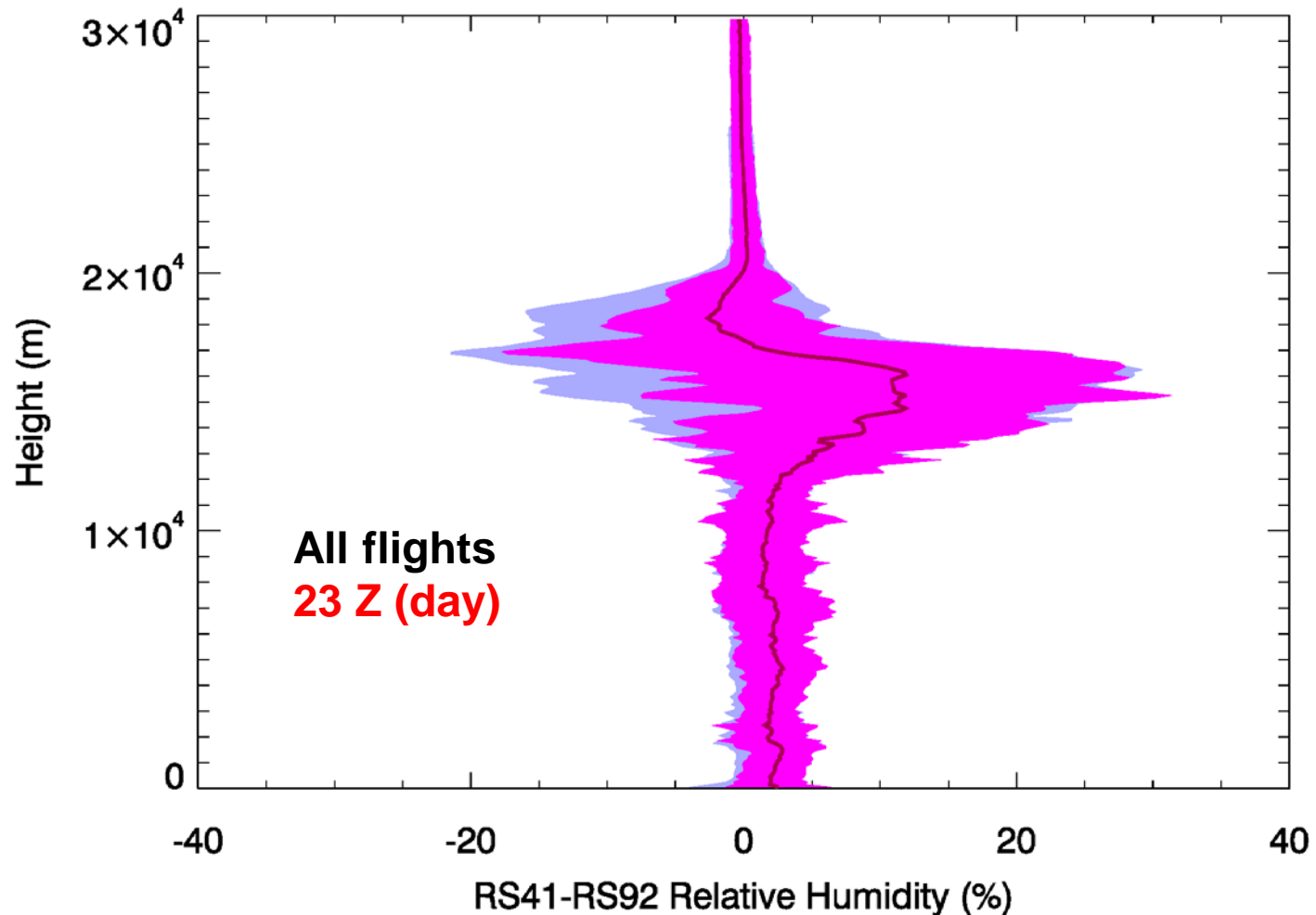
RS41-RS92 Humidity Difference Mean \pm 2 Standard Deviations





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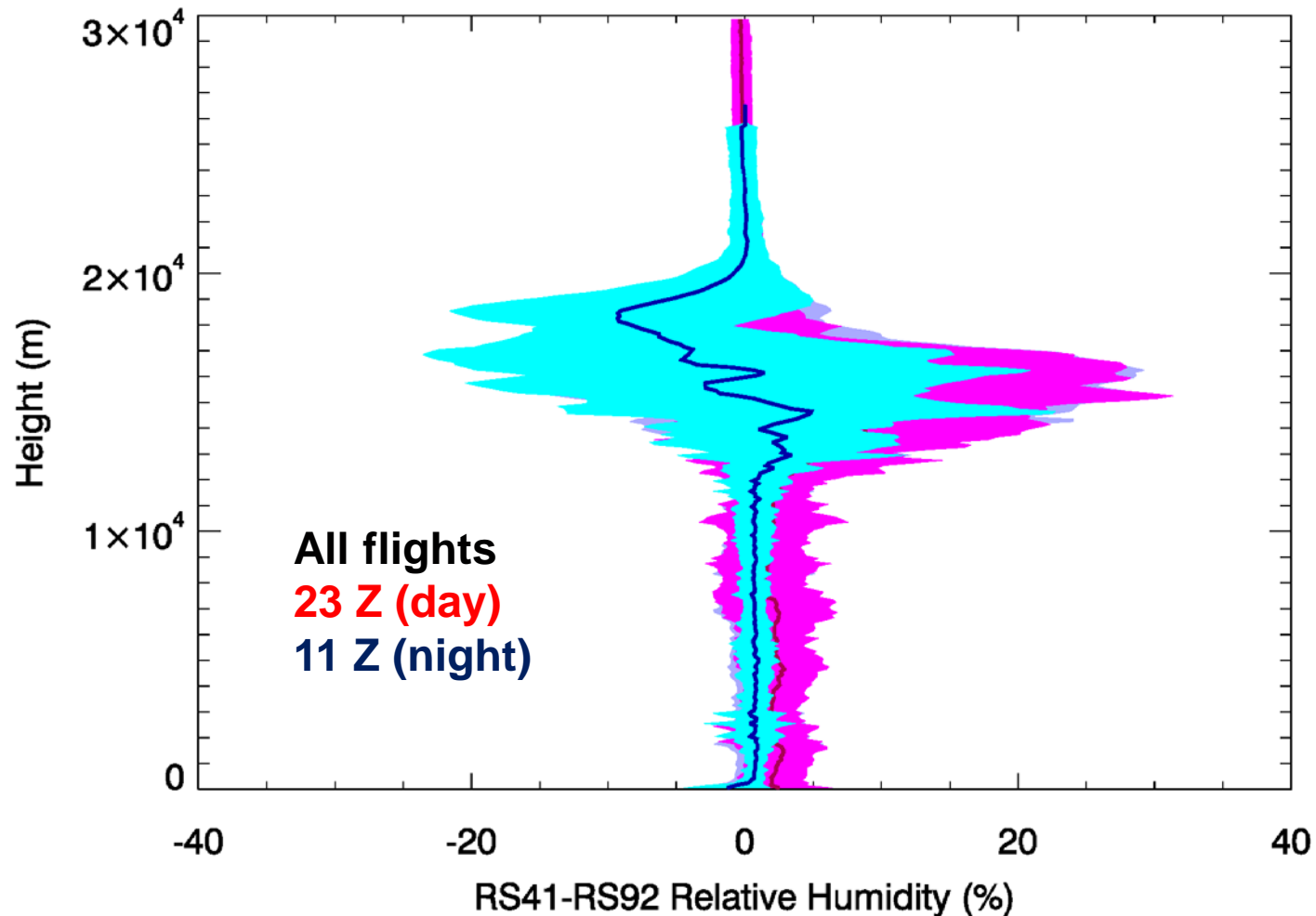
RS41-RS92 Humidity Difference Mean \pm 2 Standard Deviations





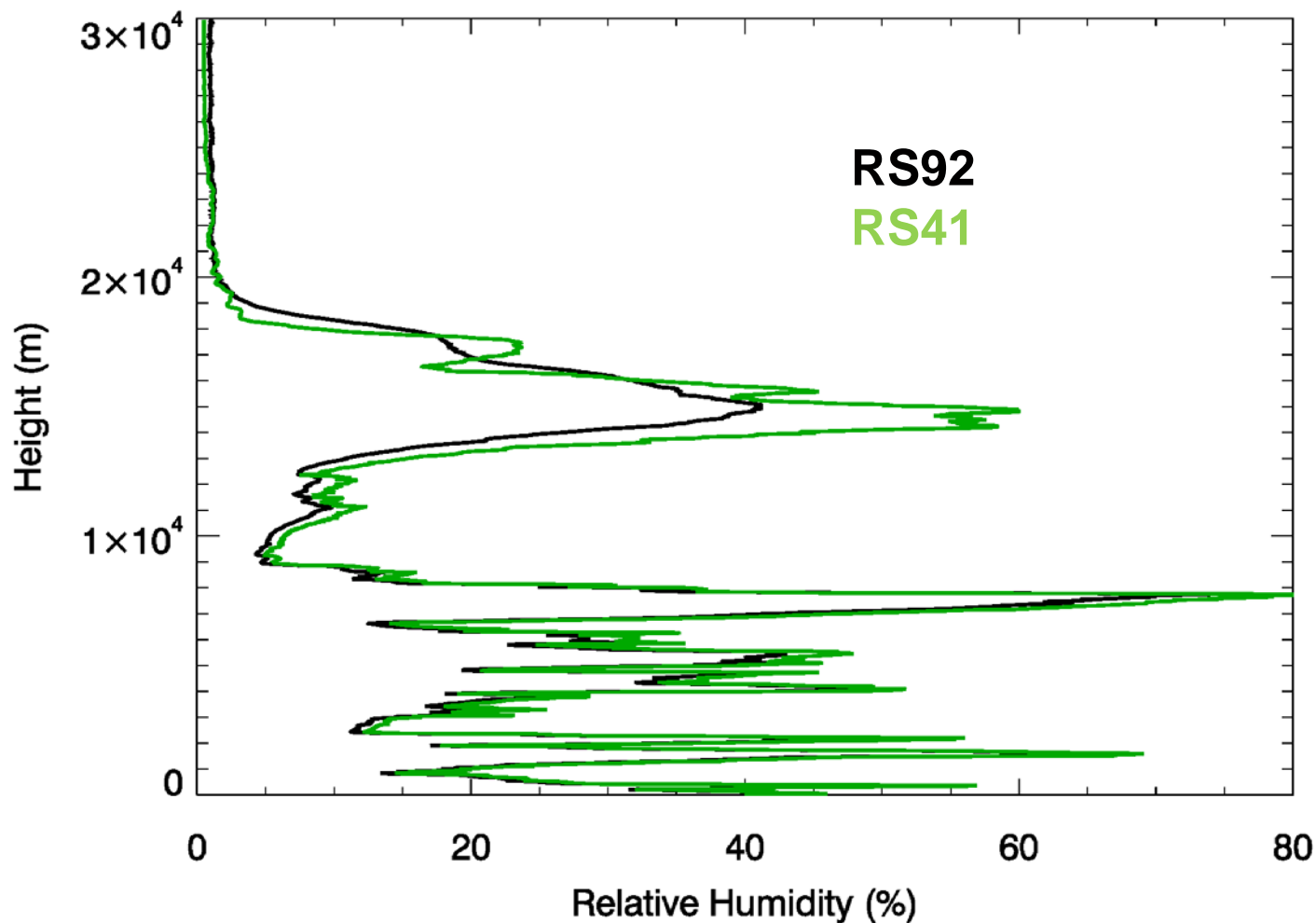
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RS41-RS92 Humidity Difference Mean \pm 2 Standard Deviations





Example Daytime Profile 20180620 2315

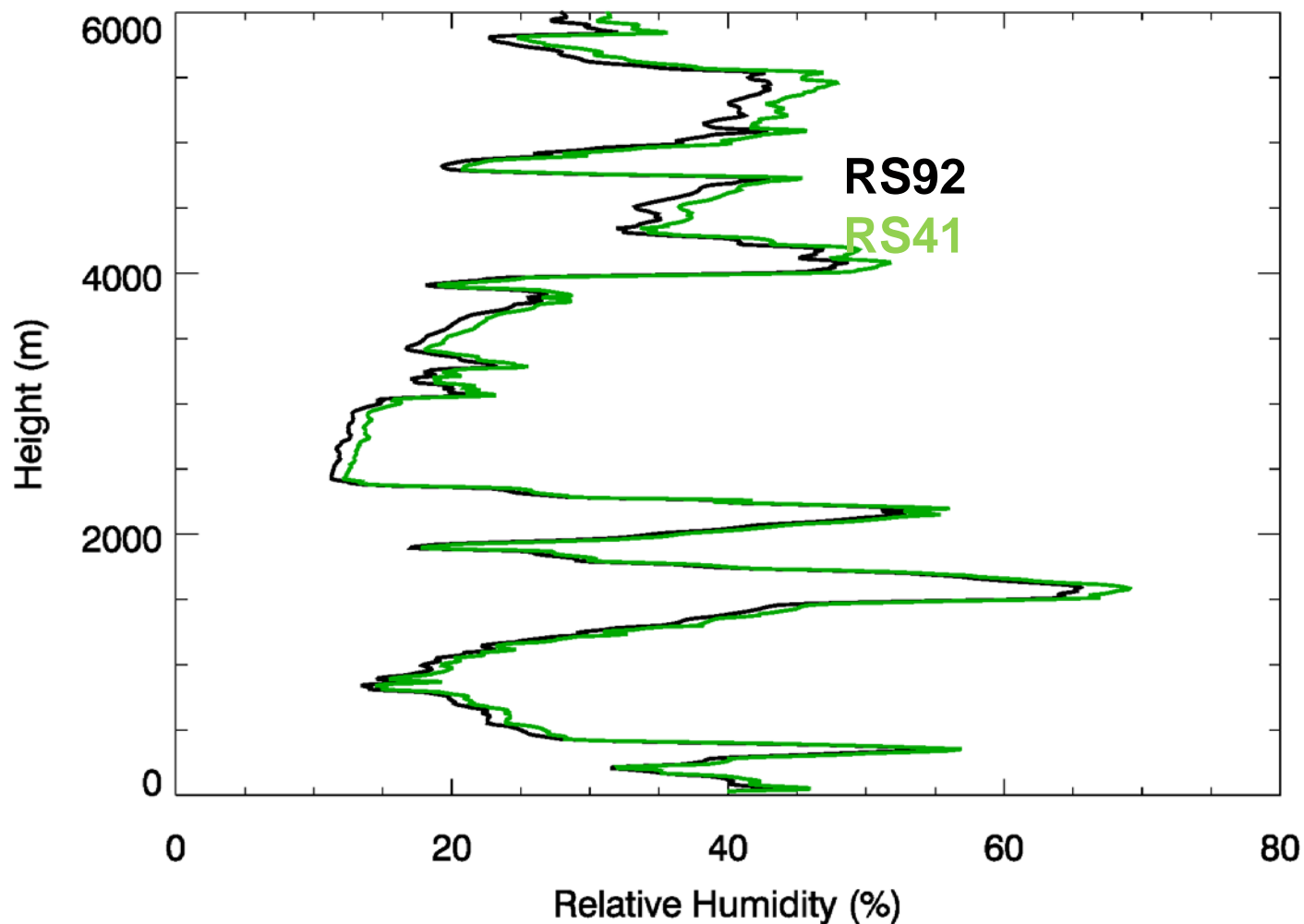




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Example Daytime Profile 20180620 2315

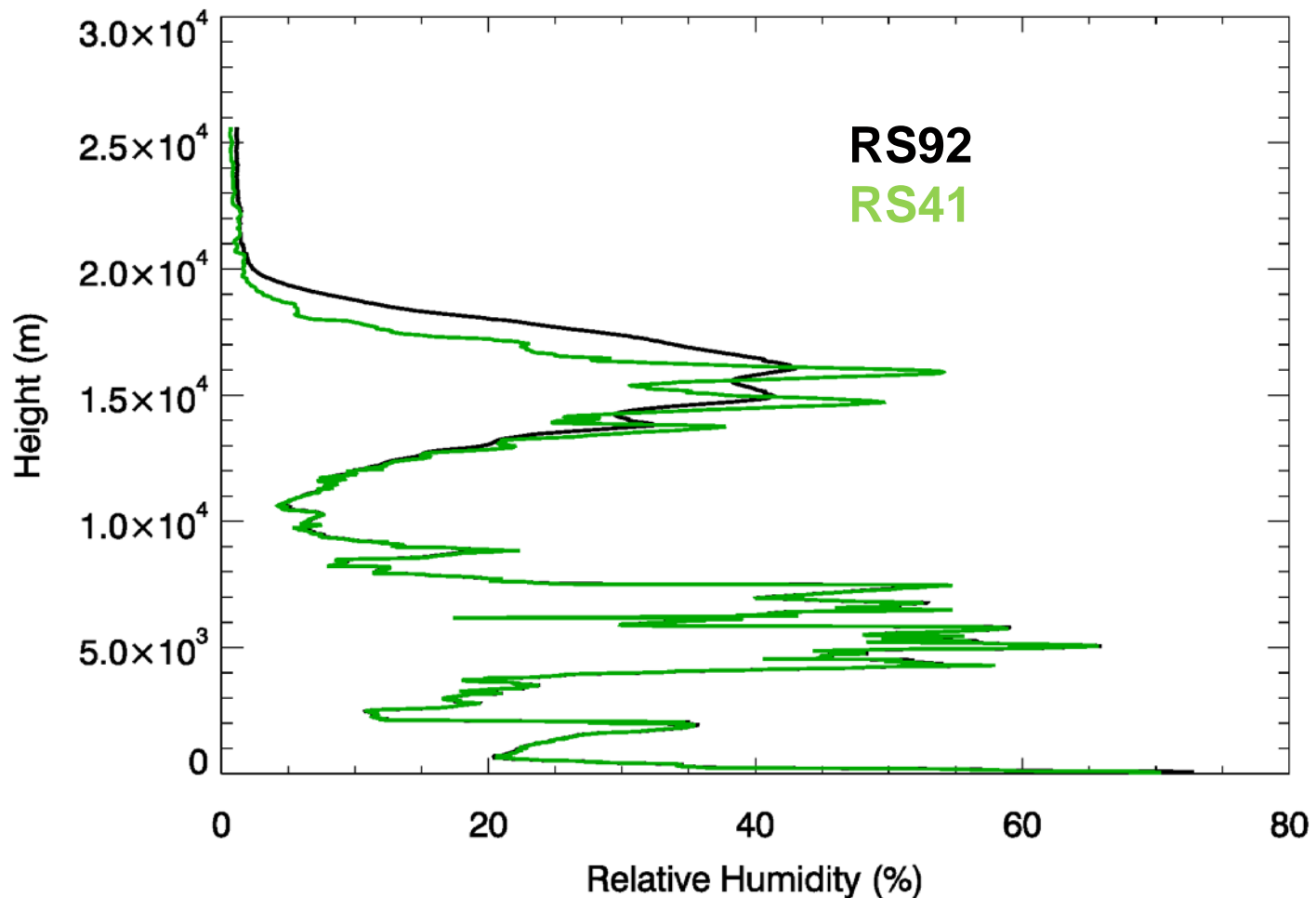




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Example Night-time Profile 20180621 1115

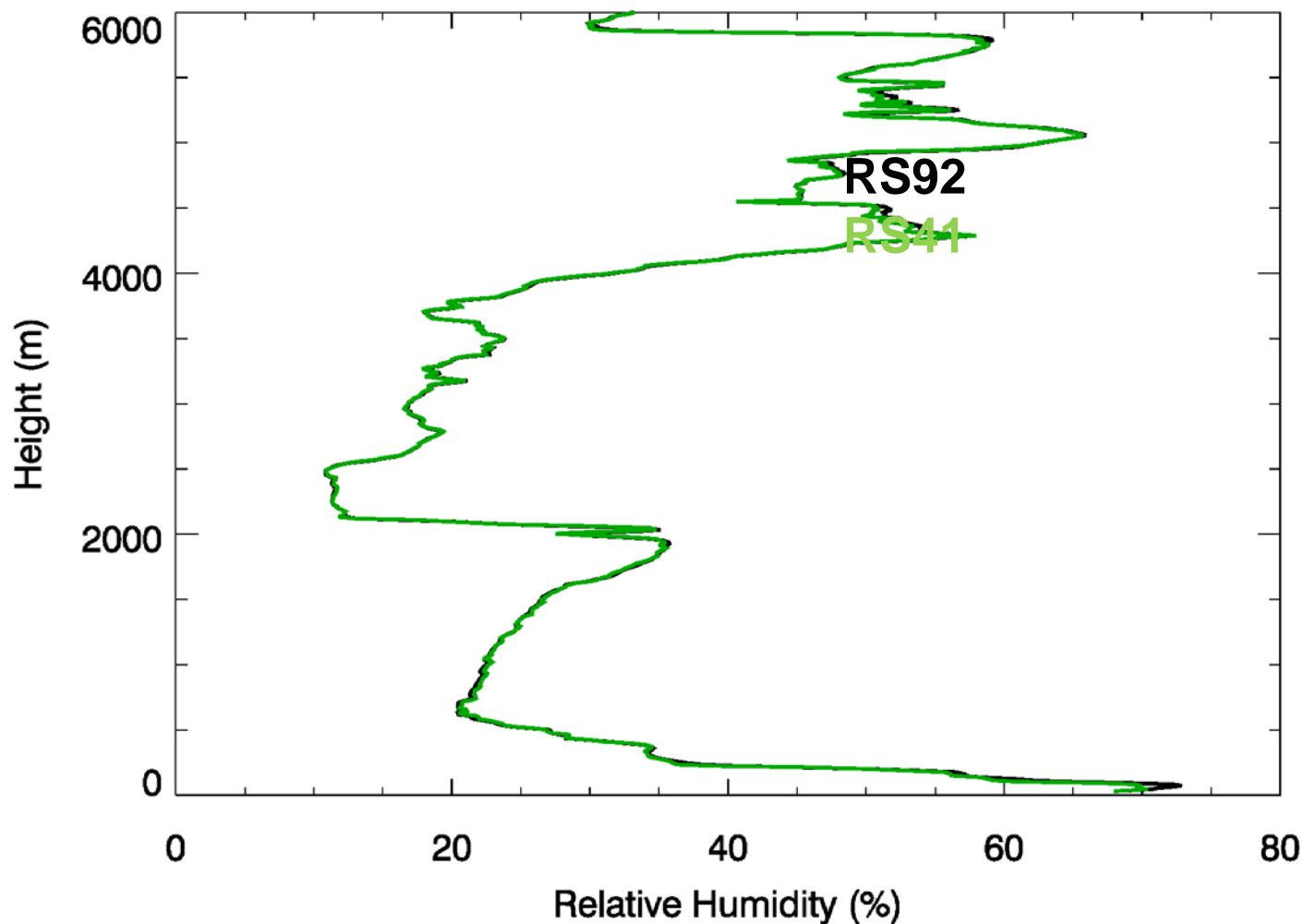




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Example Night-time Profile 20180621 1115

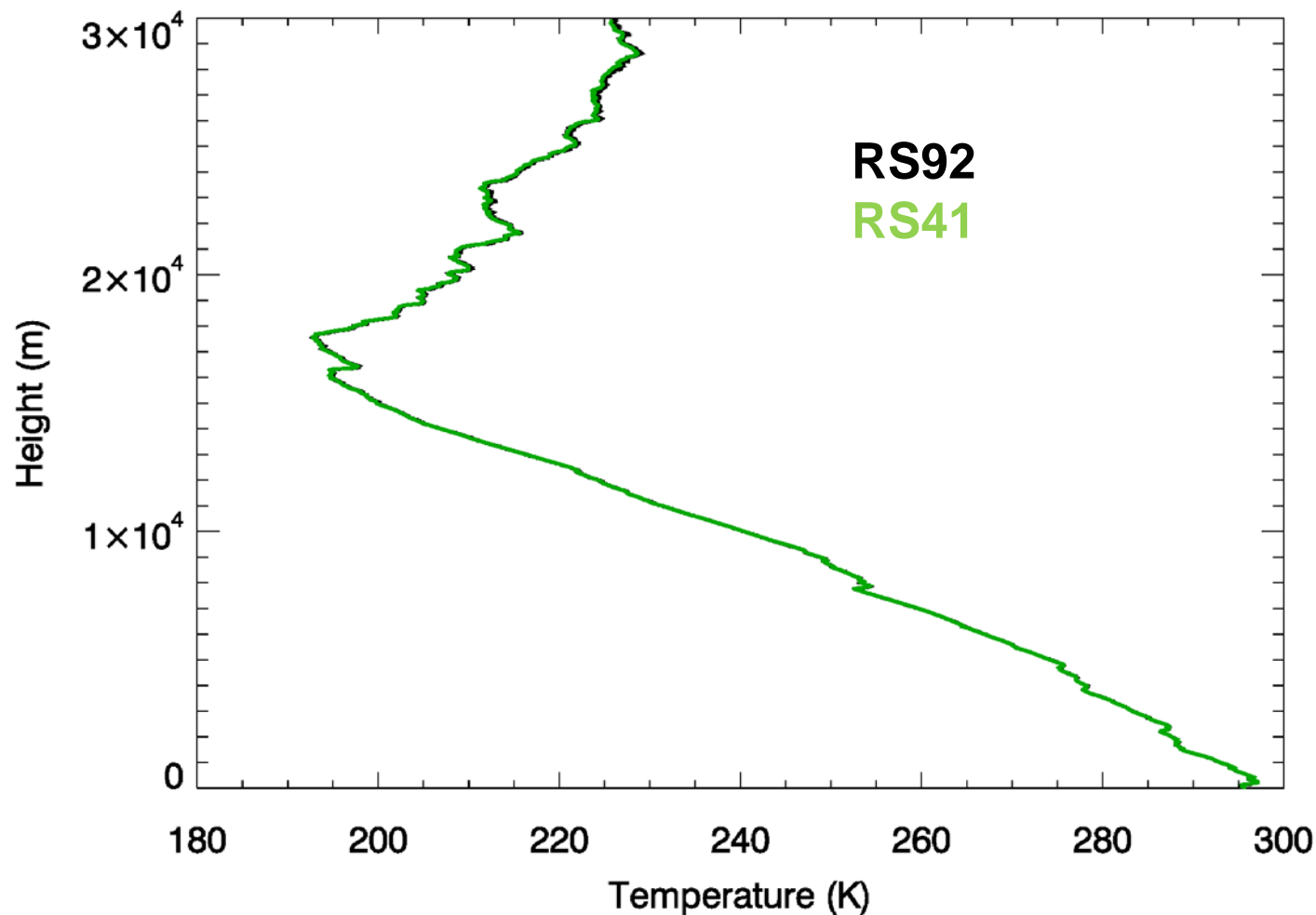




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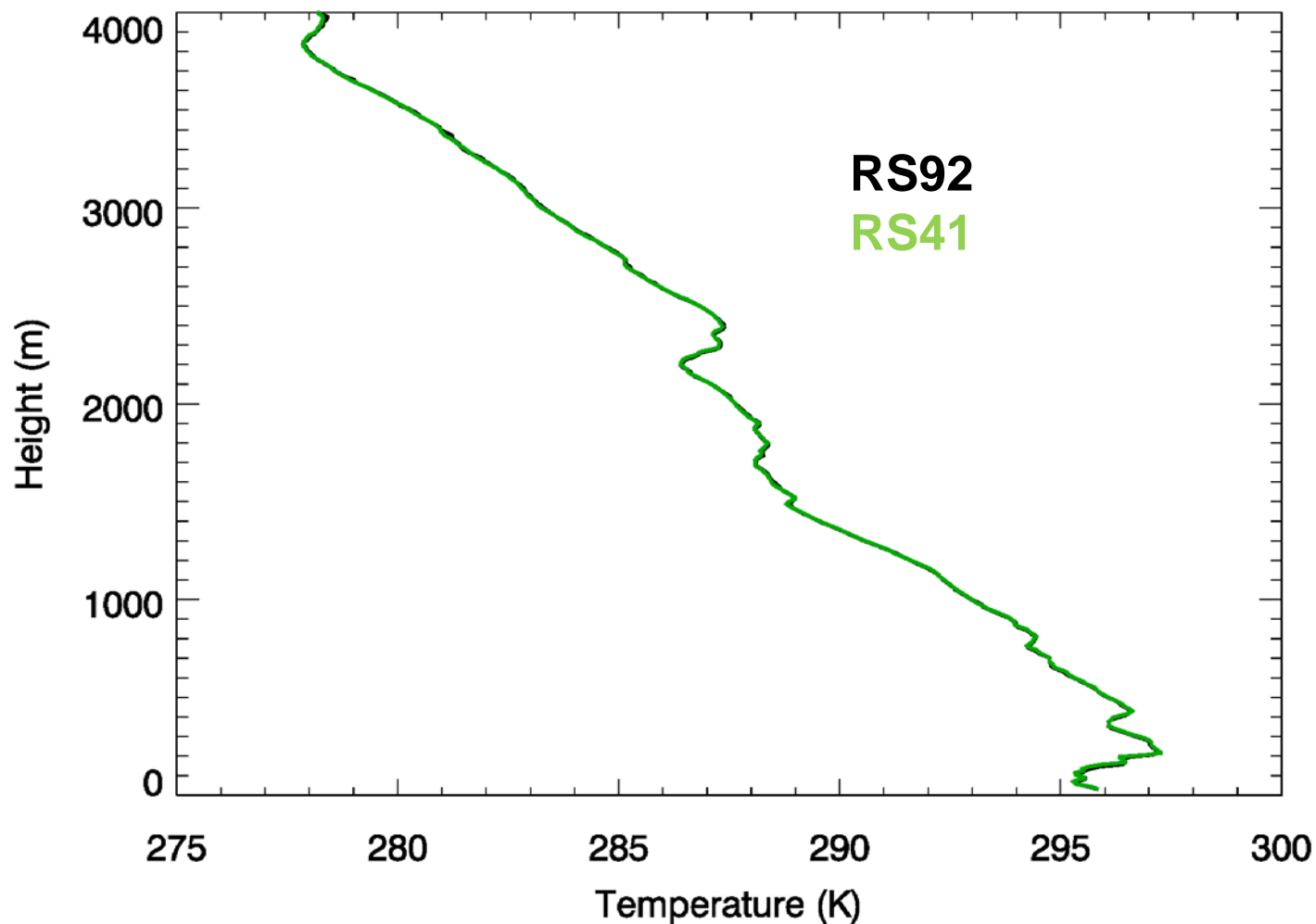
Example Daytime Profile 20180620 2315





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Example Daytime Profile 20180620 2315

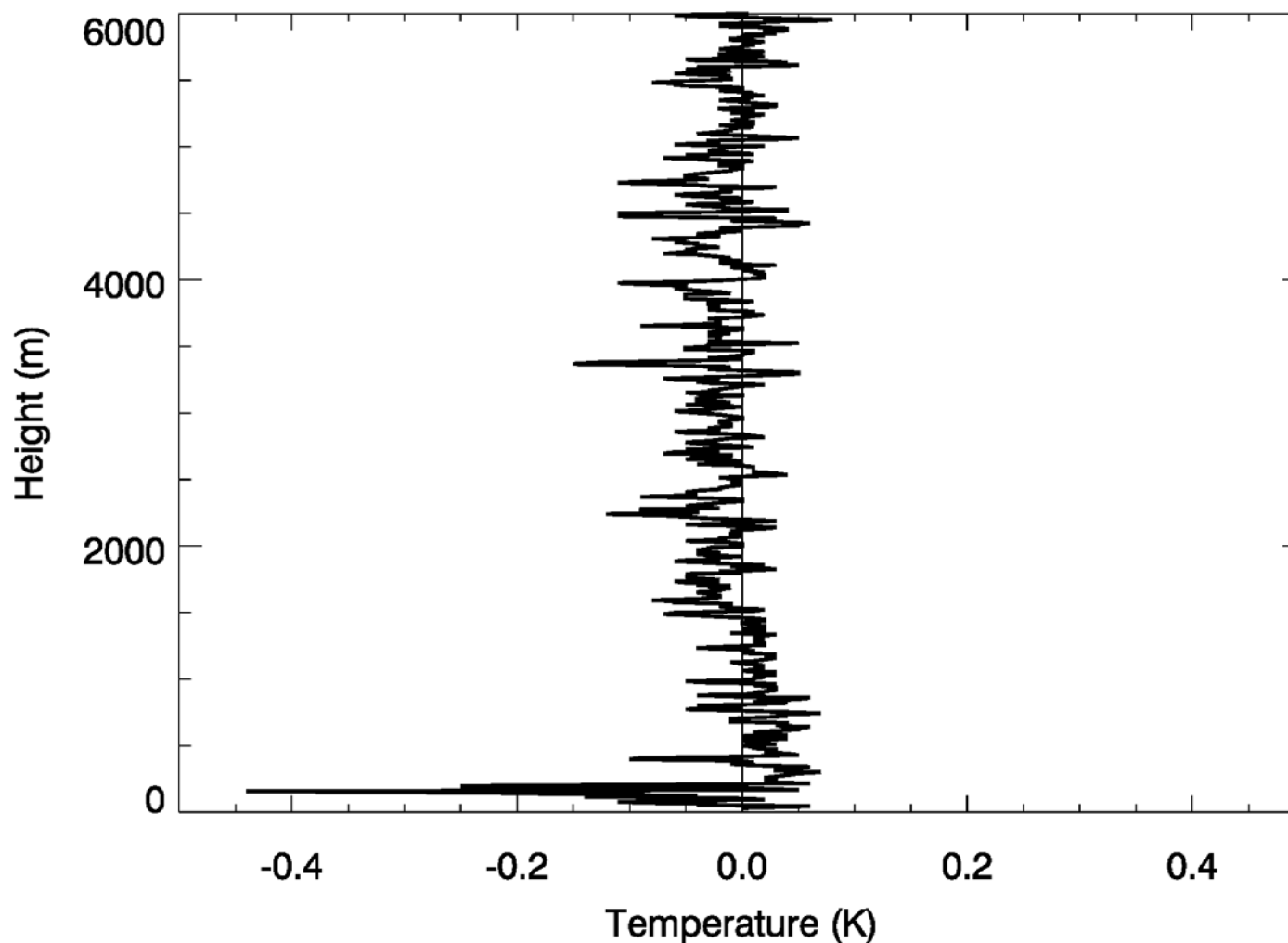




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Example Daytime Profile 20180620 2315 (Differences)





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Dual ozone soundings

To date, five dual ozone soundings have been flown at Broadmeadows (Melbourne)

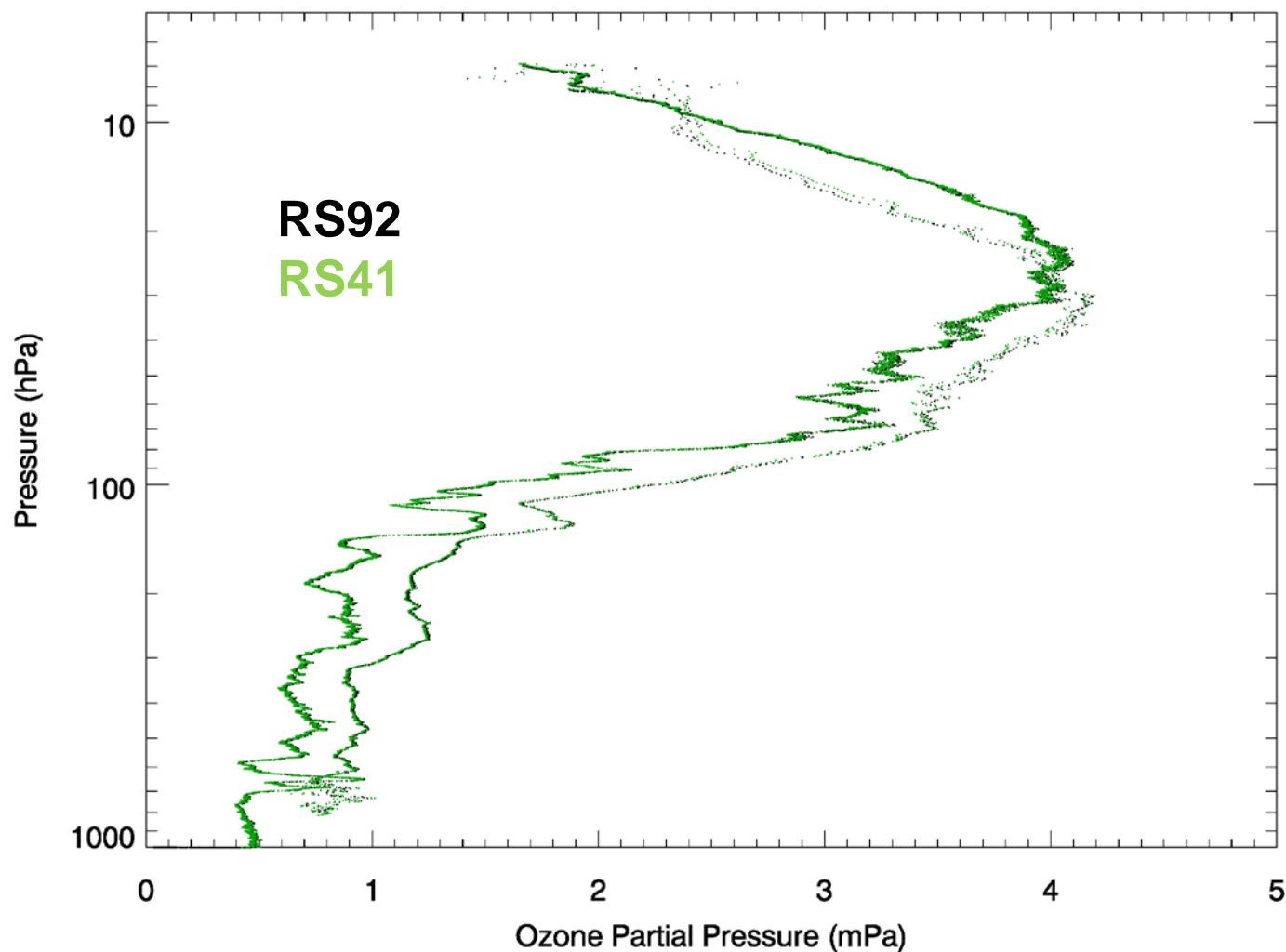
One ozonesonde but two radiosondes (RS92 and RS41) and two ozone interfaces (OIF921 and OIF411)



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Ozone Partial Pressure vs Pressure Visual Comparison

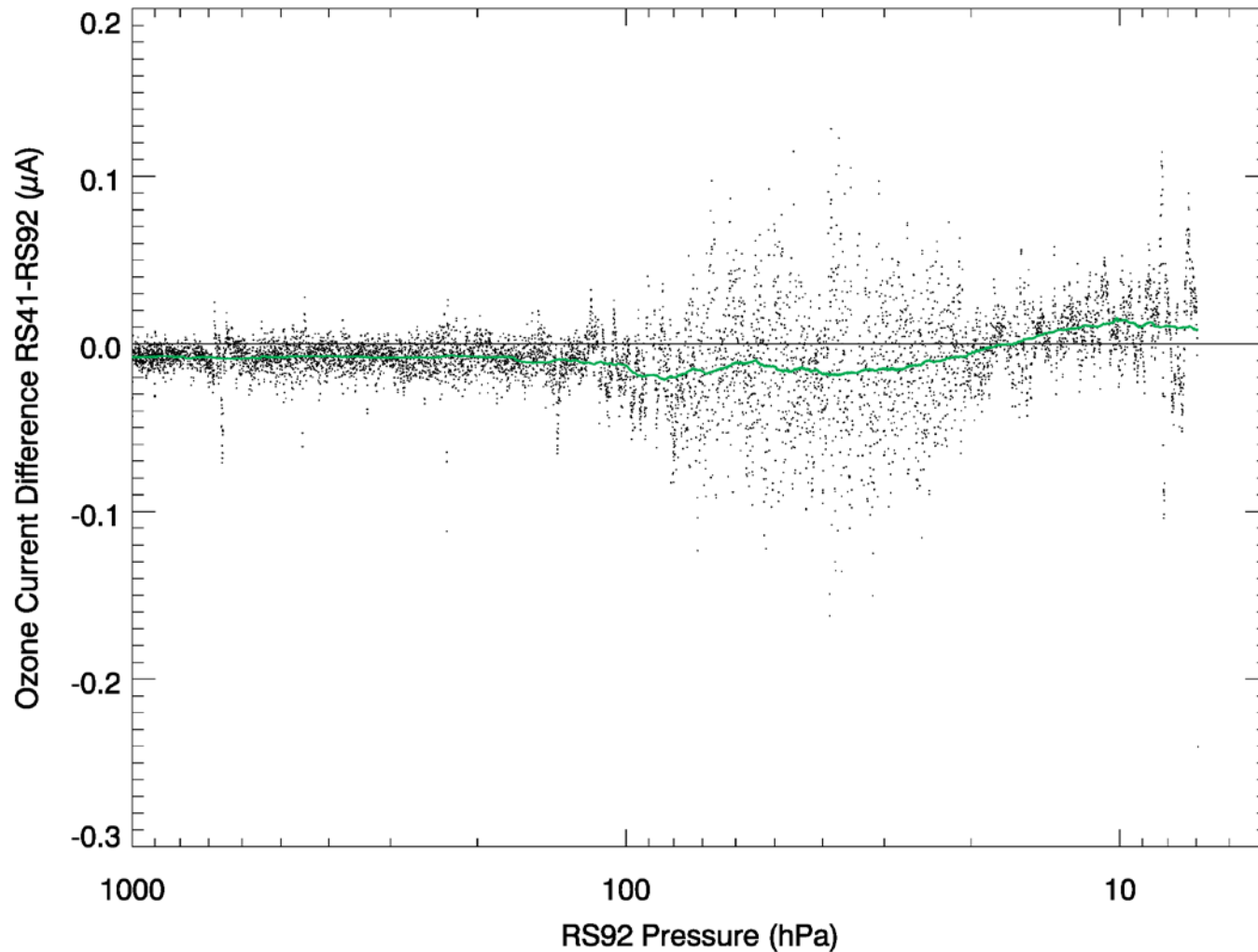




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Ozone Current Difference at Pressure Levels

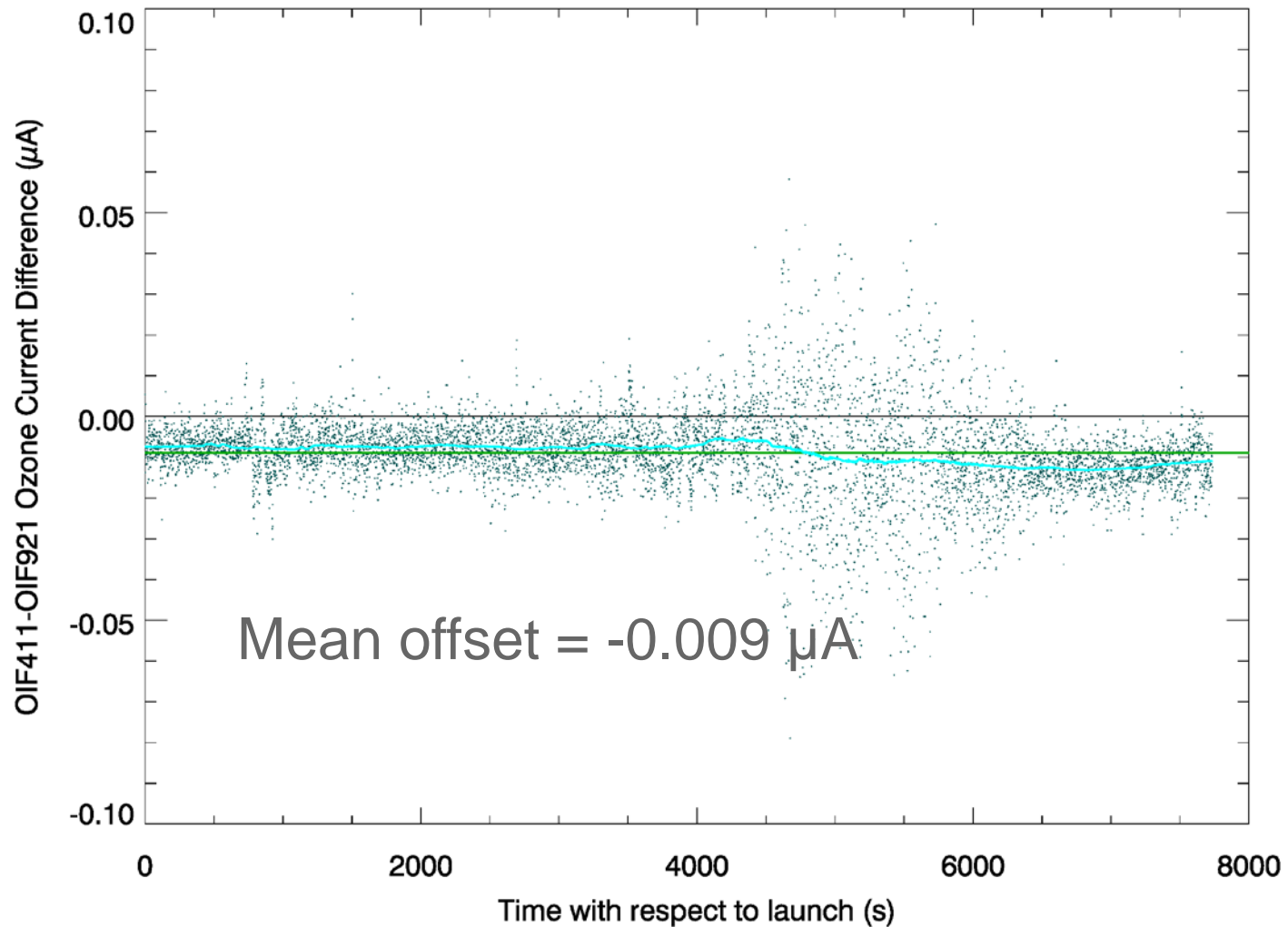




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Ozone Current Difference versus Time

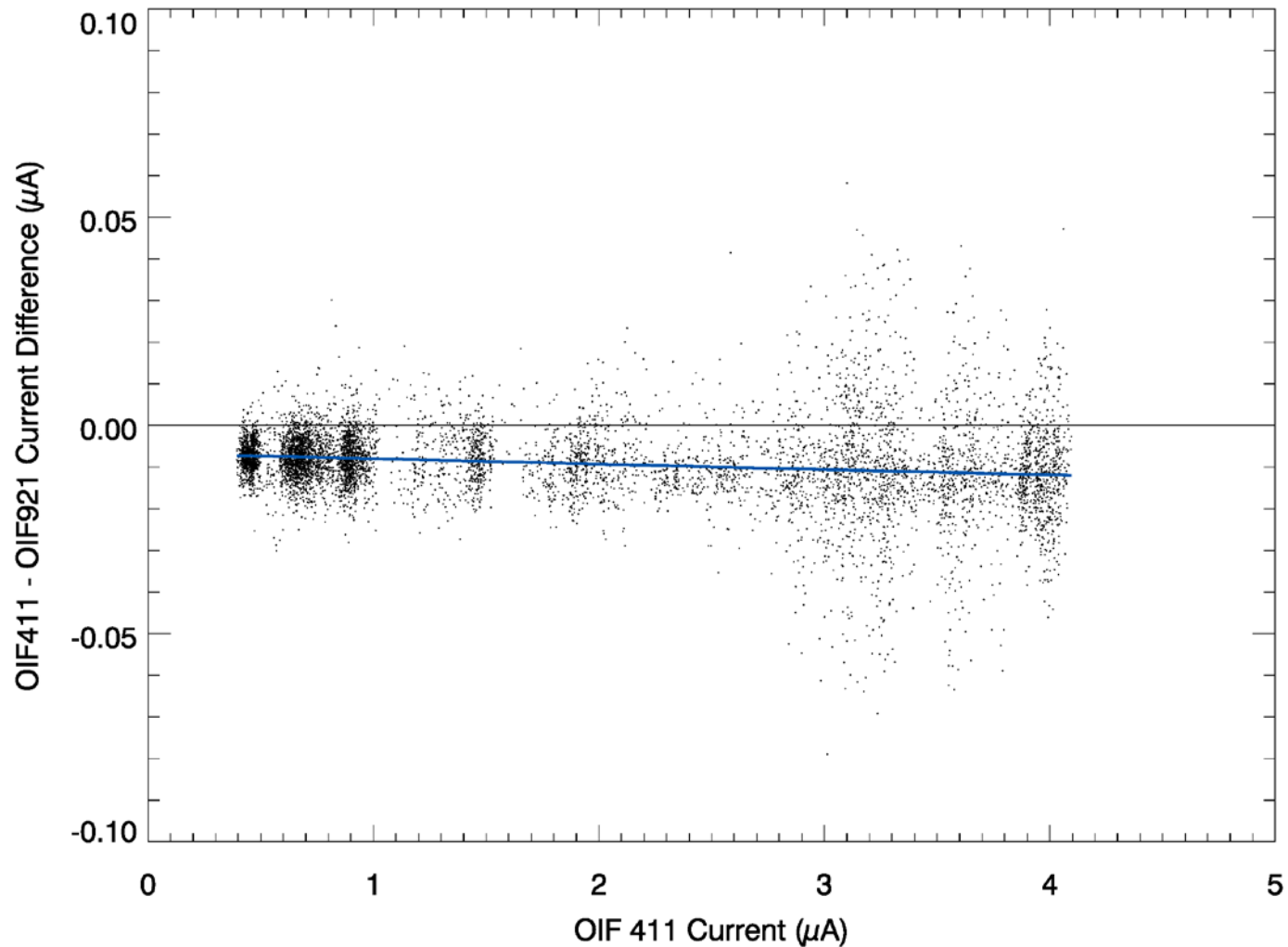




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Ozone Current Difference versus Current





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Comparison of fit values to Vaisala Laboratory measurements with Reference Current Source

OIF411 (μA)	OIF411 minus OIF921 (μA)	Vaisala Lab Value (μA)
0.0	-0.007	-0.005
0.5	-0.007	-0.007
3.0	-0.011	-0.010
6.0	-0.014	-0.012
10.0	-0.020	-0.021



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Conclusions

Darwin RS92 – RS41 intercomparison campaign June 2018
data submitted to GRUAN Lead Centre

Preliminary analysis gives broadly similar results to, for
example, UKMO 2014 findings

Dual OIF921 – OIF411 ozone soundings give mean
differences in very good agreement with Vaisala laboratory
studies as reported in Whitepaper (B211385EN-A)

Current plans are to fly weekly dual soundings in Darwin for
the next year



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Thank you...

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