

# **Brominated Flame Retardants in Antarctic Air in the Vicinity of Two All-Year Research Stations**

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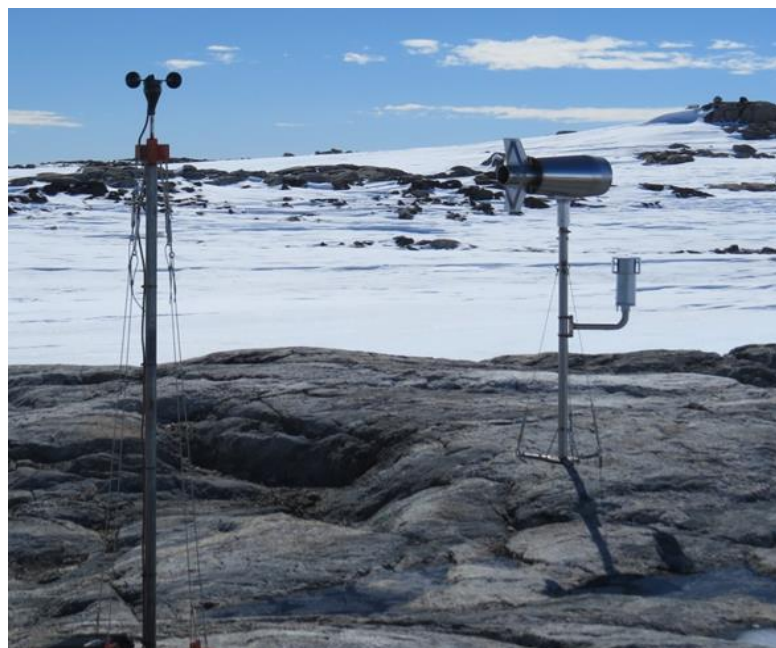
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**Figure S1.** Trollhaugen atmospheric monitoring observatory.



**Figure S2.** Photograph of the HFTPAS (rights) and anemometer plus logger unit (left) installed at Casey Station.

**Table S1.** Casey Station sample-sets (A-I1) together with corresponding sampling periods and Sample volume. '-' denotes sample sets in the series for which Brominated compound measurements are not available.

Sample ID	Start Date	Finish Date	Sampling Duration (weeks)	Wind Volume Captured (m <sup>3</sup> )
A	4.12.09	05.02.10	9.6	49,719
B	11.02.10	08.06.10	16.7	67,038 <sup>1</sup>
C	08.06.10	02.09.10	12.3	95,304
D	02.09.10	16.11.10	10.7	37,722
E	16.11.10	12.02.11	8.1	71,930 <sup>2</sup>
F	21.02.11	04.06.11	14.6	110,694 <sup>2</sup>
G	-	-	-	-
H	06.02.12	09.03.12	4.6	46,513 <sup>1</sup>
I	09.03.12	08.04.12	4.3	44,277 <sup>1</sup>
J	08.04.12	16.05.12	5.4	71,971
K	-	-	-	-
L	19.06.12	27.07.12	5.4	43,565
M	27.07.12	07.09.12	6.2	61,601 <sup>1</sup>
N	07.09.12	09.10.12	4.7	53,760 <sup>2</sup>
O	09.10.12	11.11.12	4.7	68,958
P	11.11.12	11.12.12	4.3	40,975
Q	30.12.13	04.02.13	5.1	13,860
R	04.02.13	18.03.13	6.4	26,161
S	18.03.13	22.04.13	4.6	24,120
Sample ID	Start Date	Finish Date	Sampling Duration (weeks)	Air Volume Sampled (m <sup>3</sup> )
T	22.04.13	20.05.13	4.0	41,843
U	20.05.13	01.07.13	6.0	43,687
V	-	-	-	-
W	13.08.13	06.09.13	3.4	20,494
X	06.09.13	17.10.13	5.9	60,392
Y	17.10.13	18.11.13	5.4	19,869

<sup>1</sup> Calculated partially using surrogate wind data obtained from the Bureau of Meteorology monitoring station 300017 (Casey Station, Antarctica)

<sup>2</sup> Calculated entirely using surrogate wind data obtained from the Bureau of Meteorology monitoring station 300017 (Casey Station, Antarctica)

<b>Z</b>	18.11.13	24.12.13	5.1	13,866
<b>A1</b>	12.01.14	17.02.14	5.1	32,805
<b>B1</b>	-	-	-	-
<b>C1</b>	24.03.14	28.04.14	5.0	16,250
<b>D1</b>	-	-	-	-
<b>E1</b>	02.06.14	07.07.14	5.0	34,925
<b>F1</b>	07.07.14	18.08.14	5.9	25,592
<b>G1</b>	18.08.14	24.09.14	5.3	118,160 <sup>2</sup>
<b>H1</b>	24.09.14	20.10.14	3.7	29,552 <sup>2</sup>
<b>I1</b>	20.10.14	27.11.14	5.0	38,406

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Calculated partially using surrogate wind data obtained from the Bureau of Meteorology monitoring station 300017 (Casey Station, Antarctica)

Calculated entirely using surrogate wind data obtained from the Bureau of Meteorology monitoring station 300017 (Casey Station, Antarctica)

**Table S2.** 2013 Troll Station samples together with corresponding sampling periods and captured wind volume.

<b>Sample ID</b>	<b>Start Date</b>	<b>Finish Date</b>	<b>Air Volume Sampled (m<sup>3</sup>)</b>
<b>1</b>	11.02.13	18.02.13	3,546
<b>2</b>	18.02.13	25.02.13	2,688
<b>3</b>	25.02.13	04.03.13	2,674
<b>4</b>	04.03.13	11.03.13	2,684
<b>5</b>	11.03.13	18.03.13	3,706
<b>6</b>	18.03.13	25.03.13	2,474
<b>7</b>	25.03.13	01.04.13	2,719
<b>8</b>	01.04.13	08.04.13	3,664
<b>9</b>	04.04.13	15.04.13	3,117
<b>10</b>	15.04.13	22.04.13	2,220
<b>11</b>	22.04.13	29.04.13	
<b>12</b>	29.04.13	06.05.13	2,705
<b>13</b>	06.05.13	13.05.13	3,709
<b>14</b>	13.05.13	20.05.13	2,957
<b>15</b>	20.05.13	27.05.13	3,150
<b>16</b>	03.06.13	10.06.13	3,141
<b>17</b>	10.06.13	17.06.13	3,423
<b>18</b>	17.06.13	24.06.13	3,257
<b>19</b>	24.06.13	01.07.13	3,438
<b>20</b>	01.07.13	08.07.13	3,047
<b>21</b>	08.07.13	15.07.13	2,865
<b>22</b>	15.07.13	22.07.13	3,052
<b>23</b>	22.07.13	29.07.13	2,525
<b>24</b>	29.07.13	05.08.13	3,200
<b>25</b>	05.08.13	12.08.13	3,223
<b>26</b>	12.08.13	19.08.13	2,750
<b>27</b>	19.08.13	26.08.13	1,911
<b>28</b>	26.08.13	02.09.13	2,863
<b>29</b>	02.09.13	09.09.13	2,699
<b>30</b>	09.09.13	16.09.13	3,098
<b>31</b>	16.09.13	23.09.13	2,943
<b>32</b>	23.09.13	30.09.13	2,877
<b>33</b>	30.09.13	07.10.13	1,921
<b>34</b>	07.10.13	14.10.13	2,277
<b>35</b>	14.10.13	21.10.13	2,602
<b>36</b>	21.10.13	28.10.13	3,369
<b>37</b>	28.10.13	04.11.13	3,461
<b>38</b>	04.11.13	11.11.13	3,896
<b>39</b>	11.11.13	18.11.13	2,175

**Table S3.** Casey Station chemical concentrations by sample set (2 sig. figures). Values are travel blank corrected (LOQ). Concentrations are presented in fg/m<sup>3</sup> to two significant figures. 'ND' denotes non-detected values. In 2010 congeners BDE-49 and BDE-71 were co-quantified (\*).

	A	B	C	D	E	F	H	I	J	L	M
<b>TBA</b>	39.0	120.0	43.0	46.0	47.0	35.0	ND	56.0	47.0	92.0	42.0
<b>BDE-28</b>	2.0	0.93	0.52	0.25	ND	0.033	0.076	0.018	0.22	0.58	0.32
<b>BDE-47</b>	13.0	29.0	17.0	7.8	ND	0.033	4.5	1.4	1.0	4.4	1.38
<b>BDE-49</b>	1.3	1.2	0.44	ND	ND	0.89	0.25	0.5	0.034	0.41	0.11
<b>BDE-66</b>	26.0	0.33	ND	ND	ND	0.043	0.23	0.38	0.19	0.59	0.21
<b>BDE-71</b>	*	*	*	*	ND	ND	ND	0.13	ND	ND	ND
<b>BDE-77</b>	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND
<b>BDE-85</b>	ND	0.29	ND	ND	0.039	0.026	ND	ND	ND	ND	0.035
<b>BDE-99</b>	4.3	7.8	1.3	2.8	ND	0.91	6.6	0.23	0.40	8.4	0.13
<b>BDE-100</b>	1.9	2.3	0.83	0.77	ND	0.17	1.2	ND	0.058	0.77	0.026
<b>BDE-119</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-138</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-153</b>	ND	0.5606 77526	ND	ND	0.10	0.23	0.31	ND	0.035	0.66	0.12
<b>BDE-154</b>	ND	0.3667 96444	ND	ND	0.0007 2	0.13	0.39	0.025	0.13	0.24	0.048
<b>BDE-183</b>	ND	1.0	ND	1.3	0.21	0.57	ND	0.16	ND	0.22	0.23
<b>BDE-196</b>	ND	2.6	ND	13.0	ND	1.4	ND	ND	ND	2.4	1.1
<b>BDE-206</b>	ND	5.4	ND	100.0	17.0	6.4	2.3377 64064	2.3	0.073	17.0	ND
<b>BDE-209</b>	13.0	68.0	18.0	360.0	81.0	39.0	0	73.0	0.81	90.0	0
<b>Sum BDE</b>	48.0	52.0	20.0	130.0	100.0	50.0	16.0	78.0	3.0	130.0	3.7

	N	O	P	Q	R	S	T	U	W	X	Y
<b>TBA</b>	24.0	8.6	9.8	33.0	37.0	120.0	ND	11.0	860.0	32.0	ND
<b>BDE-28</b>	0.34	0.23	ND	0.78	0.25	0.19	ND	ND	0.33	0.12	0.033
<b>BDE-47</b>	1.3	0.86	0.77	12.0	ND	0.36	0.61	ND	1.6	0.28	2.5
<b>BDE-49</b>	0.26	0.052	0.14	2.2	0.31	0.083	0.087	ND	0.17	0.094	0.034
<b>BDE-66</b>	1.5	ND	ND	3.4	0.45	0.26	0.42	ND	ND	0.23	ND
<b>BDE-71</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-77</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-85</b>	ND	ND	ND	0.011	0.028	ND	0.46	ND	ND	ND	ND
<b>BDE-99</b>	1.0	0.19	0.41	3.5	ND	1.4	ND	ND	0.77	0.37	2.1
<b>BDE-100</b>	0.051	0.017	0.13	1.1	ND	0.94	ND	ND0	0.53	0.27	ND
<b>BDE-119</b>	ND	ND	ND	ND	ND	ND	0.32	ND	ND	ND	ND

<b>BDE-138</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-153</b>	0.03	0.057	ND	0.11	0.10	ND	0.11	0.034	ND	0.13	0.3
<b>BDE-154</b>	0.01	0.036	ND	0.67	0.23	ND	0.079	0.0004 58	ND	0.066	0.18
<b>BDE-183</b>	0.32	ND	ND	0.28	0.11	ND	2.2	ND	ND	ND	ND
<b>BDE-196</b>	1.5	ND	ND	ND	1.3	ND	95.0	ND	170.0	ND	ND
<b>BDE-206</b>	8.8	0.69	ND	3.8	ND	ND	480.0	ND	220.0	14.0	ND
<b>BDE-209</b>	ND	0.57	ND	21.0	ND	ND	1100.0	ND	590.0	43.0	ND
<b>Sum BDE</b>	15.0	2.7	1.4	49.0	2.8	3.2	1700.0	0.035	980	59.0	5.4

	<b>Z</b>	<b>A1</b>	<b>C1</b>	<b>E1</b>	<b>F1</b>	<b>G1</b>	<b>H1</b>	<b>I1</b>
<b>TBA</b>	120.0	110.0	490.0	100.0	410.0	48.0	47.0	69.0
<b>BDE-28</b>	ND	0.31	ND	0.12	0.084	0.11	ND	0.11
<b>BDE-47</b>	ND	5.1	3.3	3.0	2.5	0.61	0.94	1.6
<b>BDE-49</b>	ND	0.11	ND	ND	ND	0.0074	ND	ND
<b>BDE-66</b>	ND	0.081	ND	ND	ND	ND	ND	ND
<b>BDE-71</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-77</b>	0.2	ND	ND	ND	ND	ND	ND	ND
<b>BDE-85</b>	ND	ND	ND	0.89	ND	ND	ND	ND
<b>BDE-99</b>	1.5	3.7	2.6	1.3	0.87	0.16	0.32	0.77
<b>BDE-100</b>	ND	0.41	0.10	0.89	ND	ND	ND	ND
<b>BDE-119</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-138</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-153</b>	0.17	ND	ND	ND	ND	ND	ND	ND
<b>BDE-154</b>	0.19	ND	ND	ND	ND	ND	ND	ND
<b>BDE-183</b>	0.71	0.25	ND	ND	0.36	ND	ND	ND
<b>BDE-196</b>	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-206</b>	3.1	ND	ND	ND	2.02	ND	1.0	1.0
<b>BDE-209</b>	ND	ND	15.0	5.6	8.4	ND	14.0	5.4
<b>Sum BDE</b>	5.9	10.0	21.0	12.0	14.0	0.89	16.0	8.9

**Table S4.** Troll Station chemical concentrations by sample set. Concentrations are presented in fg/m<sup>3</sup> to two significant figures. 'ND' denotes non-detected values.

	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TBA</b>	1,900.0	170.0	190.0	30	5,000.0	550.0	590.0	510.0	13,000	14,000	870.0	260.0	19,000
<b>BDE-28</b>	170.0	10.0	13.0	6.0	190.0	13.0	6.0	5.0	38.0	32.0	5.0	9.0	94.0
<b>BDE-47</b>	7800.0	500.0	410.0	260.0	5,300.0	390.0	180.0	150.0	1,150.0	1,000.0	110.0	200.0	1,600.0
<b>BDE-49</b>	190.0	15.0	11.0	7.0	180.0	11.0	4.0	3.0	30.0	35.0	3.0	6.0	49.0
<b>BDE-66</b>	120.0	6.3	9.2	7.0	120.0	10.0	4.0	3.0	23.0	25.0	3.0	6.0	36.0
<b>BDE-71</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-77</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-85</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	ND	ND
<b>BDE-99</b>	610.0	57.0	54.0	44.0	990.0	65.0	29.0	24.0	240	180.0	50.0	46.0	330.0
<b>BDE-100</b>	320.0	24.0	24.0	16.0	390.0	26.0	13.0	10.0	100.0	80.0	10.0	15.0	120.0
<b>BDE-119</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-138</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-153</b>	ND	ND	ND	ND	30.0	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-154</b>	9.8	ND	ND	ND	34.0	ND	ND	ND	ND	ND	ND	ND	11.0
<b>BDE-183</b>	ND	ND	ND	ND	24.0	ND	ND	ND	ND	ND	ND	ND	13.0
<b>BDE-196</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-206</b>	290.0	ND	120.0	ND	150.0	ND	ND	ND	92.0	110.0	ND	ND	51.0
<b>BDE-209</b>	9,200	490.0	1,600.0	ND	2,300.0	ND	ND	ND	1,300.0	640.0	ND	ND	1,400.0

<b>Sum</b>	18,70	1,100	2,200	340	9,700	515	236	195	3,000	2,100	180	280	3,700
<b>BDE</b>	0												

	14	15	16	17	18	19	20	21	22	23	24	25	26
<b>TBA</b>	18,000	25,000	27,000	24,000	25,000	26,000	3,200	26,000	3,300	1,800	2,400	21,000	2,500
<b>BDE-28</b>	42.0	98.0	22.0	27.0	21.0	46.0	3.0	72.0	110.0	2.0	4.0	22.0	1.9
<b>BDE-47</b>	820.0	1,900.0	430.0	400.0	610.0	620.0	52.0	1,100	2,500	40.0	63.0	400.0	28.0
<b>BDE-49</b>	28.0	73.0	16.0	15.0	15.0	17.0	1.7	45.0	59.0	ND	1.7	23.0	2.0
<b>BDE-66</b>	26.0	57.0	13.0	11.0	13.0	14.0	ND	40.0	34.0	ND	2.2	21.0	ND
<b>BDE-71</b>	ND	34.0	ND	ND	ND	ND	ND	ND	9.6	ND	ND	ND	ND
<b>BDE-77</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-85</b>	ND	ND	ND	ND	ND	ND	ND	ND	4.0	ND	ND	ND	ND
<b>BDE-99</b>	170.0	540.0	130.0	77.0	210.0	110.0	ND	320.0	180.0	ND	16.0	120.0	ND
<b>BDE-100</b>	73.0	190.0	43.0	32.0	64.0	50.0	ND	120.0	82.0	ND	6.3	42.0	ND
<b>BDE-119</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-138</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-153</b>	ND	20.0	ND	ND	ND	ND	ND	ND	4.9	ND	ND	ND	ND
<b>BDE-154</b>	ND	17.0	ND	ND	ND	ND	ND	15.0	4.3	ND	ND	ND	ND
<b>BDE-183</b>	ND	ND	ND	ND	ND	ND	ND	ND	8.4	ND	ND	ND	ND
<b>BDE-196</b>	ND	ND	ND	ND	302	ND	ND	ND	ND	ND	ND	ND	ND
<b>BDE-206</b>	ND	43.0	ND	ND	1,200	290.0	ND	ND	130.0	ND	ND	110.0	ND



<b>BDE-209</b>	ND	520.0	450.0	420.0	3,300	5,500	ND	ND	770.0	ND	ND	1,900	380.0
<b>Sum BDE</b>	1,100	3,500	1,100	980	5,700	6,600	57	1,700	3,900	42	93	2,600	410

[illegible]

<b>BDE-206</b>	ND	ND	ND	100.0	ND	ND	190.0	ND	ND	ND	ND	87.0	ND
<b>BDE-209</b>	ND	ND	ND	1,000	ND	ND	4,100	ND	ND	ND	ND	2,200	ND
<b>Sum BDE</b>	100	25	34	1,100	44	140	4,500	63	47	70	ND	2,400	140

**Table S5.** Average analyte mass held within the last (3 of 3) PUF in the sampling train (size adjusted), where ~33% indicates complete saturation of media for the analyte.

Analyte	% Analyte Mass held in Final PUF
TBA	20
BDE-28	34
BDE-47	34
BDE-49	24
BDE-66	28
BDE-71	3
BDE-77	12
BDE-85	6
BDE-99	29
BDE-100	34
BDE-119	3
BDE-138	3
BDE-153	9
BDE-154	8
BDE-183	16
BDE-196	15
BDE-206	22
BDE-209	27