Radionuclides in ground level air in Sweden Year 2006

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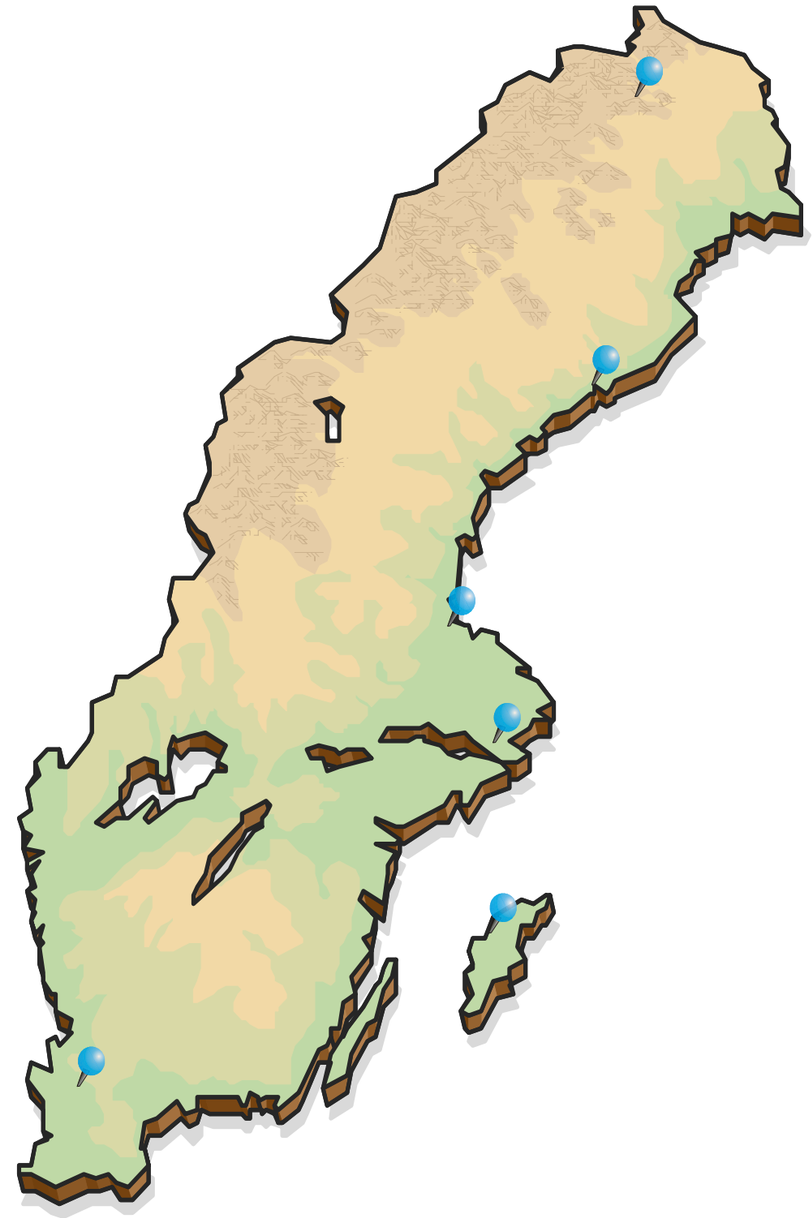
KARIN LINDH, NEDA TOOLOUTALAIE



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Radionuclides in ground level air in Sweden
Year 2006

Abstract

Filtering of ground level air is performed continuously at six different locations in Sweden: Kiruna, Umeå, Gävle, Kista, Visby and Ljungbyhed. The filters are pressed into weekly samples and the contents of different radionuclides are measured by gamma spectroscopy. Precipitation is also collected at four of the stations: Kiruna, Gävle, Kista and Ljungbyhed, the samples are ashed and the contents of radionuclides are measured.

The levels of Be-7 and Cs-137 in air and precipitation are presented for the different stations.
Other antropogenic radionuclides detected, if any, are also presented.

Keywords

Airborne radionuclides, deposition, ^{7}Be, ^{137}Cs, ^{131}I

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Rapportens titel

Radionuklider i markluft i Sverige, år 2006

Sammanfattning

Stationer för filtrering av markluft finns på sex olika ställen i Sverige: Kiruna, Umeå, Gävle, Kista, Visby och Ljungbyhed. Filtren pressas och analyseras veckovis med hjälp av gammaspektroskopi med germaniumdetektor. Nederbörd samlas in på fyra av dessa stationer: Kiruna, Gävle, Kista och Ljungbyhed. Nederbördsproven askas in och mäts med hjälp av gammaspektroskopi.
Halterna av Be-7 och Cs-137 presenteras för luft och nederbörd för de olika stationerna. I de fall andra antropogena radionuklider detekteras presenteras även dessa.

Nyckelord

Luftburen radioaktivitet, deposition, ^{7}Be, ^{137}Cs, ^{131}I

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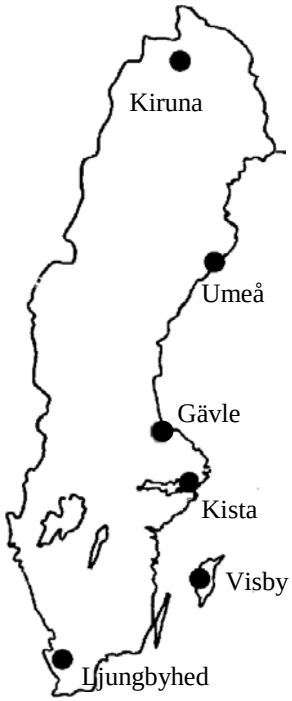
Sampling and analysis procedures

Sampling of ground level air is performed at six different locations in Sweden, as follows:



Kiruna:	67.84° N	20.42° E
Umeå:	63.85° N	20.34° E
Gävle:	60.40° N	17.14° E
Kista:	59.40° N	17.93° E
Visby:	57.63° N	18.32° E
Ljungbyhed:	56.08° N	13.23° E

At five stations (Kista excluded), 1000 m^3/h of air is filtered through a glass fibre filter (Camfil type CS 5.0 or A600G). At each station the filters are changed twice weekly (Monday and Thursday or Friday) and sent by mail to our laboratory in Kista for measurement and analysis. At the station in Kista 1700 m^3/h of air is filtered and the filters are changed every 28^{th} hour.

Weekly samples are made from each station by taking 3/4 of each filter (1/4 of the filter is left for filing) and compress them together into a small disc (diameter 60 mm, thickness 13 mm). These samples are measured, 3-4 days after the collection, on well shielded High Purity Germanium (HPGe) detectors. From the station in Kista, the filters produced per week are assembled in a Marinelli-like geometry by pressing them into one circular disc (diameter 94 mm, thickness 16 mm), placed on top of the detector, and into six rectangular bricks (77 mm by 48 mm by 13 mm) placed around the detector.

At four of the stations (Kiruna, Umeå, Kista and Ljungbyhed) a small part of the air flow (12m^3/h) that has passed the filter is taken through a charcoal capsule in order to collect gaseous iodine. The cartridges are changed weekly but only analysed if particulate iodine in greater amount has been detected in the filter.

The stations at Kiruna, Gävle, Kista and Ljungbyhed are each equipped with a big stainless steel funnel (1m radius) to collect precipitation. The precipitation is passed through a column consisting of a filter part, an an-ion exchanger part and a cat-ion exchanger part. The cartridges are changed weekly and sent by mail to our laboratory. Four samples are combined to a monthly sample by ashing. The samples are measured on HPGe detectors. From these measurements the total deposition is calculated.

Radionuclides seen in the filters are normally only the naturally occurring radon daughters and ^{7}Be. At most of the stations ^{137}Cs are detected, which is due to resuspension of the Chernobyl fallout. In tables I and II the concentrations of ^{7}Be and ^{137}Cs are presented. The depositions at the stations where precipitation are collected are presented in table III. Sometimes also other anthropogenic radionuclides are detected and in that case these are presented in Table IV.

Table Ia

^{7}Be concentrations in Sweden, jan - jun 2006

Week starting	*Kiruna*	*Umeå*	*Gävle*	*Kista*	*Visby*	*Ljungbyhed*
2-jan	2960 (0.1)	1550 (0.3)	1820 (0.2)	2140 (0.1)	2920 (0.1)	2830 (0.1)
9-jan	2180 (0.2)	1860 (0.2)	2390 (0.3)	2480[9] (0.1)	2670 (0.2)	2530 (0.1)
16-jan	3700 (0.2)	2710 (0.2)	5250 (0.2)	5670 (0.1)	4050 (0.1)	3630 (0.2)
23-jan	1840 (0.2)	1410 (4.1)	2110 (0.2)	2370 (0.1)	2320 (0.2)	2010[18] (0.2)
30-jan	2400 (0.1)	2380 (0.1)	1700 (0.2)	1740[10] (0.2)	2210 (0.2)	2980[19] (0.1)
6-feb	1800 (0.2)	2120 (0.1)	1190 (0.3)	1770[11] (0.2)	1560 (0.3)	950 (0.2)
13-feb	1450 (0.1)	1760 (0.2)	2100 (0.2)	2340 (0.2)	1990 (0.3)	1810 (0.2)
20-feb	2120 (0.2)	1870 (0.2)	1590[6] (0.2)	1990 (0.1)	1560 (0.3)	1470 (0.2)
27-feb	1340 (0.2)	1350 (0.2)	1710[7] (0.3)	2130[12] (0.2)	2170 (0.3)	1700 (0.2)
6-mar	2890 (0.1)	2510 (0.1)	2480 (0.1)	2490 (0.1)	2290 (0.2)	2110 (0.2)
13-mar	2320 (0.2)	2350 (0.2)	2900 (0.1)	3120 (0.1)	3110 (0.2)	3040 (0.1)
20-mar	1700 (0.2)	1530 (0.2)	2370 (0.1)	2840 (0.1)	2650 (0.2)	2090 (0.3)
27-mar	1800 (0.2)	1990 (0.2)	1200 (0.3)	1360 (0.2)	1740 (0.3)	2130 (0.2)
3-apr	1400 (0.2)	1580 (0.1)	1540 (0.3)	2400 (0.1)	2570 (0.2)	2320 (0.1)
10-apr	1630[1] (0.1)	1280 (0.2)	1860 (0.2)	1770[13] (0.2)	1970 (0.3)	2330 (0.2)
17-apr	1630[1] (0.1)	1370 (0.2)	1980 (0.2)	1830[14] (0.2)	1940 (0.3)	2110 (0.2)
24-apr	4980 (0.1)	5880 (0.1)	5170 (0.1)	5640[15] (0.1)	5030 (0.1)	2480 (0.2)
1-may	6890 (0.1)	5170 (0.1)	5200 (0.1)	7540[16] (0.1)	6050 (0.2)	5740 (0.1)
8-may	2860 (0.1)	3670 (0.1)	3780 (0.2)	5710 (0.1)	5230 (0.1)	5200 (0.1)
15-may	2490 (0.1)	2780 (0.1)	2500 (0.2)	2550 (0.1)	5030 (0.2)	3950 (0.1)
22-may	1380 (0.3)	1530 (0.2)	2350 (0.2)	2120 (0.2)	2750 (0.2)	2210 (0.2)
29-may	2810 (0.1)	2580[4] (0.1)	2430[4] (0.1)	2430 (0.1)	1860[4] (0.2)	1730 (0.2)
5-jun	3460 (0.1)	3650[5] (0.2)	3660[5] (0.2)	4840 (0.1)	5070[5] (0.2)	2630 (0.1)
12-jun	2880 (0.1)	4350 (0.1)	3130[8] (0.2)	6700 (0.1)	5750 (0.1)	6380 (0.1)
19-jun	1840[2] (0.2)	2350 (0.2)	3130[8] (0.2)	3710 (0.1)	3370[17] (0.8)	3220 (0.1)
26-jun	4370[3] (0.2)	3620 (0.2)	3390 (0.1)	4130 (0.1)	4020 (0.2)	3390 (0.1)

Values are given in μBq/m^3.
Error estimates (1σ %) are given in brackets.

[1] Two weeks filter, 10-24/4
[2] Nine days filter 19-28/6
[3] Five days filter 28/6 – 3/7
[4] Nine days filter 29/5 – 7/6
[5] Five days filter, 7 – 12/6
[6] Eight days filter, 20 – 28/2
[7] Six days filter, 28/2 – 6/3
[8] Two weeks filter, 12 - 26/6
[9] Six days filter, 9 - 15/1
[10] Five days filter, 30/1 – 4/2
[11] One week filter, 4 - 11/2
[12] Six days filter, 27/2 – 5/3
[13] Six days filter, 10 - 16/4
[14] Eight days filter, 16 – 24/4
[15] Six days filter, 24 - 30/4
[16] Five days filter, 30/4 – 5/5
[17] Five days filter, 21 – 26/6
[18] Eight days filter, 23 – 31/1
[19] Six days filter, 31/1 –6/2

Table Ib

^{7}Be concentrations in Sweden, jul - dec 2006

Week starting	*Kiruna*		*Umeå*		*Gävle*		*Kista*		*Visby*		*Ljungbyhed*	
3-jul	4060	(0.2)	5240	(0.1)	6090	(0.1)	6820	(0.1)	4380[20]	(0.1)	4060[23]	(0.1)
10-jul	2150	(0.2)	2190[5]	(0.2)	2310	(0.1)	2500	(0.1)	4380[20]	(0.1)	1760[24]	(0.2)
17-jul	2080	(0.2)	2220[6]	(0.2)	2480	(0.2)	3360	(0.1)	3840	(0.2)	3480	(0.1)
24-jul	3480	(0.1)	2850	(0.1)	4240	(0.2)	5880	(0.1)	5630	(0.2)	4390	(0.2)
31-jul	4970	(0.1)	4590	(0.1)	5090	(0.1)	4880	(0.1)	5150	(0.1)	3550	(0.1)
7-aug	3120	(0.2)	4330	(0.1)	4180	(0.1)	6520[11]	(0.1)	5600	(0.1)	3360	(0.1)
14-aug	3110	(0.1)	2790	(0.1)	2070	(0.2)	3140[12]	(0.1)	2960	(0.2)	2400	(0.1)
21-aug	4770	(0.1)	3340	(0.1)	3440	(0.1)	3340[13]	(0.1)	2890	(0.2)	2670	(0.1)
28-aug	1910	(0.2)	2330	(0.2)	2400	(0.2)	3100	(0.1)	2920	(0.1)	2760	(0.1)
4-sep	2390	(0.2)	1840	(0.2)	2040	(0.2)	2260	(0.2)	1990	(0.3)	1820	(0.2)
11-sep	3050	(0.1)	3040	(0.1)	3160	(0.3)	3800	(0.1)	3810	(0.1)	3580	(0.1)
18-sep	930	(0.4)	3110	(0.1)	3920	(0.2)	4540	(0.1)	4170	(0.1)	3620	(0.1)
25-sep	2300	(0.2)	1120	(0.2)	2890	(0.5)	3470[14]	(0.2)	3860	(0.2)	3230	(0.1)
2-oct	640	(0.4)	680	(0.3)	1230	(0.2)	1970	(0.1)	2380	(0.2)	2440	(0.2)
9-oct	1170	(0.2)	1210	(0.2)	2430	(0.1)	2340	(0.1)	3410	(0.1)	2970	(0.2)
16-oct	1140	(0.2)	1590	(0.2)	2370	(0.2)	5350	(0.1)	4860	(0.2)	3840	(0.2)
23-oct	1260	(0.4)	1200	(0.2)	1430	(0.2)	1850	(0.3)	2300	(0.2)	2770	(0.2)
30-oct	1030	(0.2)	1540	(0.2)	1420	(0.3)	1420	(0.2)	1680	(0.3)	1690	(0.2)
6-nov	1090	(0.2)	1750	(0.1)	1710	(0.1)	2460	(0.1)	2690	(0.2)	2560	(0.2)
13-nov	750	(0.2)	920	(0.3)	1670	(0.3)	2100[15]	(0.2)	2610	(0.1)	2280	(0.2)
20-nov	870	(0.4)	1740	(0.2)	2070[9]	(0.3)	2810[16]	(0.1)	2650	(0.1)	2590	(0.2)
27-nov	1300	(0.3)	1620	(0.2)	2510[10]	(0.2)	2480[17]	(0.2)	2520	(0.2)	3250	(0.1)
4-dec	470[1]	(0.4)	1040	(0.3)	1630	(0.2)	2310[18]	(0.2)	2640	(0.1)	2040	(0.2)
11-dec	1260[2]	(0.2)	920	(0.2)	1830	(0.2)	2020	(0.1)	1980	(0.2)	1500	(0.2)
18-dec	1000[3]	(0.3)	1570[7]	(0.2)	1990	(0.2)	2010	(0.1)	2010[21]	(0.1)	1090	(0.3)
25-dec	1030[4]	(0.3)	1570[8]	(0.2)	1600	(0.2)	2060[19]	(0.2)	2400[22]	(0.2)	1810	(0.2)

Values are given in μBq/m^3.
Error estimates (1σ %) are given in brackets.

[1] Eight days filter, 4 – 12/12
[2] Six days filter, 12 - 18/12
[3] Four days filter 18 – 22/12
[4] Ten days filter, 22/12 – 1/1-2007
[5] Four days filter, 10 – 14/7
[6] Ten days filter, 14 – 24/7
[7] Nine days filter, 18 – 27/12
[8] Six days filter, 27/12 – 2/1-2007
[9] Eight days filter, 20 – 28/11
[10] Six days filter, 28/11 – 4/12
[11] Six days filter, 7 – 13/8
[12] Eight days filter, 13 – 21/8
[13] Six days filter, 21 – 27/8
[14] Six days filter, 25/9 – 1/10
[15] Six days filter, 13 – 19/11
[16] Five days filter, 20 – 25/11
[17] Six days filter, 27/11 –3/12
[18] Four days filter, 4 – 8/12
[19] Five days filter, 25 – 30/12
[20] Two weeks filter, 3 – 17/7
[21] Ten days filter, 18 – 28/12
[22] Five days filter, 28/12 – 2/1-2007
[23] Eleven days filter, 3 – 14/7
[24] Three days filter, 14 – 17/7

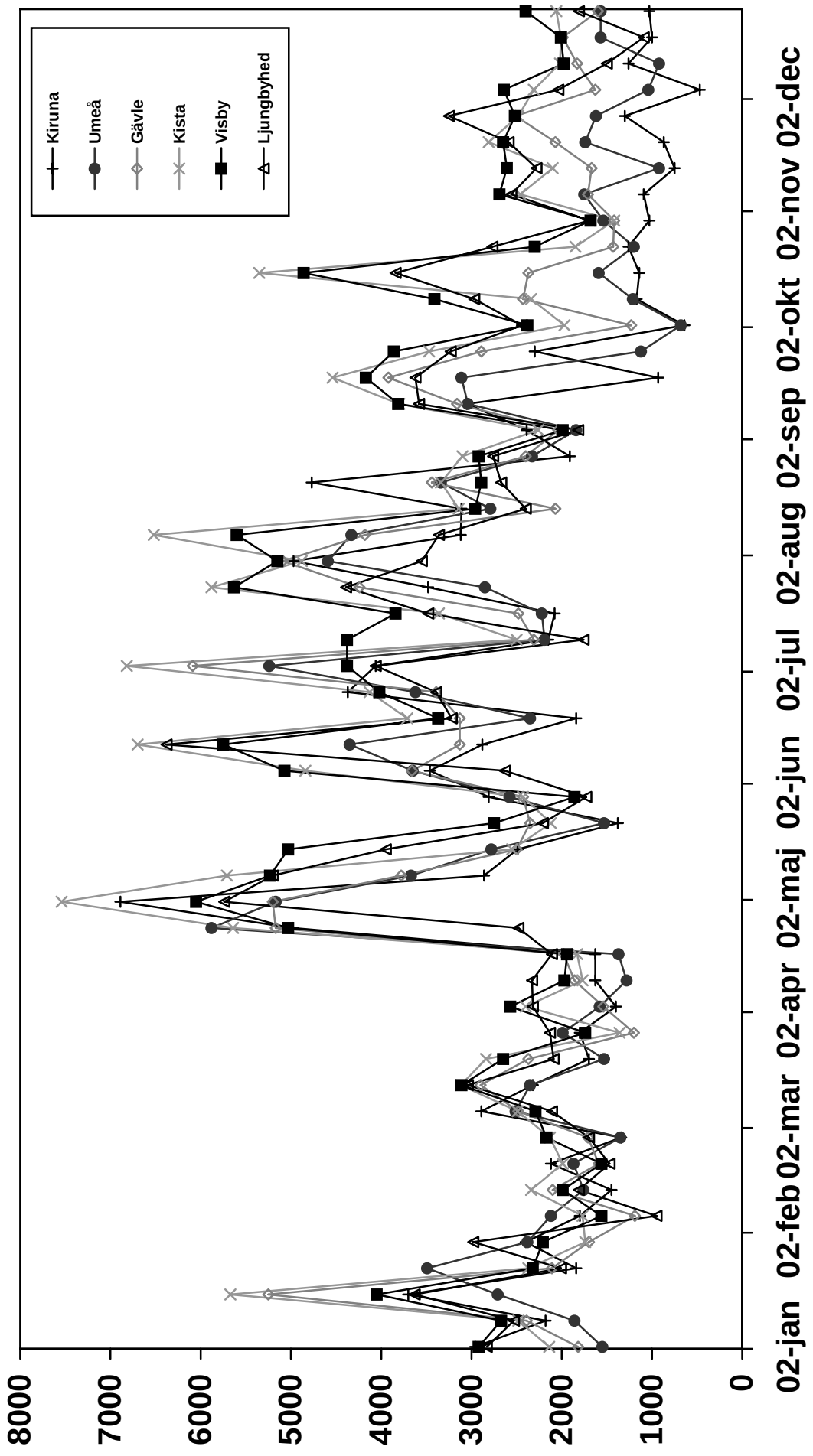

Kiruna
Umeå
Gävle
Kista
Visby
Ljungbyhed
8000
7000
6000
5000
4000
3000
2000
1000
0
02-jan
02-feb
02-mar
02-apr
02-maj
02-jun
02-jul
02-aug
02-sep
02-okt
02-nov
02-dec

Table IIa

^{137}Cs concentrations in Sweden, jan - jun 2006

Week starting	*Kiruna*	*Umeå*	*Gävle*	*Kista*	*Visby*	*Ljungbyhed*
2-jan	0.2 (23)	6.1 (3)	6.8 (2)	1.4 (4)	1.1 (6)	1.4 (4)
9-jan	0.2 (40)	2.4 (2)	1.1 (15)	0.7[9] (9)	1.1 (13)	1.7 (4)
16-jan	0.4 (27)	1.5 (7)	2.0 (9)	1.0 (5)	1.4 (5)	2.0 (8)
23-jan	<0.1 -	2.3 (2)	2.4 (3)	0.9 (6)	0.7 (17)	1.9[18] (3)
30-jan	0.5 (9)	4.5 (1)	3.7 (4)	1.0[10] (7)	0.8 (14)	1.2[19] (5)
6-feb	0.6 (9)	5.1 (1)	3.5 (4)	2.9[11] (3)	1.7 (8)	1.0 (5)
13-feb	0.6 (7)	3.9 (4)	3.6 (2)	2.3 (3)	5.6 (4)	1.1 (6)
20-feb	0.2 (25)	2.2 (2)	3.2[6] (2)	1.5 (3)	0.9 (14)	0.8 (6)
27-feb	0.3 (17)	3.3 (2)	4.5[7] (3)	0.9[12] (8)	0.9 (14)	1.2 (6)
6-mar	<0.1 -	3.6 (2)	5.1 (2)	2.7 (3)	1.3 (12)	2.7 (4)
13-mar	0.2 (21)	3.4 (4)	5.8 (1)	1.8 (4)	1.2 (12)	1.6 (3)
20-mar	<0.1 -	2.6 (2)	6.9 (1)	1.3 (5)	1.1 (14)	1.6 (9)
27-mar	0.1 (48)	2.7 (2)	2.2 (4)	1.4 (5)	0.7 (19)	0.5 (11)
3-apr	0.4 (12)	3.4 (2)	1.6 (10)	0.9 (6)	1.3 (9)	0.3 (13)
10-apr	0.2[1] (10)	2.1 (2)	3.7 (2)	0.6[13] (12)	0.9 (13)	0.7 (8)
17-apr	0.2[1] (10)	4.1 (2)	4.6 (2)	0.7[14] (10)	0.6 (26)	0.6 (10)
24-apr	1.0 (12)	4.9 (2)	5.7 (1)	3.3[15] (3)	4.9 (2)	0.7 (20)
1-may	1.0 (6)	5.0 (2)	7.4 (1)	3.2[16] (3)	2.6 (6)	2.1 (3)
8-may	0.4 (13)	3.6 (2)	15.8 (1)	2.9 (2)	1.9 (7)	1.2 (4)
15-may	0.3 (15)	3.9 (2)	4.2 (5)	0.8 (8)	1.0 (11)	0.2 (18)
22-may	0.1 (83)	3.3 (2)	10.6 (2)	2.0 (4)	0.9 (15)	0.5 (10)
29-may	<0.1 -	11.5[4] (1)	6.9[4] (1)	1.6 (4)	0.7[4] (16)	0.5 (10)
5-jun	0.2 (23)	7.1[5] (2)	18.8[5] (2)	1.8 (5)	0.9[5] (18)	0.4 (11)
12-jun	0.2 (19)	24.7 (1)	6.8[8] (2)	1.3 (5)	0.9 (13)	0.6 (8)
19-jun	0.5[2] (12)	5.0 (3)	6.8[8] (7)	0.4 (15)	0.9[17] (44)	0.3 (15)
26-jun	0.4[3] (45)	2.9 (3)	9.6 (1)	0.9 (8)	1.0 (17)	0.4 (13)

Values are given in μBq/m^3.
Error estimates (1σ %) are given in brackets.

[1] Two weeks filter, 10-24/4
[2] Nine days filter 19-28/6
[3] Five days filter 28/6 – 3/7
[4] Nine days filter 29/5 – 7/6
[5] Five days filter, 7 – 12/6
[6] Eight days filter, 20 – 28/2
[7] Six days filter, 28/2 – 6/3
[8] Two weeks filter, 12 - 26/6
[9] Six days filter, 9 - 15/1
[10] Five days filter, 30/1 – 4/2
[11] One week filter, 4 - 11/2
[12] Six days filter, 27/2 – 5/3
[13] Six days filter, 10 - 16/4
[14] Eight days filter, 16 – 24/4
[15] Six days filter, 24 - 30/4
[16] Five days filter, 30/4 – 5/5
[17] Five days filter, 21 – 26/6
[18] Eight days filter, 23 – 31/1
[19] Six days filter, 31/1 –6/2

Table IIb

^{137}Cs concentrations in Sweden, jul – dec 2006

Week starting	*Kiruna*		*Umeå*		*Gävle*		*Kista*		*Visby*		*Ljungbyhed*	
3-jul	0.3	(36)	3.2	(2)	5.5	(2)	0.6	(9)	1.0[20]	(4)	0.5[23]	(6)
10-jul	0.2	(48)	3.6[5]	(3)	3.9	(2)	0.5	(15)	1.0[20]	(4)	0.2[24]	(41)
17-jul	0.3	(22)	1.8[6]	(6)	3.3	(5)	0.5	(10)	0.9	(12)	0.3	(18)
24-jul	0.2	(30)	1.9	(3)	8.9	(3)	0.7	(8)	1.3	(12)	0.3	(44)
31-jul	0.3	(36)	3.0	(2)	5.2	(1)	1.1	(6)	0.9	(13)	0.3	(15)
7-aug	0.7	(19)	3.5	(3)	8.6	(1)	3.8[11]	(2)	1.1	(11)	0.6	(9)
14-aug	0.4	(13)	3.9	(2)	3.8	(5)	0.3[12]	(14)	0.6	(19)	0.4	(13)
21-aug	0.4	(13)	1.9	(3)	3.9	(2)	1.1[13]	(7)	1.1	(12)	0.3	(15)
28-aug	0.3	(23)	2.8	(6)	4.0	(2)	0.4	(15)	0.5	(12)	0.2	(22)
4-sep	0.3	(21)	4.0	(2)	4.0	(2)	0.9	(7)	0.6	(21)	0.3	(21)
11-sep	0.3	(16)	4.9	(2)	4.3	(7)	0.7	(9)	1.2	(6)	1.3	(5)
18-sep	<0.3	-	6.6	(1)	6.6	(2)	1.0	(7)	1.2	(5)	0.9	(7)
25-sep	<0.2	-	4.2	(2)	5.4	(5)	2.7[14]	(5)	3.3	(7)	0.6	(13)
2-oct	<0.3	-	4.4	(1)	5.9	(1)	0.8	(6)	0.8	(14)	0.3	(18)
9-oct	<0.1	-	4.9	(1)	5.9	(1)	1.4	(5)	1.1	(6)	1.0	(16)
16-oct	<0.1	-	3.1	(2)	3.7	(4)	0.6	(13)	0.9	(16)	0.8	(16)
23-oct	<0.3	-	2.1	(3)	3.7	(2)	0.6	(10)	0.7	(9)	0.5	(11)
30-oct	0.2	(24)	2.1	(3)	2.1	(9)	0.7	(9)	0.4	(40)	0.3	(18)
6-nov	0.2	(35)	1.5	(3)	3.3	(2)	0.7	(9)	0.6	(23)	0.7	(9)
13-nov	0.2	(21)	1.5	(4)	2.2	(7)	0.8[15]	(8)	0.7	(8)	1.0	(19)
20-nov	<0.3	-	2.2	(3)	1.7[9]	(10)	0.4[16]	(15)	0.9	(6)	0.9	(17)
27-nov	0.2	(43)	2.8	(4)	1.7[10]	(5)	0.4[17]	(19)	0.7	(17)	0.9	(7)
4-dec	<0.1[1]	-	1.5	(5)	2.2	(3)	0.2[18]	(32)	0.5	(11)	0.4	(30)
11-dec	0.1[2]	(28)	1.1	(7)	2.4	(2)	0.5	(9)	0.3	(21)	<0.2	-
18-dec	0.2[3]	(42)	1.9[7]	(5)	2.8	(3)	0.7	(7)	0.3[21]	(13)	0.9	(13)
25-dec	<0.2[4]	-	1.9[8]	(4)	1.7	(4)	0.9[19]	(11)	0.5[22]	(20)	0.4	(14)

Values are given in μBq/m^3.
Error estimates (1σ %) are given in brackets.

[1] Eight days filter, 4 – 12/12
[2] Six days filter, 12 - 18/12
[3] Four days filter 18 – 22/12
[4] Ten days filter, 22/12 – 1/1-2007
[5] Four days filter, 10 – 14/7
[6] Ten days filter, 14 – 24/7
[7] Nine days filter, 18 – 27/12
[8] Six days filter, 27/12 – 2/1-2007
[9] Eight days filter, 20 – 28/11
[10] Six days filter, 28/11 – 4/12
[11] Six days filter, 7 – 13/8
[12] Eight days filter, 13 – 21/8
[13] Six days filter, 21 – 27/8
[14] Six days filter, 25/9 – 1/10
[15] Six days filter, 13 – 19/11
[16] Five days filter, 20 – 25/11
[17] Six days filter, 27/11 –3/12
[18] Four days filter, 4 – 8/12
[19] Five days filter, 25 – 30/12
[20] Two weeks filter, 3 – 17/7
[21] Ten days filter, 18 – 28/12
[22] Five days filter, 28/12 – 2/1-2007
[23] Eleven days filter, 3 – 14/7
[24] Three days filter, 14 – 17/7

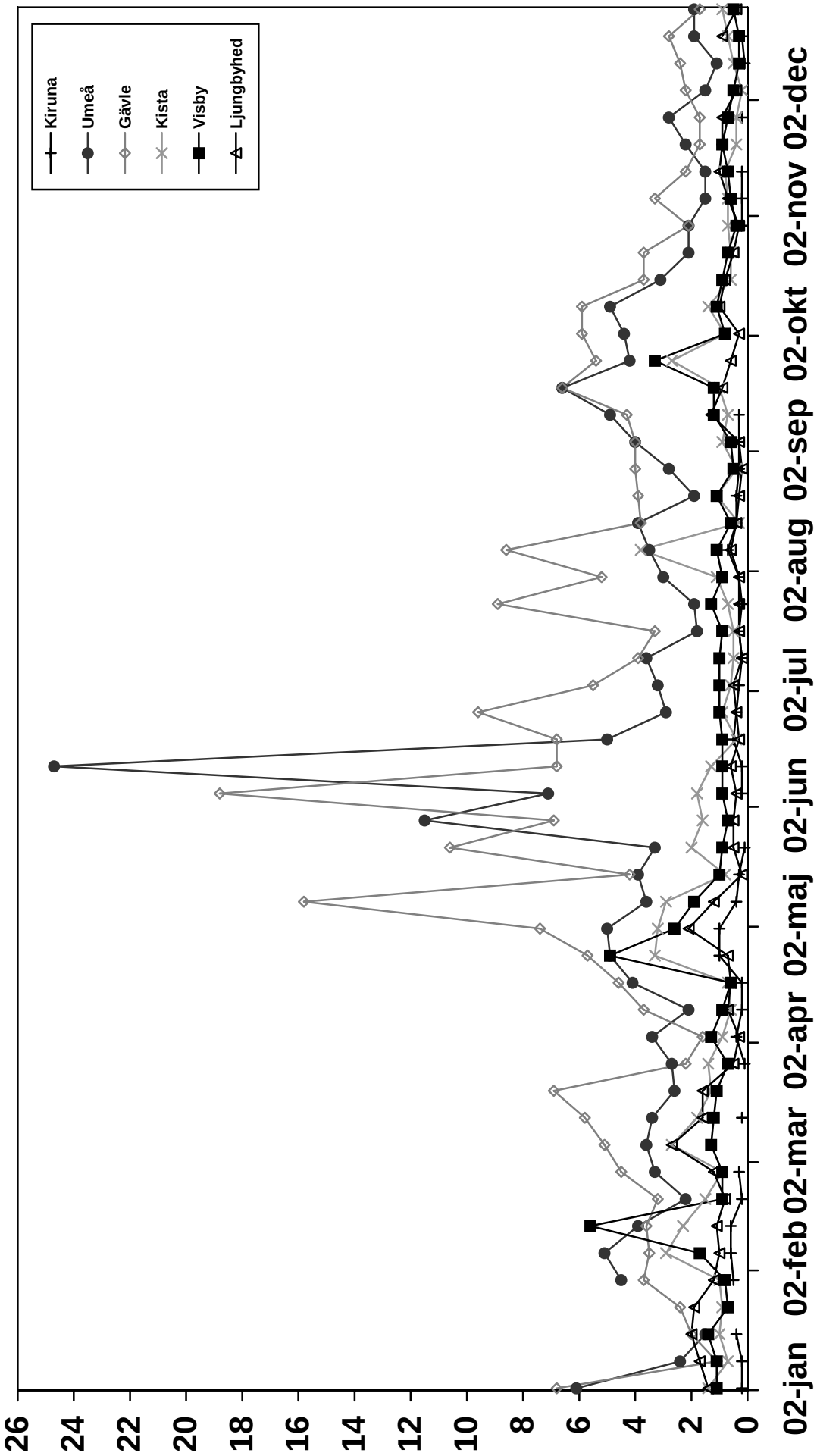

Kiruna
Umeå
Gävle
Kista
Visby
Ljungbyhed
26
24
22
20
18
16
14
12
10
8
6
4
2
0
02-jan
02-feb
02-mar
02-apr
02-maj
02-jun
02-jul
02-aug
02-sep
02-okt
02-nov
02-dec

Table IIIa

Deposition measurements, 2006

Kiruna

Weeks	*Period*	*^{7}Be*	*^{137}Cs*	*Precipitation (mm)*
51 – 02	19/12 - 2005– 17/1 - 2006	20600 (0.4)	5 (30)	13.7
03 – 06	17/1 – 13/2	13300 (0.5)	8 (32)	14.0
07 – 10	13/2 – 13/3	1100 (7)	<15	0
11 – 14	13/3 – 10/4	16300 (1.1)	<16	21.0
15 – 18	10/4 – 8/5	17800 (0.59	<29	4.8
19 – 22	8/5 – 5/6	67100 (0.2)	13 (19)	98.4
23 – 26	5/6 – 2/7	57200 (0.3)	32 (9)	No data
27 – 30	2/7 – 31/7	47400 (0.4)	12 (39)	12.4
31 – 34	31/7 – 25/8	91900 (0.4)	36 (27)	28.0
35 – 38	25/8 – 25/9	74700 (0.4)	22 (22)	57.6
39 – 42	25/9 – 23/10	34900 (0.5)	10 (35)	13.7
43 – 46	23/10 – 20/11	25600 (0.5)	<8	16.6
47 – 50	20/11 – 18/12	20100 (0.6)	<7	50.0

Gävle

Weeks	*Period*	*^{7}Be*	*^{137}Cs*	*Precipitation (mm)*
50 – 01	12/12 - 2005– 9/1 - 2006	35300 (0.4)	93 (4)	31.8
02 – 05	9/1 – 6/2	15100 (1.0)	41 (15)	9.6
05 – 09	6/2 – 6/3	56900 (0.4)	86 (10)	44.2
10 – 13	6/3 – 3/4	33600 (0.5)	62 (13)	33.1
14 – 17	3/4 - 2/5	68700 (0.2)	88 (4)	36.0
18 – 21	2/5 – 29/5	56300 (0.2)	470 (1.0)	24.5
22 – 25	29/5 – 26/6	22600 (0.7)	525 (2)	26.4
26 – 29	26/6 – 24/7	61300 (0.2)	151 (2)	9.9
30 – 33	24/7 – 31/8	83900 (0.3)	164 (8)	63.7
34 – 37	31/8 – 18/9	89700 (0.3)	100 (6)	69.4
38 – 41	18/9 – 16/10	48600 (0.4)	113 (4)	23.6
32 – 45	16/10 – 13/11	97200 (0.2)	97 (4)	131.8
46 – 49	13/11 – 11/12	38600 (0.4)	56 (7)	37.2

Values are given in mBq/m^2.

Error estimates (1σ %) are given in brackets.

Table IIIb

Deposition measurements, 2006

Kista

Weeks	*Period*	*^{7}Be*		*^{137}Cs*		*Precipitation (mm)*
01 – 04	2/1 – 30/1	17000	(0.5)	54	(6)	6.4
05 – 08	30/1 – 27/2	30900	(0.6)	72	(13)	19.1
09 – 12	27/2 – 27/3	18900	(0.8)	37	(19)	18.1
13 – 16	27/3 – 24/4	34300	(0.4)	42	(15)	32.8
17 – 20	24/4 – 22/5	21900	(0.6)	21	(30)	8.3
21 – 24	22/5 – 19/6	44700	(0.4)	122	(7)	42.3
25 – 28	19/6 – 17/7	72300	(0.3)	26	(28)	34.7
29 – 32	17/7 – 14/8	60100	(0.2)	10	(22)	38.8
33 – 36	14/8 – 11/9	145700	(0.2)	35	(13)	131.8
37 – 40	11/9 – 9/10	29100	(0.5)	9	(39)	14.6
41 – 44	9/10 – 6/11	134800	(0.2)	18	(19)	72.3
45 – 48	6/11 – 4/12	37600	(0.3)	5	(43)	22.0
49 – 52	4/12 - 2006 – 2/1 - 2007	24800	(0.5)	<7		11.8

Ljungbyhed

Weeks	*Period*	*^{7}Be*		*^{137}Cs*		*Precipitation (mm)*
52 – 03	27/1 - 2005 – 23/1 - 2006	32900	(12)	<6		23.2
04 – 07	23/1 – 20/2	40400	(0.4)	23	(26)	34.4
08 – 11	20/2 – 20/3	15400	(0.9)	14	(40)	13.7
12 – 15	20/3 – 18/4	100700	(0.2)	13	(23)	56.7
16 – 19	18/4 – 15/5	47800	(0.4)	<16		22.6
20 – 23	15/5 – 12/6	50300	(0.4)	40	(20)	66.9
24 – 27	12/6 – 7/7	28100	(0.6)	35	(20)	10.5
28 – 31	7/7 – 7/8	60900	(0.2)	12	(18)	38.8
32 – 35	7/8 – 4/9	145500	(0.3)	23	(41)	128.0
36 – 39	4/9 – 2/10	39500	(0.4)	15	(24)	37.9
40 – 43	2/10 – 30/10	90600	(0.2)	8	(35)	77.7
44 – 47	30/10 – 27/11	160100	(0.2)	9	(28)	100.6
48 – 51	27/11 – 25/12	148900	(0.3)	15	(47)	97.1

Values are given in mBq/m^2.

Error estimates (1σ %) are given in brackets.

Table IV

Other anthropogenic radionuclides detected, 2006

Week starting	*Station*	*Isotope*	*Concentration*	*Note*
23-jan	Gävle	^{131}I	0.5 (23)	(1)
22-may	Gävle	^{131}I	0.6 (35)	(1)
10-jul	Gävle	^{131}I	0.6 (22)	(1)

Values are given in μBq/m^3.
Error estimates (1σ %) are given in brackets.

(1) The activities of ^{131}I found in Gävle have been shown to correspond to administration of cancer treatment doses for thyroidea cancer at the Gävle-Sandviken County Hospital (ref. Erlandsson et al., "I-131 in air filters at Gävle", presented at NSRP 13th meeting in Åbo, 25-29 August 2002).