

# SOAS post-project sonic 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 last 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. Several sonics not used in SOAS tested okay post-SCP.

SN	Height	EOL Cal	CSI Cal	u	v	w	METCRAX?
0536		8/1/13	6/27/12	ok	ok	ok	OK
0537		8/1/13	6/21/12	ok	ok	ok	OK
0538	8 m	7/25/13	10/17/12	32 - 49 C -7 cm/s @ 43 C	46 - 49 C -7.3 C @ 49 C	44-46 V -2.5 cm/s @ 45 C	OK
0539		8/2/13	6/20/12	ok	ok	ok	OK
0540			2013 recal				OK
0671		8/3/13	6/28/12	ok	ok	ok	OK
0672	32 m	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
0673	26 m	7/25/13	7/18/12	ok	25 - 44 C +6 cm/s @ 39 C	20 - 50 C -3 cm/s @ 34 C	OK
0674		7/29/13	8/13/12	ok	ok	ok	OK
0677		8/2/13	6/17/12	ok	16 - 30 C -7 cm/s @ 23 C	ok	Requires CSI recal
0720	RAL	7/31/13	12/31/11	ok	ok	ok	OK
0738	RAL	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
0739	RAL	8/1/13	8/18/10	46 - 55 C > +8 cm/s	ok	48 - 55 C +2.8 cm/s @ 55 C	OK
0740	RAL	7/31/13	8/28/12	ok	ok	26 - 36 C -2.4 cm/s @ 31 C	OK
0800	14 m	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
0853		8/2/13	6/21/12	ok	ok	ok	OK
0855		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			2013 recal				OK
1117			2013 recal				OK
1119	2 m	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			2013 recal				OK
1121	20 m	7/26/13	12/8/11	-14 - 24 C -11 cm/s @ -9 C	-14 - 44C -9.5 cm/s @ -7 C	-15 - 49 C -5.6 cm/s @ -9 C	Requires CSI recal
1122	44 m	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
1123			2013 recal				OK
1124		8/2/13	7/19/12	ok	ok	ok	OK

1244	38 m	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
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