

Sonic pre- and post-METCRAXII zero-wind temperature chamber tests

Following the SOAS project, we tested each sonic in a zero-wind enclosure within the EOL temperature chamber, measuring wind component offsets and sonic temperature errors over the nominal range -30 C to 55 C. The procedure is to warm the chamber up to 55 C and then slowly decrease the temperature linearly to -30 C, followed by slowly increasing the temperature back to 55 C. The zero-wind enclosure holds two sonic heads on their sides (with the v-axis vertical) and electronics, one above the other and separated with a horizontal layer of rigid blue foam. On the cool-down cycle, the atmosphere around the top sonic is unstably stratified (cold enclosure lid above warmer air) and that around the bottom sonic is stably stratified (cold enclosure bottom below warmer air). The opposite is true during the warm-up cycle. Both the wind component data and the sonic temperature data have significantly less variance when the air is stably stratified, and thus we use data from the bottom sonic during the cool-down cycle and data from the upper sonic during the warm-up cycle.

The following table shows wind component offsets as okay if the u and v offsets are less than +/- 4 cm/s and the w offsets less than +/- 2 cm/s. If the zero wind offset exceeds these thresholds, the table lists the temperature range of the over-limit offset and the largest amplitude of the offset. The plots of offsets versus temperature can then be examined to determine the exact nature of the offset.

The 8th column relates to the following project, METCRAX, in October 2013. The operating temperature range for night-time warm-air intrusions into the crater is on the order of -10 to +20 C. The last column notes whether or not the sonic is suitable for that temperature range.

10/4/13, twh: Added columns 9-13 for post-project EOL zero-wind tests

SN	Location	EOL Cal	CSI Cal	u	v	w	METCRAX?	CSI recal	EOL cal	u	v	w
0536	FLR 3m	8/1/13	6/27/12	ok	ok	ok	OK		12/03b/13	ok	ok	35 - 53 C -2.9 cm /s @ 51 C
0537	NEAR 3m	8/1/13	6/21/12	ok	ok	ok	OK		11/26b/12	ok	ok	ok
0538	NEAR 10m	7/25/13	10/17/12	32 - 49 C -7 cm/s @43 C	46 - 49 C -2.5 cm/s -7.3 C @ 49 C	44 - 46 V -2.5 cm/s @ 45 C	OK		12/06/13	ok	40 - 47 C -5.9 cm/s @ 47 C	43 - 47 C -2.5 cm/s @ 45 C
0539	FAR 3m	8/2/13	6/20/12	ok	ok	ok	OK		12/09/13	ok	ok	ok
0540	Rim 15m		2013 recal				OK	6/13/13	12/02b/13	ok	ok	ok
0671	Rim 25m	8/3/13	6/28/12	ok	ok	ok	OK		11/26/12	ok	ok	ok
0672	NEAR 30m	7/26/13	10/10/12	35 - 49 C +8 cm/s @ 47 C	36 - 49 C -7.4 cm /s @ 49 C	ok	OK		12/03/13	ok	ok	ok
0673	RIM 35m	7/25/13	7/18/12	ok	25 - 44 C +6 cm/s @ 39 C	20 - 50 C -3 cm/s @ 34 C	OK		11/25/13	ok	ok	41 - 46 C -2.5 cm /s @ 45C
0674	NEAR 40m	7/29/13	8/13/12	ok	ok	ok	OK		11/22/13	ok	ok	ok
0677	SSW4	8/2/13	6/17/12	ok	16 - 30 C -7 cm/s @ 23 C	ok	Requires CSI recall	8/20/13	11/25/13	ok	ok	ok
0720	NEAR 45m	7/31/13	1/31/11	ok	ok	ok	OK		11/26b/13	ok	ok	ok
0738	not used	8/1/13	5/12/10	17 - 25 C -4.8 cm/s @ 21 C	10 - 45 C -8 cm/s @ 20 C	26 - 42 C +2.4 cm /s @32 C	Returned to RAL		NA			
0739	RIM 5m	8/1/13	8/18/10	46 - 55 C > +8 cm/s	ok	48 - 55 C +2.8 cm /s @ 55 C	OK		12/04/13	43 - 55 C 10.6 cm /s @ 55 C	51 - 53 C 5.4 cm/s @ 53 C	51 - 53 C 2.4 cm/s @ 53 C
0740	NEAR 50m	7/31/13	8/28/12	ok	ok	26 - 36 C -2.4 cm/s @ 31 C	OK		12/05/13	39 - 43 C -4.3 cm /s @ 41 C	ok	ok
0800	RIM 40m	7/29/13	6/19/12	ok	10 - 35 C +8 cm/s @ 21 C	17 - 53 C -3.6 cm/s @ 45 C	Requires CSI recal	8/19/13	12/03/13	ok	ok	ok
0853	NEAR 35m	8/2/13	6/21/12	ok	ok	ok	OK		12/03b/13	ok	ok	ok
0855	spare	8/3/13	9/12/12	-13 - 1 C -4.4 cm/s @ -11 C	ok	44 - 49 C -2.8 cm/s @ 47 C	Marginally OK					
0856	NEAR 20m		2013 recal				OK	6/12/13	12/04/13	ok	25 - 53 C -7 cm/s @ 43 C	ok
1117	NEAR 25m		2013 recal				OK	6/11/13	11/26/13	ok	ok	ok
1119	spare	7/26/13	8/9/12	ok	49-53 C +7 cm/s @ 53 C	1 - 44 C -3 cm/s @ 17 C	Marginally OK					

1120	RIM 20m		2013 recall				OK	6/12/13	12/05/13	ok	20 - 38 C -5.9 cm/s @ 31 C	ok
1121	SSW2	7/26/13	12/8/11	-14 - 24 C -11 cm/s @ -9 C	-14 - 44 C -9.5 cm/s @ -7 C	-15 - 49 C -5.6 cm/s @ -9 C	Requires CSI recal	9/5/13	11/22/13	ok	ok	ok
1122	NEAR 15m	7/26/13	12/8/11	28 - 53 C +5.8 cm/s @ 36 C	49 - 53 C -4.3 cm/s @ 53 C	48-53 C -2.7 cm/s @ 53 C	OK		12/06/13	47 - 53 C 5.5 cm/s @ 53 C	ok	43 - 53 C -4.2 cm/s @ 53 C
1123	RIM 30m		2013 recal				OK	6/13/13	12/02b/13	38 - 43 C 7.2 cm/s @ 43 C	ok	ok
1124	RIM 10m	8/2/13	7/19/12	ok	ok	ok	OK		12/09/13	ok	ok	39 - 45 C -2.5 cm/s @ 41 C
1124b									12/10/13	ok	ok	37 - 46 C -2.5 cm/s @ 45 C
1244	spare	7/30/13		-25 - 49 C +17 cm/s @ 27 C	11 - 30 C +5.5 cm/s @ 23 C	18 - 42 C +6 cm/s @ 28 C	Requires CSI recal					