Instrument review

Davis Instruments Vantage Vue AWS

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University of Reading, UK
September 2013

For Davis Instruments Vantage Pro2 review, see
www.measuringtheweather.net

This review was originally presented at the Royal Meteorological Society's Second Amateur Meteorologists' Conference held at the University of Reading on 13-15 September 2013. Product details and prices have been updated to March 2024 in v1.1.

Overview

Objective

- Comparison against UK-standard climatological instruments
- Objective assessment of climatological worth

Method

- Simultaneous same-site logging of adjacent systems
- Referenced against calibrated sensors

Period

- 14 months, 9 June 2012 to 1 September 2013
- ~ 129 000 observations, availability typically 99.8%

Overview

Elements compared

- **Temperature**
- **Precipitation**
- Humidity and dew point
- Barometric pressure
- Wind speed and direction

- Ease of setup and installation
- Reliability and durability

This comparative study is entirely independent of both manufacturer and equipment reseller

- AWS kindly loaned for this review by Dr John Dann, Prodata Associates

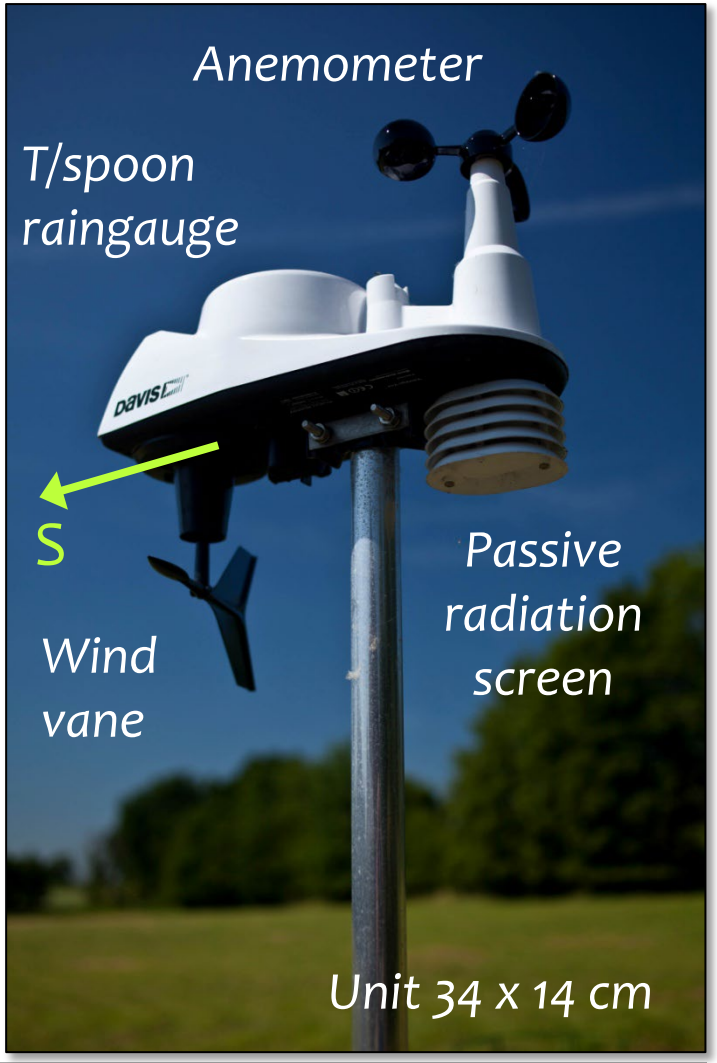
PRODATA WEATHER SYSTEMS www.weatherstations.co.uk **03336 664175**

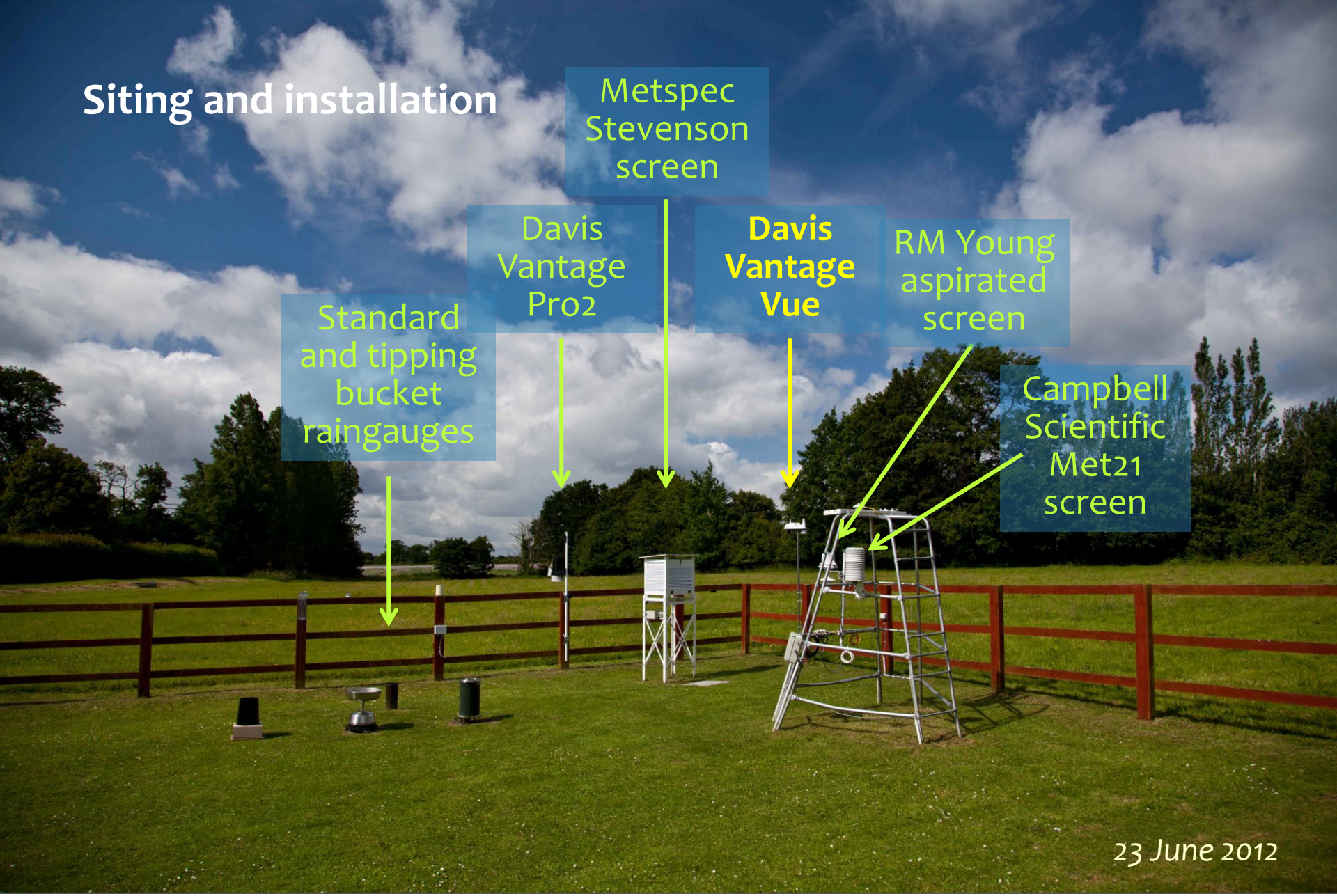
- Standard 'off the shelf' package with no special modifications or calibrations – 'sample of one'
- **The author has no connection with Davis Instruments or Prodata Associates (other than as an existing customer of the latter), and no incentives were offered or sought to influence this review in any way**

Davis Instruments Vantage Vue AWS

- ‘All-in-one’ AWS
  - Temperature, humidity, wind speed and direction, barometric pressure, precipitation
  - Sensors cannot be independently positioned for optimum exposure
- Prodata price (March 2024) £625 inc VAT

Wireless interior display unit (includes barometer)



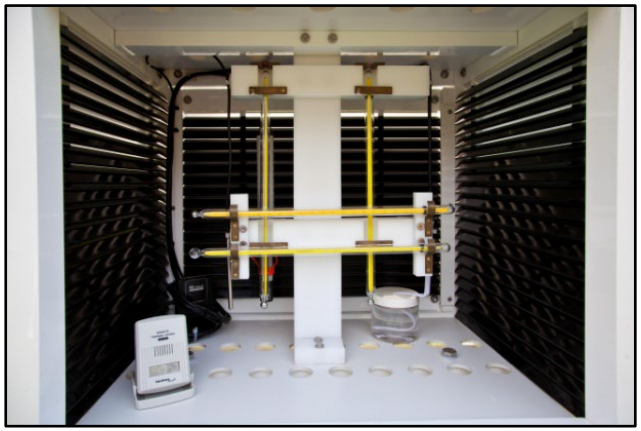


Comparison site – Stratfield Mortimer Observatory, Berkshire *51.4°N 1.0°W*

Siting and installation

Air temperature comparison basis

- Compared with adjacent MetO standard Metspec Stevenson screen using calibrated platinum resistance temperature sensor
- Sampling and logging:
  - Screen PRT - 10 s samples, 60 s running mean logged 1 min, 5 min, hourly to Campbell Scientific CR1000 logger/multiplexer
    - Aspirated and Met21 screens as Stevenson screen
  - Davis Vantage Vue 10 s spot, logged 5 min

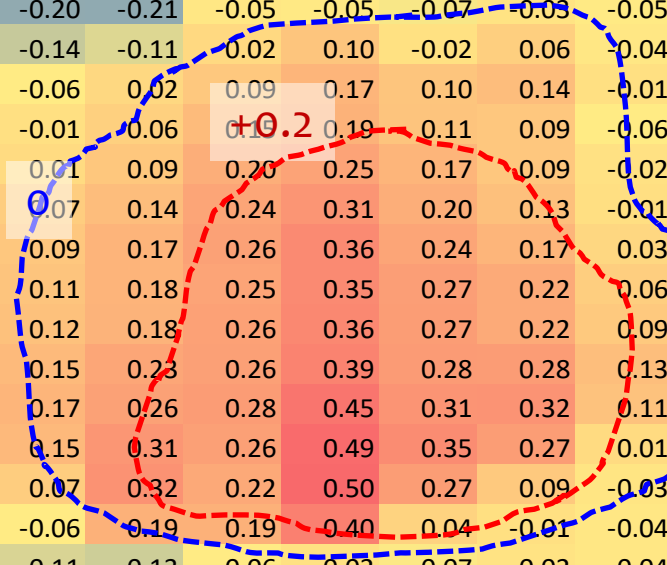


- Evaluations
  - Mean temperature differences
    - By month and by hour of day
    - By solar radiation and wind speed combinations
  - Logged max and min temperatures 00-00h
  - Performance under specific conditions
  - Performance within 0.2 and 0.5 degC of Stevenson screen temperature
  - Comparison with adjacent Davis Instruments Vantage Pro2 AWS

Temperature

*Vantage Vue - hourly mean differences from **Stevenson** screen*

Month and hour (UTC)	1	2	3	4	5	6	7	8	9	10	11	12	Average
00	-0.20	-0.22	-0.25	-0.18	-0.16	-0.14	-0.08	-0.03	-0.03	-0.05	-0.05	-0.09	**-0.12**
01	-0.21	-0.20	-0.26	-0.18	-0.17	-0.14	-0.09	-0.04	-0.03	-0.05	-0.07	-0.10	**-0.12**
02	-0.21	-0.21	-0.27	-0.18	-0.15	-0.14	-0.08	-0.02	-0.02	-0.06	-0.07	-0.09	**-0.11**
03	-0.21	-0.22	-0.25	-0.16	-0.15	-0.14	-0.07	-0.03	0.00	-0.06	-0.08	-0.10	**-0.11**
04	-0.20	-0.23	-0.28	-0.16	-0.14	-0.15	-0.08	-0.04	-0.01	-0.05	-0.07	-0.10	**-0.12**
05	-0.20	-0.22	-0.25	-0.16	-0.17	-0.14	-0.09	-0.05	-0.01	-0.05	-0.04	-0.10	**-0.12**
06	-0.20	-0.22	-0.26	-0.20	-0.21	-0.05	-0.05	-0.07	-0.03	-0.05	-0.06	-0.12	**-0.11**
07	-0.22	-0.21	-0.23	-0.14	-0.11	0.02	0.10	-0.02	0.06	-0.04	-0.08	-0.11	**-0.06**
08	-0.23	-0.21	-0.20	-0.06	0.02	0.09	0.17	0.10	0.14	-0.01	-0.07	-0.10	**0.00**
09	-0.21	-0.21	-0.20	-0.01	0.06	0.15	0.19	0.11	0.09	-0.06	-0.12	-0.11	**0.01**
10	-0.20	-0.20	-0.16	0.01	0.09	0.20	0.25	0.17	0.09	-0.02	-0.17	-0.15	**0.03**
11	-0.18	-0.19	-0.11	0.07	0.14	0.24	0.31	0.20	0.13	-0.01	-0.16	-0.21	**0.06**
12	-0.14	-0.18	-0.10	0.09	0.17	0.26	0.36	0.24	0.17	0.03	-0.09	-0.19	**0.10**
13	-0.10	-0.16	-0.06	0.11	0.18	0.25	0.35	0.27	0.22	0.06	-0.04	-0.14	**0.12**
14	-0.09	-0.12	-0.04	0.12	0.18	0.26	0.36	0.27	0.22	0.09	0.02	-0.06	**0.14**
15	-0.08	-0.06	-0.04	0.15	0.23	0.26	0.39	0.28	0.28	0.13	0.05	-0.05	**0.16**
16	-0.12	-0.02	-0.03	0.17	0.26	0.28	0.45	0.31	0.32	0.11	-0.04	-0.07	**0.18**
17	-0.17	-0.11	-0.09	0.15	0.31	0.26	0.49	0.35	0.27	0.01	-0.12	-0.08	**0.16**
18	-0.20	-0.20	-0.16	0.07	0.32	0.22	0.50	0.27	0.09	-0.03	-0.03	-0.09	**0.12**
19	-0.19	-0.21	-0.23	-0.06	0.19	0.19	0.40	0.04	-0.01	-0.04	-0.02	-0.10	**0.04**
20	-0.18	-0.18	-0.22	-0.11	-0.13	-0.06	-0.02	-0.07	-0.02	-0.04	-0.01	-0.08	**-0.09**
21	-0.20	-0.19	-0.22	-0.13	-0.17	-0.13	-0.09	-0.06	-0.02	-0.05	-0.04	-0.08	**-0.11**
22	-0.20	-0.21	-0.23	-0.15	-0.14	-0.15	-0.09	-0.05	0.01	-0.04	-0.05	-0.10	**-0.11**
23	-0.18	-0.21	-0.25	-0.15	-0.17	-0.14	-0.09	-0.05	-0.01	-0.05	-0.07	-0.08	**-0.11**
Average	**-0.18**	**-0.18**	**-0.18**	**-0.05**	**0.01**	**0.05**	**0.14**	**0.09**	**0.08**	**-0.01**	**-0.06**	**-0.10**	**-0.01**



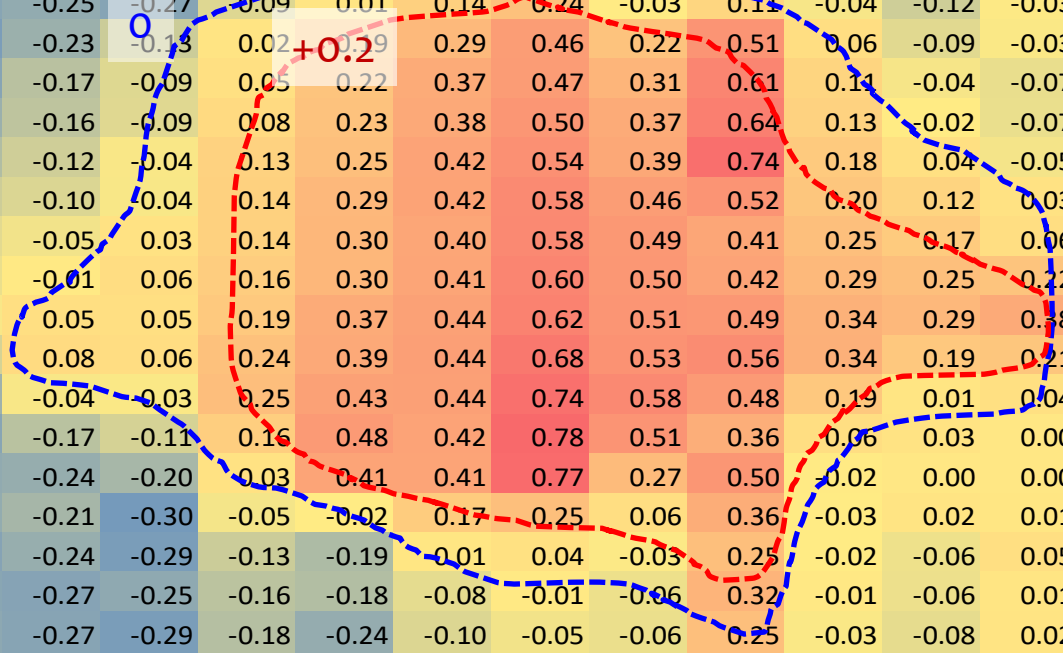
Diurnal shortwave and longwave curves

5 min data, assigned to nearest hour UTC
Data period 11 June 2012 to 1 Sept 2013

Temperature

Vantage Vue - hourly mean differences from ***aspirated*** screen

Month and hour (UTC)	1	2	3	4	5	6	7	8	9	10	11	12	Average
00	-0.29	-0.27	-0.32	-0.22	-0.24	-0.14	-0.09	-0.06	0.17	-0.04	-0.05	-0.01	**-0.12**
01	-0.29	-0.22	-0.31	-0.25	-0.25	-0.14	-0.12	-0.05	0.12	-0.05	-0.09	-0.06	**-0.13**
02	-0.28	-0.25	-0.33	-0.23	-0.22	-0.14	-0.12	-0.04	0.10	-0.05	-0.08	-0.05	**-0.13**
03	-0.28	-0.23	-0.31	-0.27	-0.26	-0.15	-0.13	-0.06	0.10	-0.05	-0.09	-0.05	**-0.14**
04	-0.27	-0.27	-0.36	-0.25	-0.22	-0.18	-0.14	-0.11	0.05	-0.05	-0.10	-0.05	**-0.16**
05	-0.26	-0.26	-0.32	-0.24	-0.33	-0.19	-0.22	-0.14	0.02	-0.04	-0.06	-0.04	**-0.17**
06	-0.24	-0.25	-0.36	-0.35	-0.36	-0.07	-0.21	-0.21	-0.06	-0.05	-0.09	-0.08	**-0.19**
07	-0.27	-0.25	-0.27	-0.09	0.01	0.14	0.24	-0.03	0.11	-0.04	-0.12	-0.03	**-0.02**
08	-0.29	-0.23	-0.13	0.02	0.09	0.29	0.46	0.22	0.51	0.06	-0.09	-0.03	**0.13**
09	-0.27	-0.17	-0.09	0.05	0.22	0.37	0.47	0.31	0.61	0.11	-0.04	-0.07	**0.17**
10	-0.23	-0.16	-0.09	0.08	0.23	0.38	0.50	0.37	0.64	0.13	-0.02	-0.07	**0.20**
11	-0.18	-0.12	-0.04	0.13	0.25	0.42	0.54	0.39	0.74	0.18	0.04	-0.05	**0.24**
12	-0.13	-0.10	0.04	0.14	0.29	0.42	0.58	0.46	0.52	0.20	0.12	0.03	**0.26**
13	-0.08	-0.05	0.03	0.14	0.30	0.40	0.58	0.49	0.41	0.25	0.17	0.06	**0.27**
14	-0.06	-0.01	0.06	0.16	0.30	0.41	0.60	0.50	0.42	0.29	0.25	0.22	**0.31**
15	-0.04	0.05	0.05	0.19	0.37	0.44	0.62	0.51	0.49	0.34	0.29	0.38	**0.35**
16	-0.11	0.08	0.06	0.24	0.39	0.44	0.68	0.53	0.56	0.34	0.19	0.21	**0.35**
17	-0.22	-0.04	-0.03	0.25	0.43	0.44	0.74	0.58	0.48	0.19	0.01	0.04	**0.30**
18	-0.27	-0.17	-0.11	0.16	0.48	0.42	0.78	0.51	0.36	0.06	0.03	0.00	**0.26**
19	-0.25	-0.24	-0.20	0.03	0.41	0.41	0.77	0.27	0.50	-0.02	0.00	0.00	**0.20**
20	-0.24	-0.21	-0.30	-0.05	-0.02	0.17	0.25	0.06	0.36	-0.03	0.02	0.01	**0.03**
21	-0.27	-0.24	-0.29	-0.13	-0.19	-0.01	0.04	-0.03	0.25	-0.02	-0.06	0.05	**-0.06**
22	-0.26	-0.27	-0.25	-0.16	-0.18	-0.08	-0.01	-0.06	0.32	-0.01	-0.06	0.01	**-0.08**
23	-0.26	-0.27	-0.29	-0.18	-0.24	-0.10	-0.05	-0.06	0.25	-0.03	-0.08	0.02	**-0.10**
Average	**-0.22**	**-0.17**	**-0.18**	**-0.03**	**0.06**	**0.16**	**0.28**	**0.18**	**0.33**	**0.07**	**0.00**	**0.02**	**0.07**



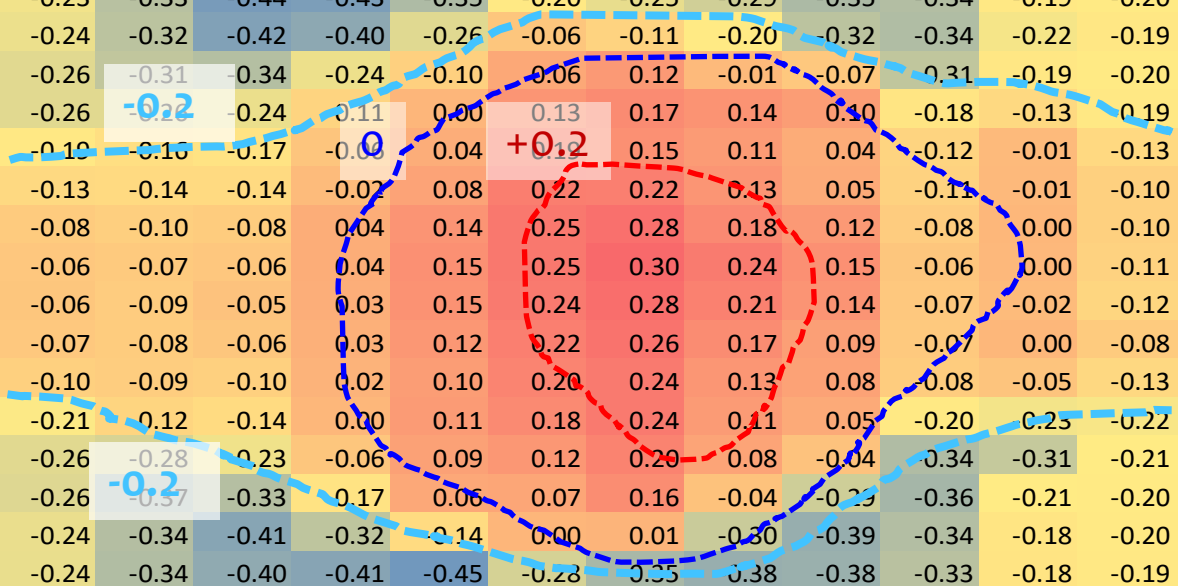
5 min data, assigned to nearest hour UTC
Data period 11 June 2012 to 1 Sept 2013

Temperature

Vantage Vue - hourly mean differences from **Davis VP2** AWS

VS VP2

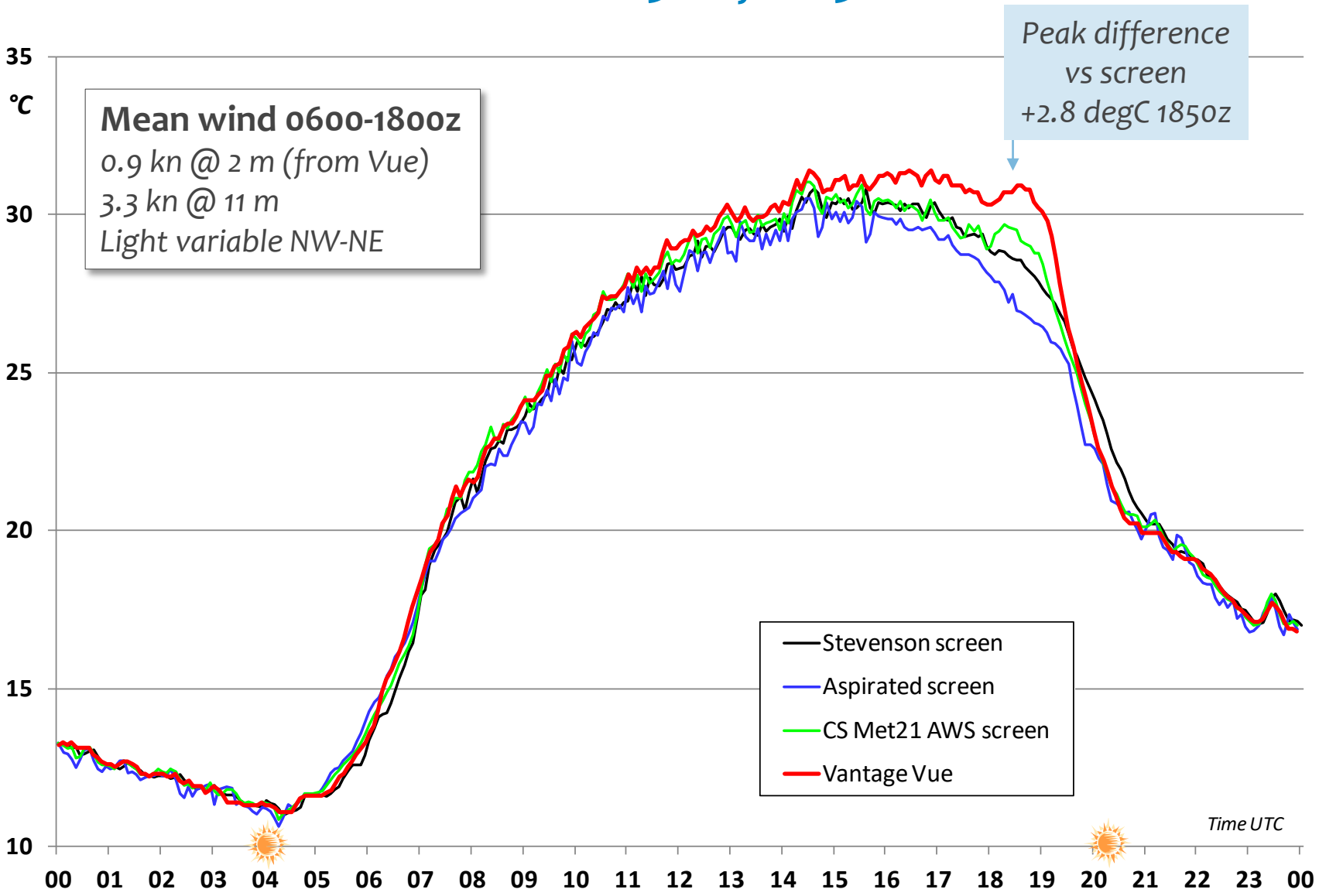
Month and hour (UTC	1	2	3	4	5	6	7	8	9	10	11	12	Average
00	-0.24	-0.31	-0.43	-0.48	-0.43	-0.30	-0.33	-0.31	-0.35	-0.37	-0.21	-0.20	**-0.33**
01	-0.24	-0.29	-0.43	-0.48	-0.43	-0.30	-0.35	-0.32	-0.37	-0.36	-0.20	-0.23	**-0.33**
02	-0.25	-0.30	-0.44	-0.49	-0.43	-0.30	-0.32	-0.31	-0.38	-0.37	-0.21	-0.23	**-0.33**
03	-0.28	-0.33	-0.44	-0.45	-0.43	-0.31	-0.31	-0.32	-0.37	-0.37	-0.22	-0.22	**-0.33**
04	-0.25	-0.34	-0.46	-0.45	-0.42	-0.28	-0.30	-0.31	-0.35	-0.35	-0.21	-0.21	**-0.32**
05	-0.23	-0.33	-0.44	-0.43	-0.35	-0.20	-0.25	-0.29	-0.35	-0.34	-0.19	-0.20	**-0.29**
06	-0.24	-0.32	-0.42	-0.40	-0.26	-0.06	-0.11	-0.20	-0.32	-0.34	-0.22	-0.19	**-0.23**
07	-0.26	-0.31	-0.34	-0.24	-0.10	-0.06	0.12	-0.01	-0.07	-0.31	-0.19	-0.20	**-0.11**
08	-0.26	-0.28	-0.24	-0.11	0.00	0.13	0.17	0.14	0.10	-0.18	-0.13	-0.19	**-0.03**
09	-0.19	-0.16	-0.17	-0.08	0.04	0.12	0.15	0.11	0.04	-0.12	-0.01	-0.13	**0.01**
10	-0.13	-0.14	-0.14	-0.02	0.08	0.22	0.22	0.13	0.05	-0.11	-0.01	-0.10	**0.04**
11	-0.08	-0.10	-0.08	0.04	0.14	0.25	0.28	0.18	0.12	-0.08	0.00	-0.10	**0.08**
12	-0.06	-0.07	-0.06	0.04	0.15	0.25	0.30	0.24	0.15	-0.06	0.00	-0.11	**0.10**
13	-0.06	-0.09	-0.05	0.03	0.15	0.24	0.28	0.21	0.14	-0.07	-0.02	-0.12	**0.09**
14	-0.07	-0.08	-0.06	0.03	0.12	0.22	0.26	0.17	0.09	-0.07	0.00	-0.08	**0.08**
15	-0.10	-0.09	-0.10	0.02	0.10	0.20	0.24	0.13	0.08	-0.08	-0.05	-0.13	**0.05**
16	-0.21	-0.12	-0.14	0.00	0.11	0.18	0.24	0.11	0.05	-0.20	-0.23	-0.22	**0.00**
17	-0.26	-0.28	-0.23	-0.06	0.09	0.12	0.20	0.08	-0.04	-0.34	-0.31	-0.21	**-0.06**
18	-0.26	-0.37	-0.33	-0.17	0.06	0.07	0.16	-0.04	-0.23	-0.36	-0.21	-0.20	**-0.12**
19	-0.24	-0.34	-0.41	-0.32	-0.14	0.00	0.01	-0.30	-0.39	-0.34	-0.18	-0.20	**-0.21**
20	-0.24	-0.34	-0.40	-0.41	-0.45	-0.28	-0.35	-0.38	-0.38	-0.33	-0.18	-0.19	**-0.33**
21	-0.26	-0.33	-0.41	-0.41	-0.41	-0.33	-0.37	-0.35	-0.35	-0.32	-0.21	-0.20	**-0.33**
22	-0.26	-0.34	-0.44	-0.43	-0.41	-0.31	-0.35	-0.35	-0.32	-0.34	-0.23	-0.21	**-0.33**
23	-0.24	-0.31	-0.45	-0.47	-0.41	-0.31	-0.34	-0.33	-0.34	-0.36	-0.23	-0.21	**-0.33**
Average	**-0.21**	**-0.25**	**-0.30**	**-0.24**	**-0.15**	**-0.04**	**-0.03**	**-0.10**	**-0.16**	**-0.26**	**-0.15**	**-0.18**	**-0.15**



5 min data, assigned to nearest hour UTC
Data period 11 June 2012 to 1 Sept 2013

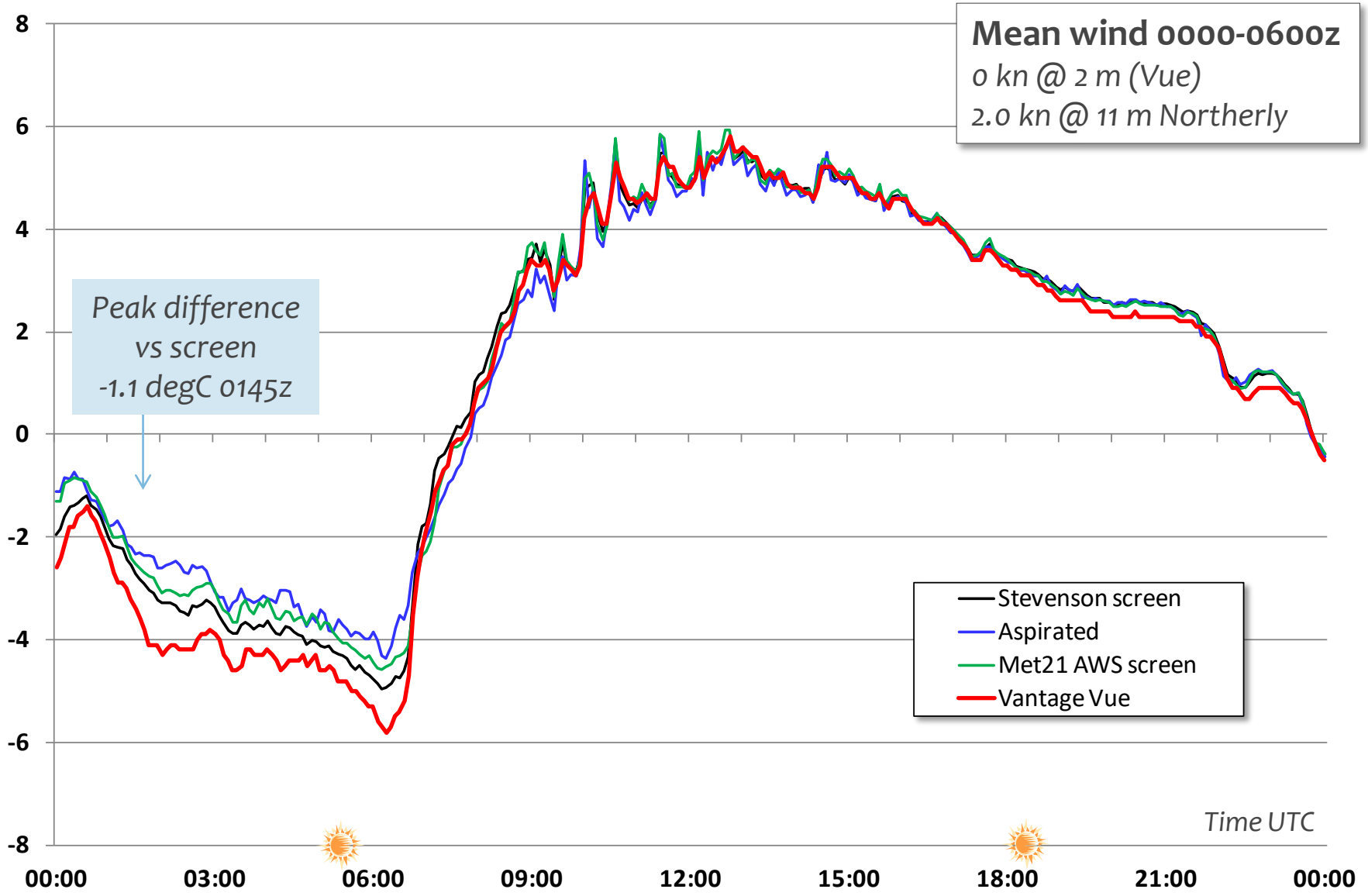
Temperature

Summer – unbroken sunshine: 13 July 2013



Temperature

Winter – clear, calm night: 31 March 2013



Temperature

Dependence upon solar radiation and 2 m wind speed

Vantage Vue differences (degC) from ***Stevenson*** *screen*

VS SCREEN — Global insolation, W/m2

V/Vue wind speed, kn	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	Grand Total
0.0	-0.12	-0.03	0.07	0.15	0.18	0.21	0.22	0.35	0.33	0.32	0.30	0.45	0.49	0.43	0.41	0.55	0.54	0.72	0.34		0.87						-0.08
0.9	-0.10	-0.05	0.01	0.07	0.12	0.14	0.18	0.24	0.28	0.26	0.25	0.30	0.34	0.32	0.31	0.37	0.47	0.49	0.48	0.48	0.50	0.40	0.78		0.23		0.02
1.7	-0.11	-0.04	0.02	0.08	0.12	0.16	0.19	0.18	0.21	0.22	0.25	0.26	0.28	0.26	0.28	0.31	0.34	0.34	0.36	0.38	0.36	0.43	0.54			-0.19	0.04
2.6	-0.11	-0.05	0.01	0.07	0.13	0.13	0.15	0.22	0.23	0.21	0.24	0.24	0.24	0.22	0.22	0.26	0.25	0.29	0.30	0.30	0.17	0.24	0.22				0.04
3.5	-0.11	-0.04	0.02	0.05	0.10	0.12	0.15	0.17	0.20	0.22	0.24	0.22	0.24	0.24	0.20	0.26	0.24	0.26	0.27	0.25	0.09	0.21	0.30				0.04
4.3	-0.11	-0.05	0.03	0.05	0.08	0.10	0.13	0.13	0.16	0.19	0.21	0.18	0.19	0.20	0.17	0.22	0.18	0.24	0.25	0.13	0.14	0.27	0.26				0.03
5.2	-0.11	-0.05	0.04	0.05	0.07	0.10	0.10	0.08	0.15	0.14	0.19	0.18	0.20	0.17	0.19	0.21	0.16	0.17	0.14	0.18	0.07						0.02
6.1	-0.09	-0.03	0.04	0.10	0.11	0.09	0.06	0.11	0.17	0.10	0.10	0.18	0.08	0.18	0.18	0.15	0.15	0.18	0.08	0.15	-0.02	0.17	0.59				0.02
7.0	-0.10	-0.06	0.04	0.07	0.09	0.11	0.11	0.19	0.17	0.24	0.14	0.22	0.18	0.21	0.13	0.10	0.08	0.10	0.12	0.21	0.34	0.38					0.02
7.8	-0.09	-0.07	0.06	0.14	0.08	0.18	0.05	0.20	0.15	0.15	0.25	0.16	0.18	0.23	0.10	0.16	0.03	0.17	0.17	0.06	0.25	0.51					0.01
8.7	-0.09	-0.04	0.00	0.11	0.12	0.09	0.19	0.14	0.08	0.12	0.12	0.14	0.09	0.13	-0.01	0.10	-0.30	0.21	0.09	0.06			-0.54				-0.03
9.6	-0.09	-0.05	-0.01	0.01	0.09	0.25	0.09	0.17	0.18	0.10	0.18	0.22	0.06	-0.14	0.09	0.15	-0.35	-0.04	0.21		0.45	0.19	0.29				-0.02
10.4	-0.09	-0.06	-0.11		0.13	0.02	0.10	0.06	-0.01	0.03	-0.04	-0.22	0.19	-0.01	0.09	-0.31	0.42		0.21								-0.06
11.3	-0.10		-0.01		0.38		-0.04	0.09		0.25	0.09		-0.17	-0.15	-0.16	-0.27				-0.04							-0.07
12.2	-0.13														-0.21												-0.15
13.0	-0.05																										-0.05
13.9	-0.15																										-0.15
Grand Total	-0.11	-0.04	0.03	0.08	0.12	0.14	0.16	0.20	0.22	0.22	0.24	0.25	0.27	0.25	0.25	0.29	0.31	0.33	0.32	0.30	0.24	0.31	0.37		0.23	-0.19	-0.01

+0.5

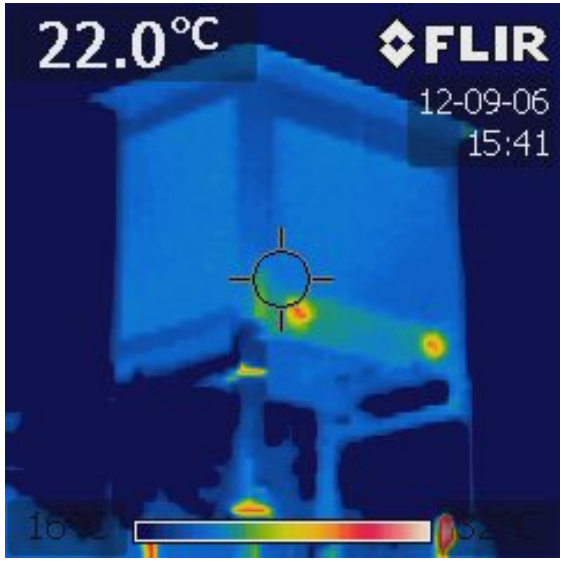
+0.25

5 min data, data period 11 June 2012 to 1 Sept 2013

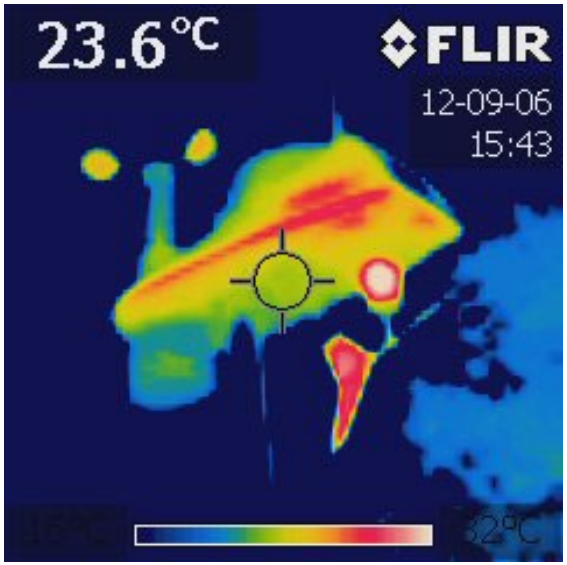
Temperature

Evidence from thermal imaging

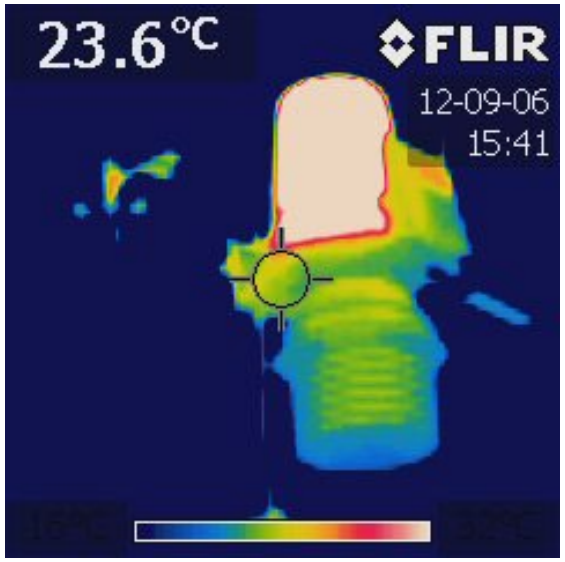
Images taken by a Flir i5 thermal imaging camera, the colour-scale is consistent.



Metspec Stevenson screen



Davis Vantage Vue



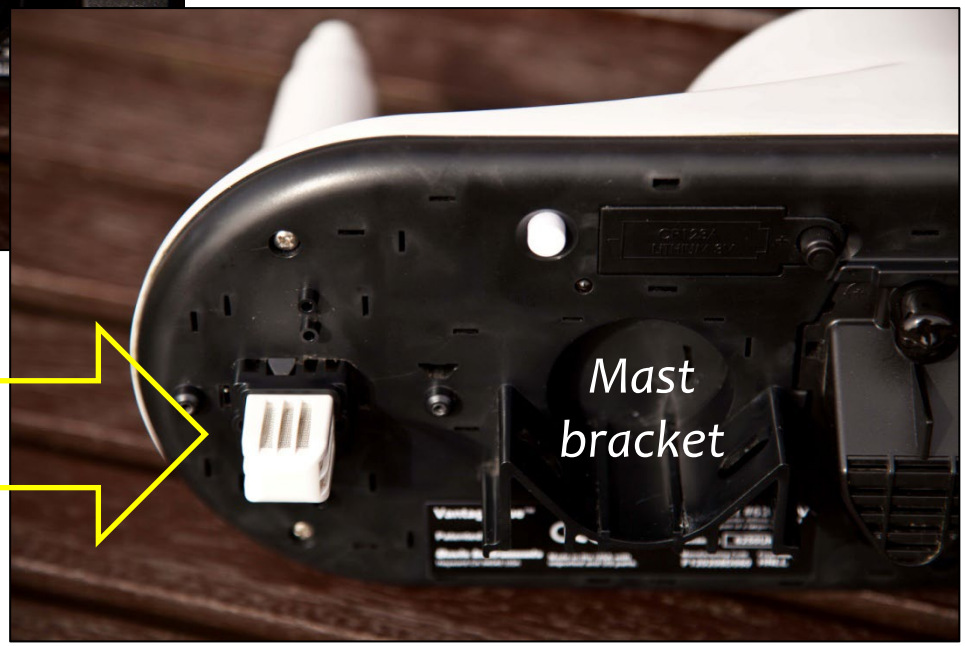
Davis Vantage Pro2

Images by kind courtesy of Simon Bell, Aston University

Temperature

Long-wave warming of underside of unit

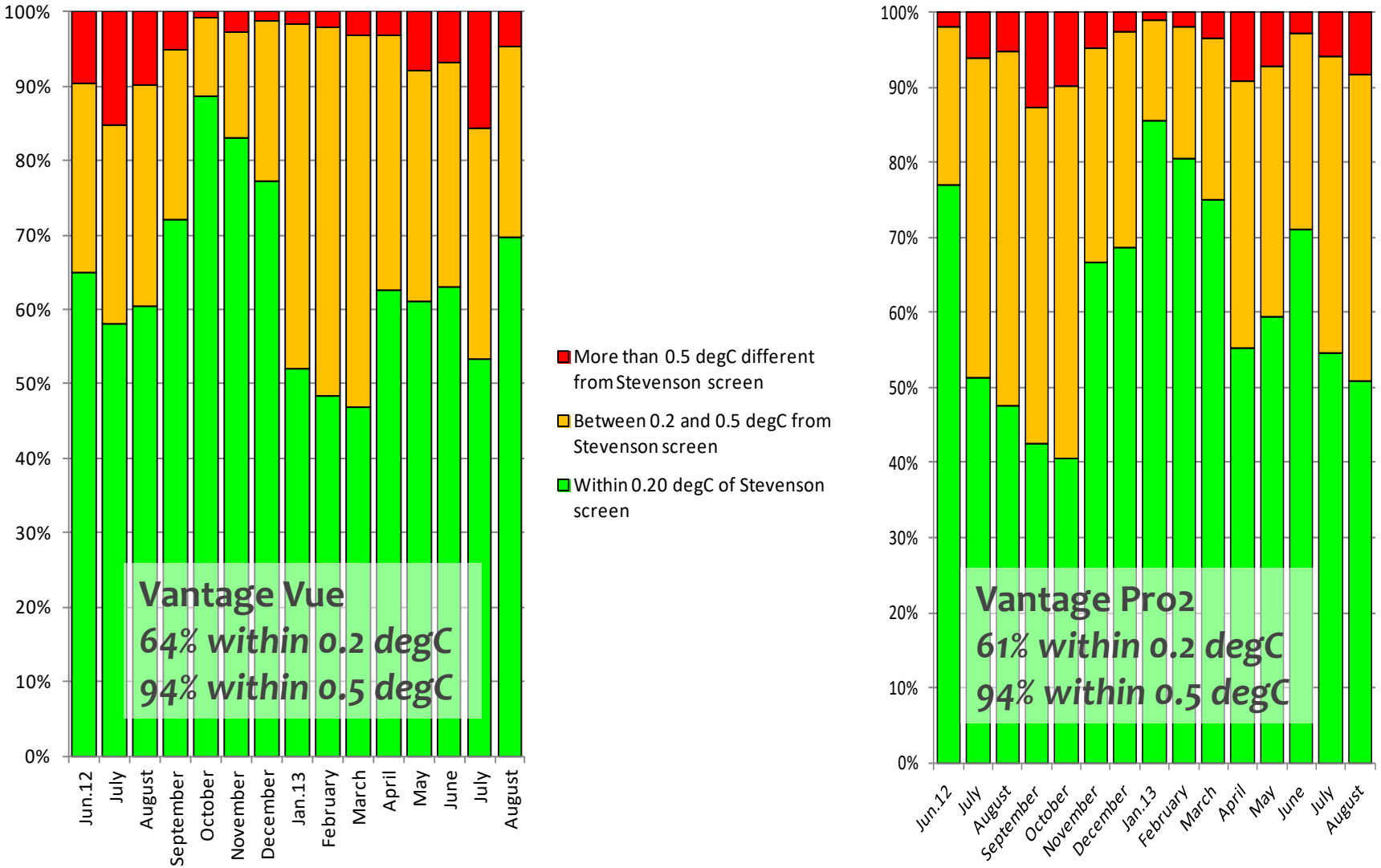
Passive screen
70 x 90 mm, 5 'saucers'



Temperature and humidity sensor

Temperature

Vantage Vue performance within 0.20/0.50 degC of Stevenson screen



Temperature

Monthly means of maximum and minimum

00-00h	MEAN MONTHLY MAXIMUM °C				MEAN MONTHLY MINIMUM °C				DIFF FROM SCREEN	
Month	VVue	Screen	Aspirated	Met21	VVue	Screen	Aspirated	Met21	Vvue M/Max	Vvue M/Min
June *10-30th*	19.0	18.7	18.6	18.7	9.6	9.7	9.6	9.7	+0.29	-0.14
July	20.7	20.2	20.2	20.3	11.1	11.1	10.9	11.2	+0.47	-0.02
August	22.3	22.0	21.8	22.1	11.7	11.7	11.6	11.8	+0.36	+0.03
September	19.0	18.8	18.7	18.9	7.1	7.1	7.1	7.2	+0.21	+0.03
October	13.4	13.4	13.2	13.5	5.9	6.0	5.9	6.1	+0.01	-0.11
November	10.1	10.2	10.0	10.3	2.0	2.1	2.0	2.2	-0.11	-0.08
December	8.0	8.2	8.0	8.3	1.4	1.4	1.2	1.5	-0.19	-0.05
January	6.1	6.2	6.2	6.2	0.9	1.1	1.0	1.1	-0.16	-0.19
February	6.0	6.1	6.0	6.1	-0.2	0.0	0.0	0.1	-0.15	-0.24
March	6.6	6.7	6.7	6.7	-0.7	-0.4	-0.2	-0.3	-0.07	-0.33
April	12.6	12.5	12.6	12.6	2.7	2.8	2.7	2.9	+0.04	-0.15
May	18.7	18.5	18.4	18.6	5.5	5.6	5.6	5.7	+0.20	-0.12
June	19.4	19.1	19.1	19.3	8.6	8.8	8.7	8.8	+0.23	-0.18
July	26.1	25.7	25.6	25.8	11.6	11.7	11.5	11.8	+0.35	-0.12
August	23.4	23.4	23.3	23.4	11.2	11.3	11.0	11.3	+0.06	-0.04
Average	**14.11**	**14.07**	**13.99**	**14.16**	**4.66**	**4.80**	**4.71**	**4.86**	**+0.03**	**-0.13**
12 mo ended August 2013										
								Mean RMS error	0.21	0.18
								Within 0.2 degC - days	**218**	**331**
								%	**60**	**90**
								Within 0.5 degC - days	**233**	**348**
								%	**64**	**95**

Temperature - conclusions

- Vantage Vue screen is overly sensitive to both short-wave (solar) and long-wave (terrestrial) radiation
  - The passive shield warms more than the Stevenson screen, particularly in sunshine and light winds, and stays warm into the evening
  - Under strong solar radiation and light winds differences average ~ +1 degC, can exceed +2 degC
  - Under clear skies at night differences average about -0.5 degC but can exceed -2 degC
- 64% of the 5 min spot observations were within 0.2 degC of the Stevenson screen – indistinguishable from Vantage Pro2 results
- Mean absolute error was near zero, RMS error 0.18 degC
  - The largest and smallest differences wrt **Stevenson screen** were +2.8 and -1.5 degC

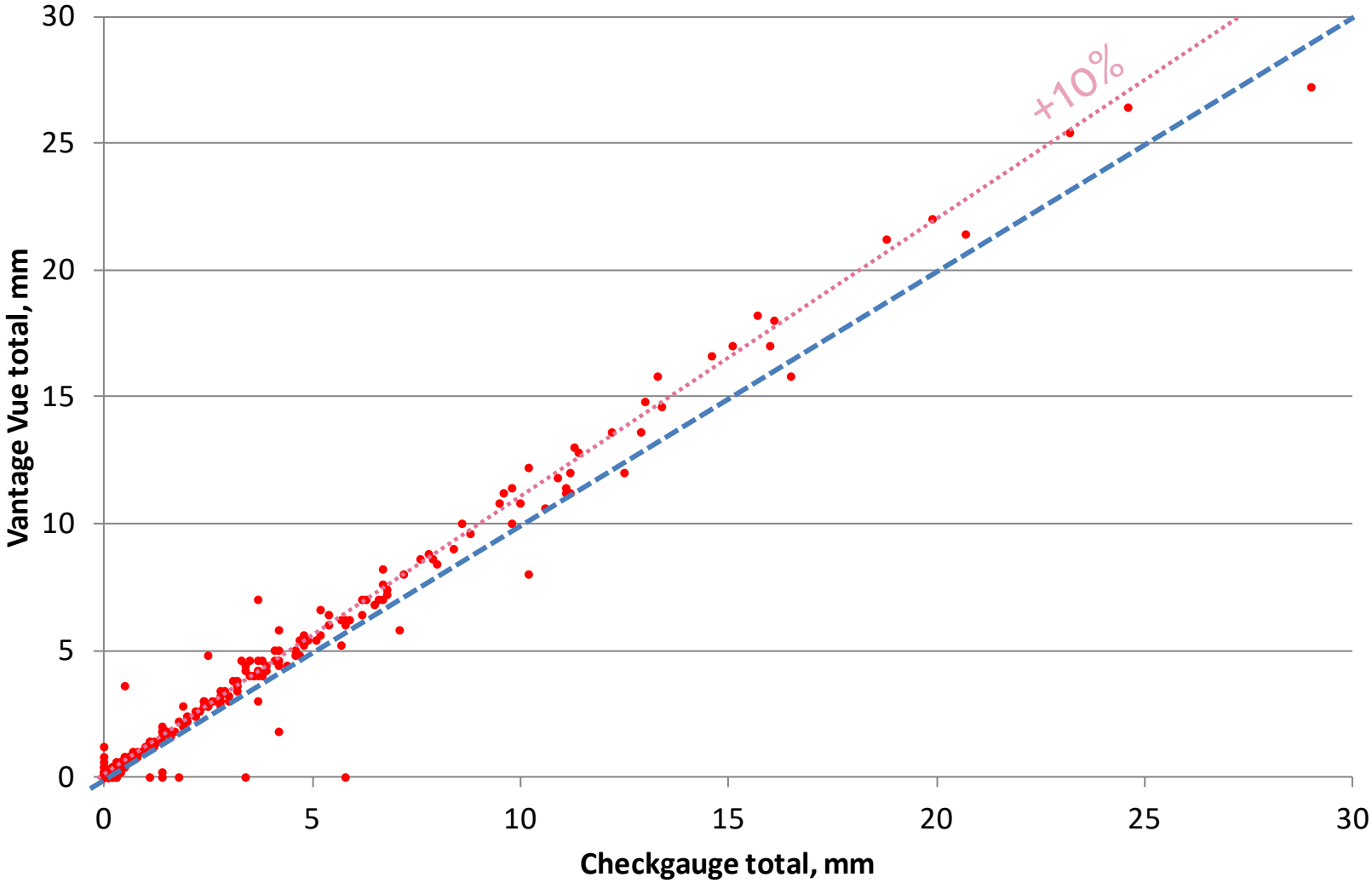
Precipitation: comparison basis

- Vantage Vue ‘tipping spoon’ compared with
  - Adjacent standard copper ‘five-inch’ climatological gauge, read daily at 0900 UTC
  - 1 and 5 min logged data from Didcot 0.2 mm tipping-bucket raingauge
  - Vantage Vue gauge rim at **2.0 m AGL**, five-inch at **30 cm**, Didcot at **42 cm**

Funnel diameter 120 mm

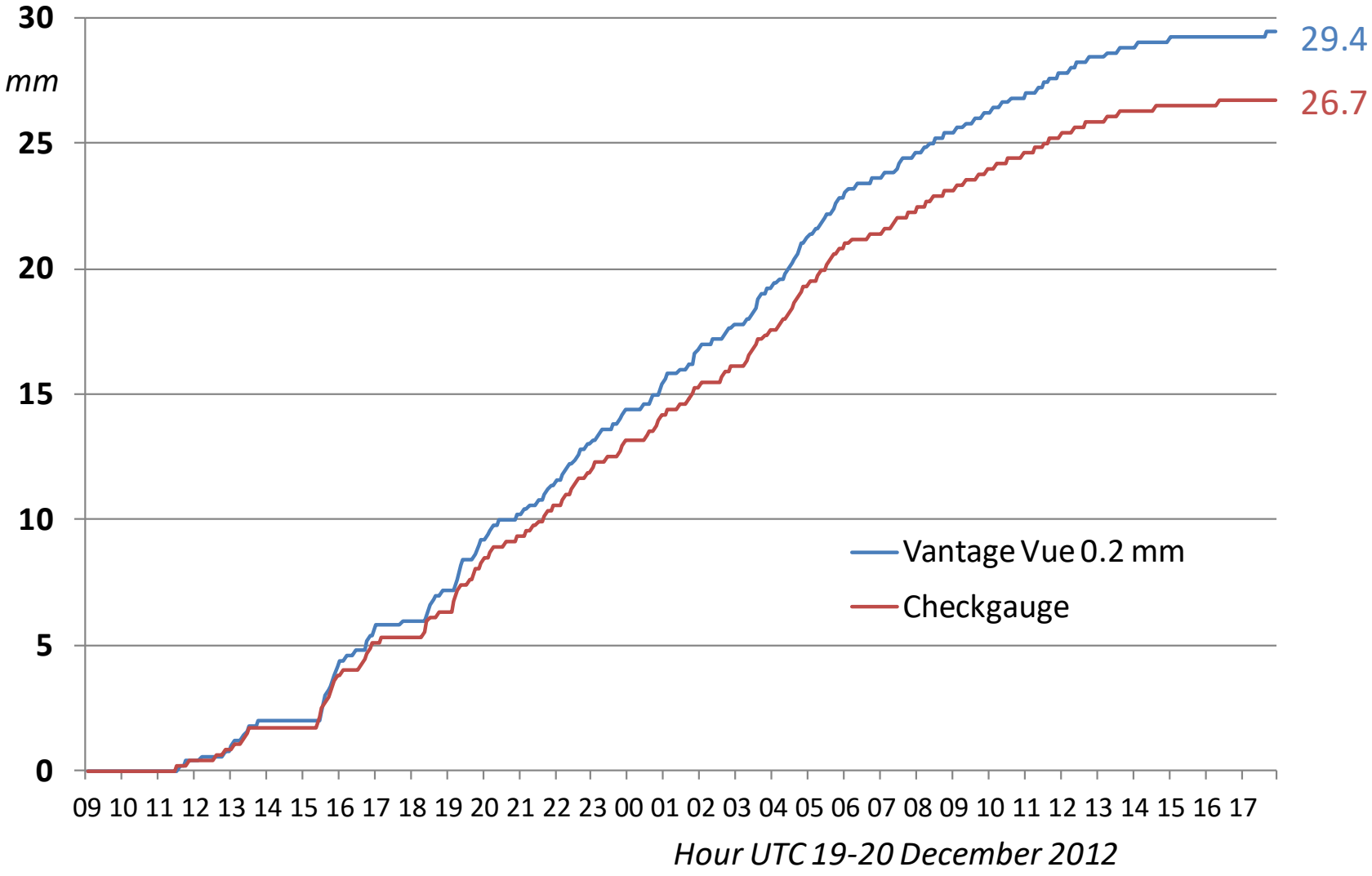
Precipitation

Scatterplot of daily 0900-0900 UTC totals



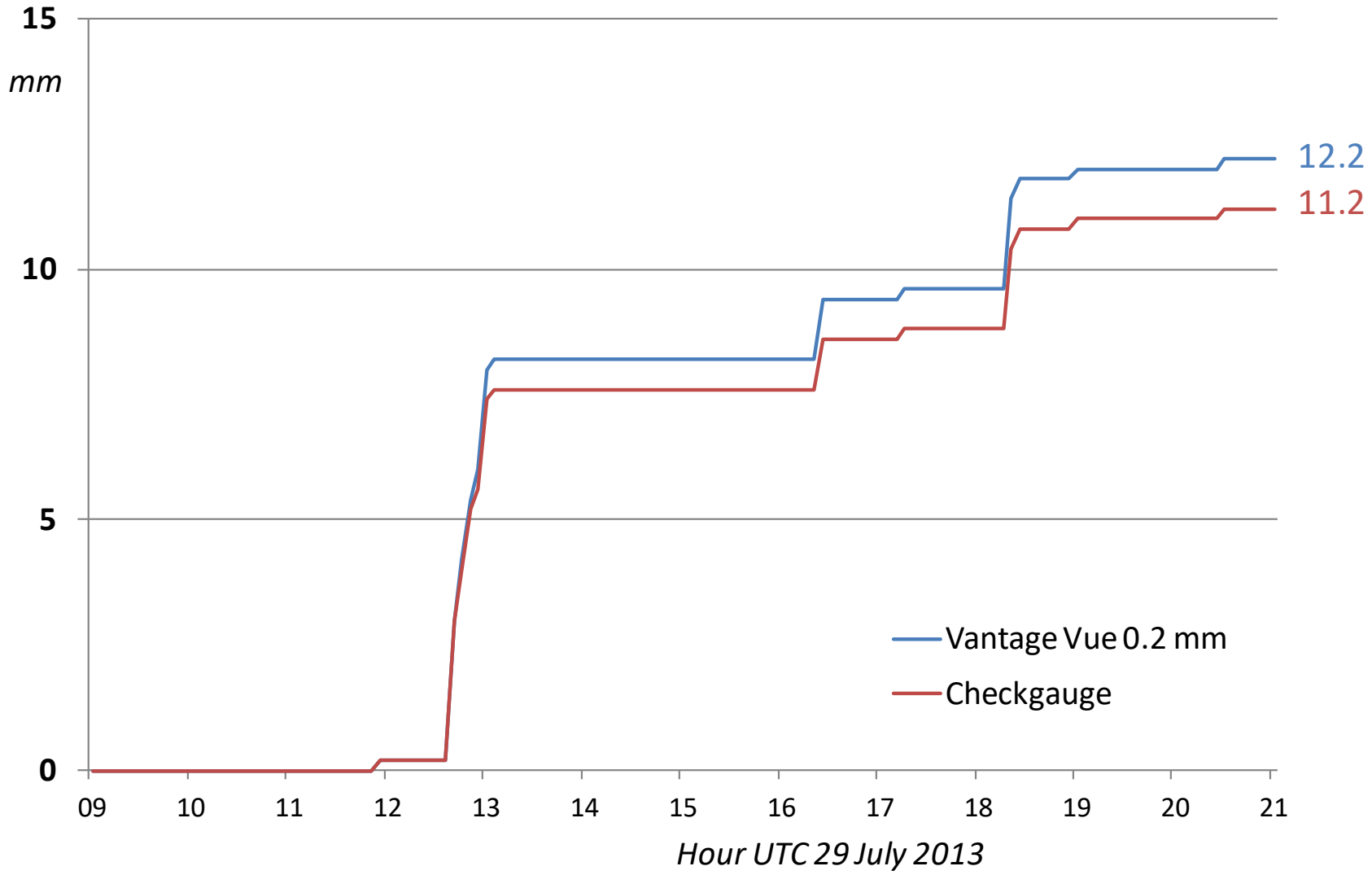
Precipitation

Timing: prolonged rainfall. Winds mostly SE force 2-3



Precipitation

Timing: intense rainfall. Showers and thunderstorms



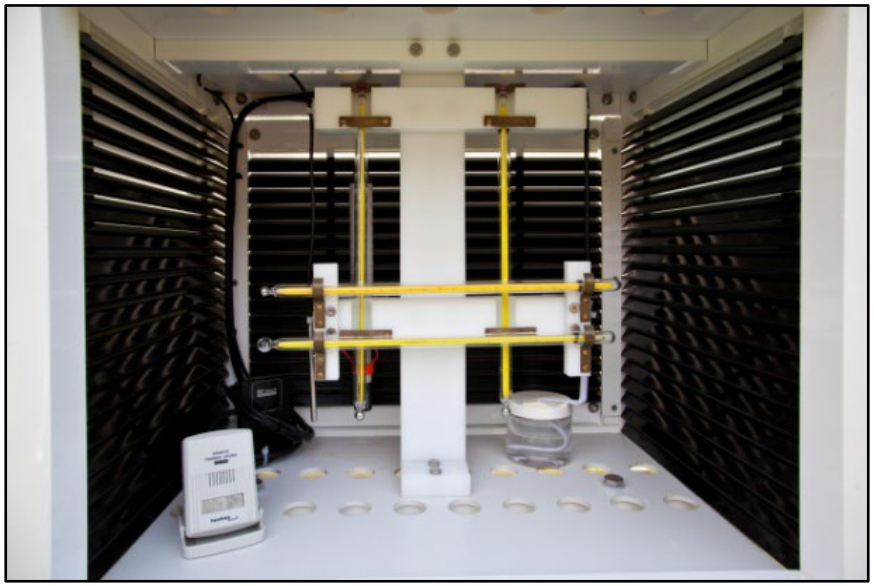
Precipitation: monthly totals

		MONTHLY TOTALS			PERCENTAGE OF CHECKGAUGE	
Year	Month	Vantage Vue	Checkgauge	Didcot 0.2 mm TB	Vantage Vue	Didcot 0.2 mm TB
2012	June *10-30th*	97.4	97.4	93.2	100	96
	July	83.2	74.8	76.2	111	102
	August	49.8	43.5	44.8	114	103
	September	54.4	47.1	47.0	115	100
	October	136.2	120.8	117.0	113	97
	November	89.8	85.9	83.6	105	97
	December	128.8	117.1	114.2	110	98
2013	January	66.0	65.5	*64.6*	101	99
	February	42.4	37.3	36.4	114	98
	March	100.0	91.2	89.4	110	98
	April	48.6	45.7	45.4	106	99
	May	58.0	54.4	55.2	107	101
	June	22.2	19.2	19.4	116	101
	July	33.2	28.7	28.4	116	99
	August	20.0	16.2	17.4	123	107
	TOTAL	**1030.0**	**944.8**	**932.2**	**109**	**99**
	12 months to August 2013					
	Total fall, mm	**799.6**	**729.1**	**718.0**	**110**	**98**
	Rain days (≥ 0.2 mm)	192	179	192	107	107

- Slightly high throughout
  - +5-15%
  - Should be lower owing to height!
- Higher rainday count

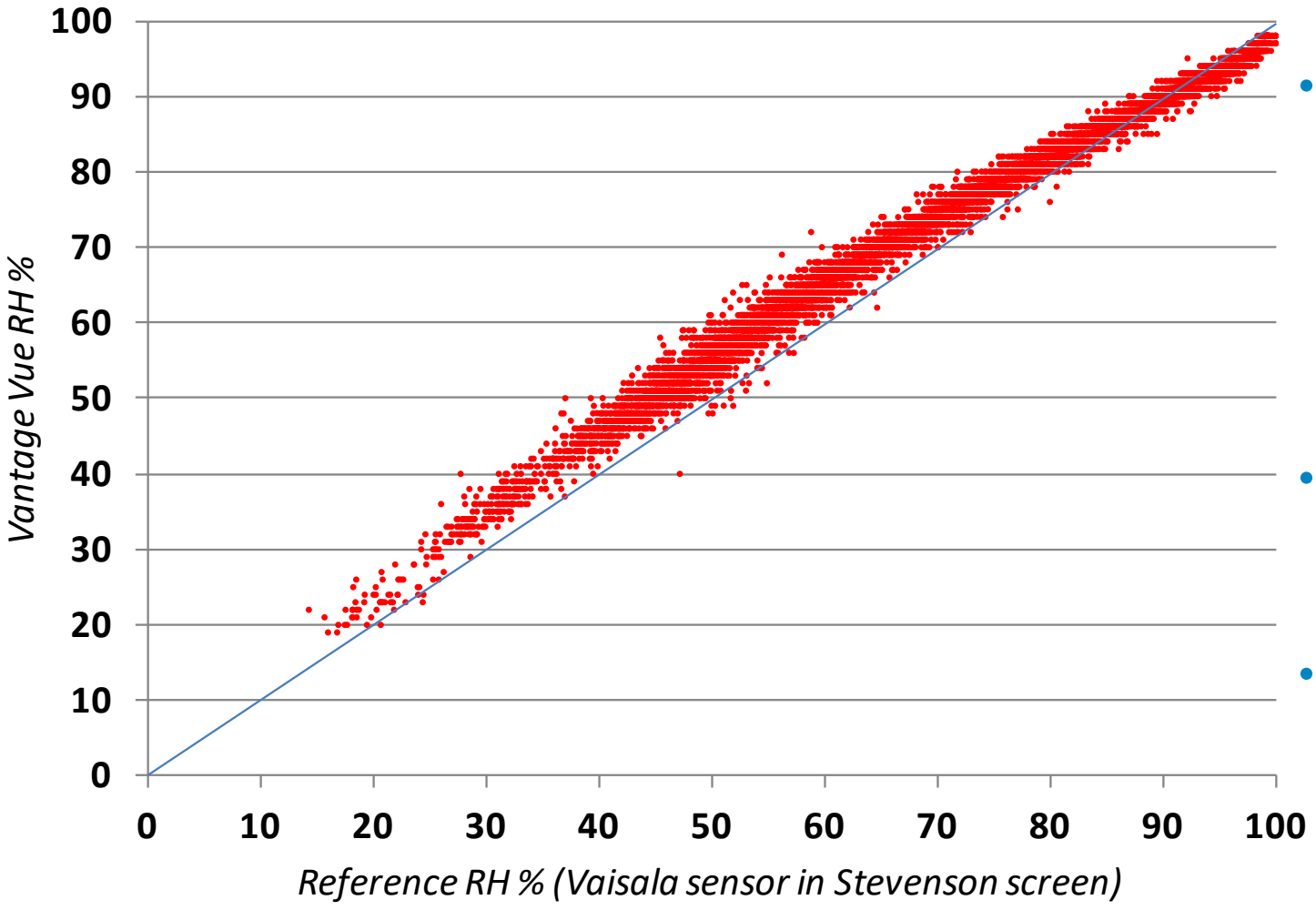
Humidity: comparison basis

- Compared with calibrated Vaisala HMP45C capacitative sensor housed within Stevenson screen
- Sampling and logging:
  - 10 s samples, 60 s running mean logged 1 min, 5 min, hourly to Campbell Scientific CR1000 logger/multiplexer
  - Davis Vantage Vue 10 s spot, logged 5 min



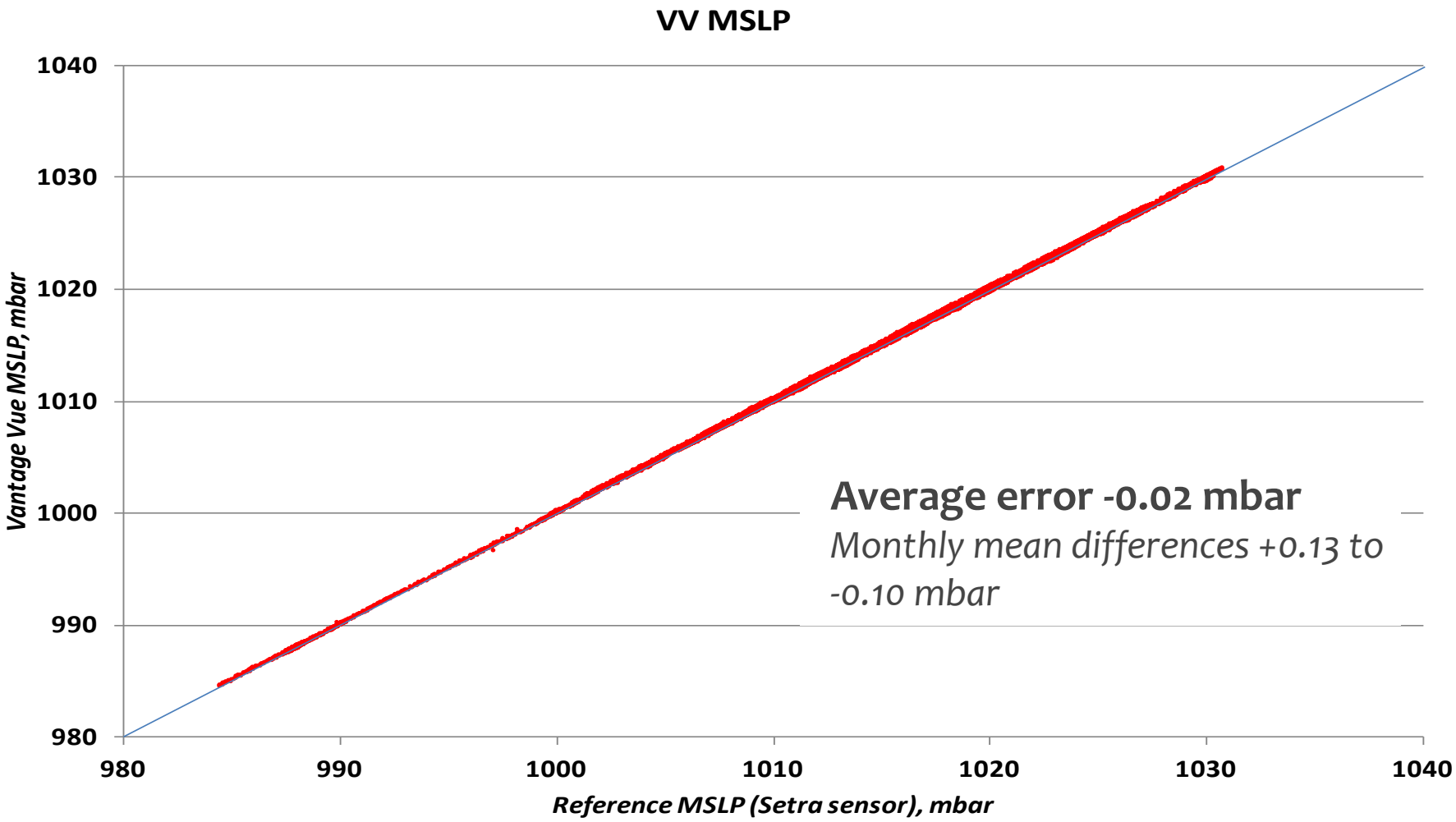
Humidity: scatterplot

May-June 2013, 17 568 5 min observation pairs



- Slightly high most of range
  - Mean absolute error +1.9%
  - Mean RMS error +3.0%
- Worst in midrange, ~ 6% error
- Dew point errors ~ 1 degC high

Barometric pressure: scatterplot



Wind speed comparisons

- Vue 2.0 m AGL, 2.5 s samples

  Starting speeds – anemo ~ 1.4 kn, wind vane 1-2 kn

2.0 m above ground

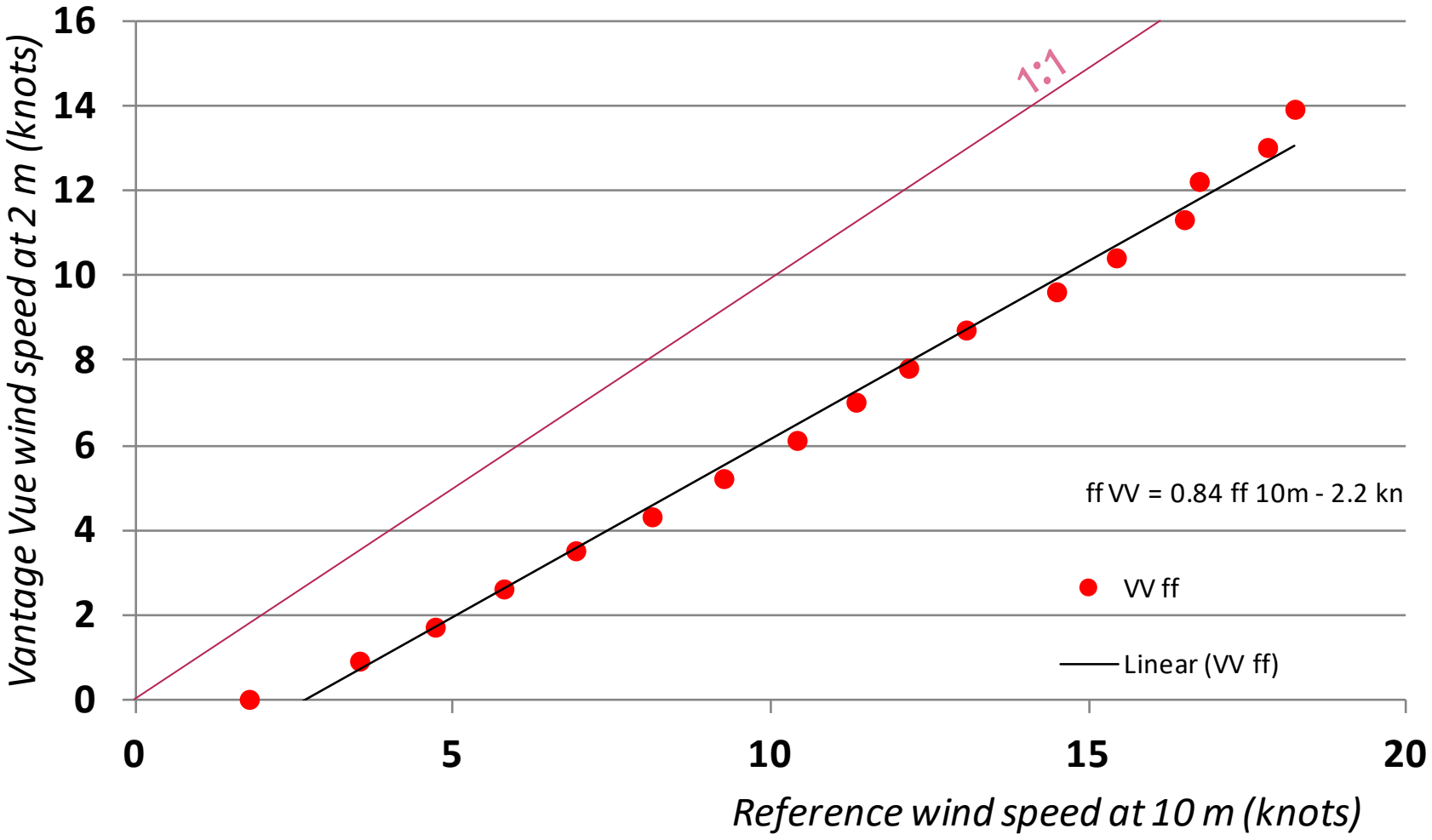
11.1 m above ground

Effective height ~ 6 m AGL

- Vector Instruments anemo/wind vane 11.1 m AGL, 1 s samples
  - Starting speeds – anemo ~ 0.5 kn, wind vane 1.0 kn
  - Gust 3 sec running mean

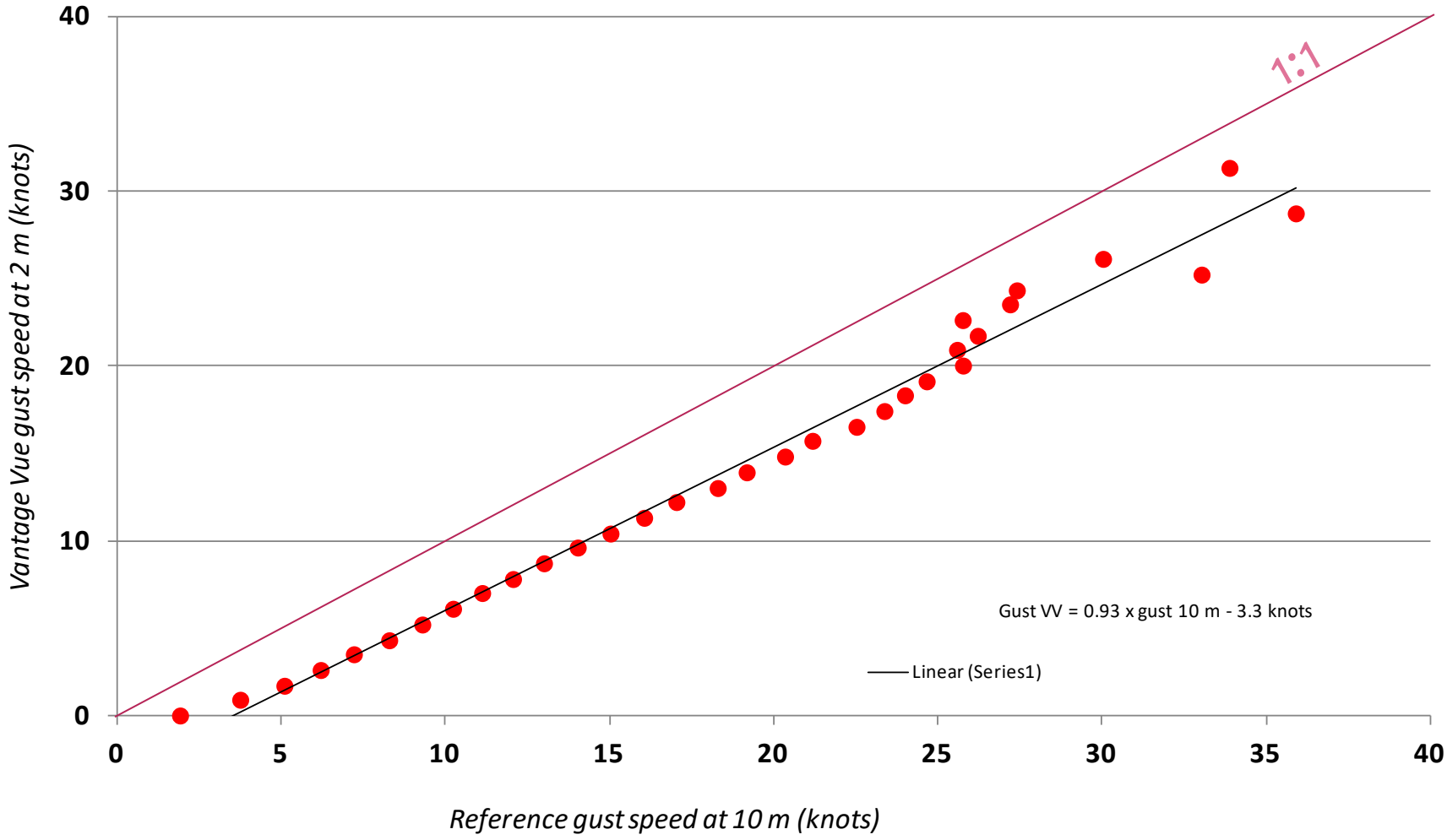
Wind speed - means

2 m Vantage Vue vs 10 m Vector anemometer, knots



Wind speed - gusts

2 m Vantage Vue vs 10 m Vector anemometer, knots



Summary assessment

Davis Instruments Vantage Vue AWS

Accurate climatological records

Element	*Very poor*	*Poor*	*Reasonable*	*Good*	*Excellent*
Setup and ease of use					X
Air temperature			X		
Precipitation		X	X		
Humidity			X		
Barometric pressure					X
Wind speed				X	
Wind direction			X		
Reliability and maintenance					X
Capability					X

Conclusions

Based on 14 month evaluation -

- Air temperature records are likely to show significant departures from neighbouring standard sites on sunny days (+1-2 degC) and on clear nights (-1 degC) owing to insufficient radiation shielding on the passive screen and black base to unit
- Rainfall readings were high – a standard 'checkgauge' should always be used to provide accurate rainfall measurements
- Humidity is slightly high, but within acceptable tolerances
- Barometric pressure is excellent (once set to MSL)
- Wind speed and direction are reliable, but limited to system height
- **In the author's opinion the Davis Vantage Vue AWS represents good value for money for those who require a simple or 'starter' system, or where ease and simplicity of installation are paramount**

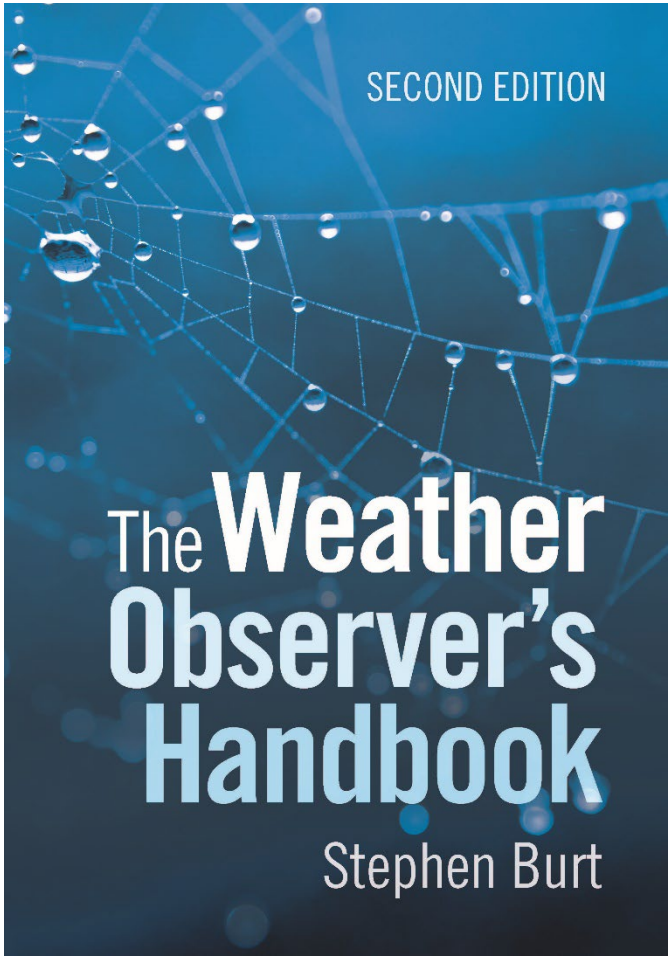
Other instrument reviews

Other instrument reviews on www.measuringtheweather.net

- available as downloadable PDFs:

- **Davis Instruments Vantage Vue AWS**
- **CoCoRaHS raingauge review**
- **An overview of sunshine sensors**
- **Logging the output from the Instromet sunshine sensor**
- **Campbell Scientific 'Met21' passive AWS radiation screen**
- **Davis Vantage Pro2 AWS review**

- Others are added from time-to-time, check website for latest



The Weather Observer's Handbook by Stephen Burt

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Paperback £39.99, Hardback £90

ISBN: *Paperback* 978-1-107-66228-5, *Hardback* 9781009260541
500 pp., 254 x 178 mm

Review from the first edition (2012):

"I would highly recommend this comprehensive weather-observing guide to hobbyists, professionals, teachers, and college instructors. The author has done an outstanding job making the book accessible to anyone interested in observing the weather, even if they do not have a technical background. At the same time, there is plenty of useful information for those of us who have been professionally involved in observing the weather for quite some time."

Bulletin of the American Meteorological Society, May 2013