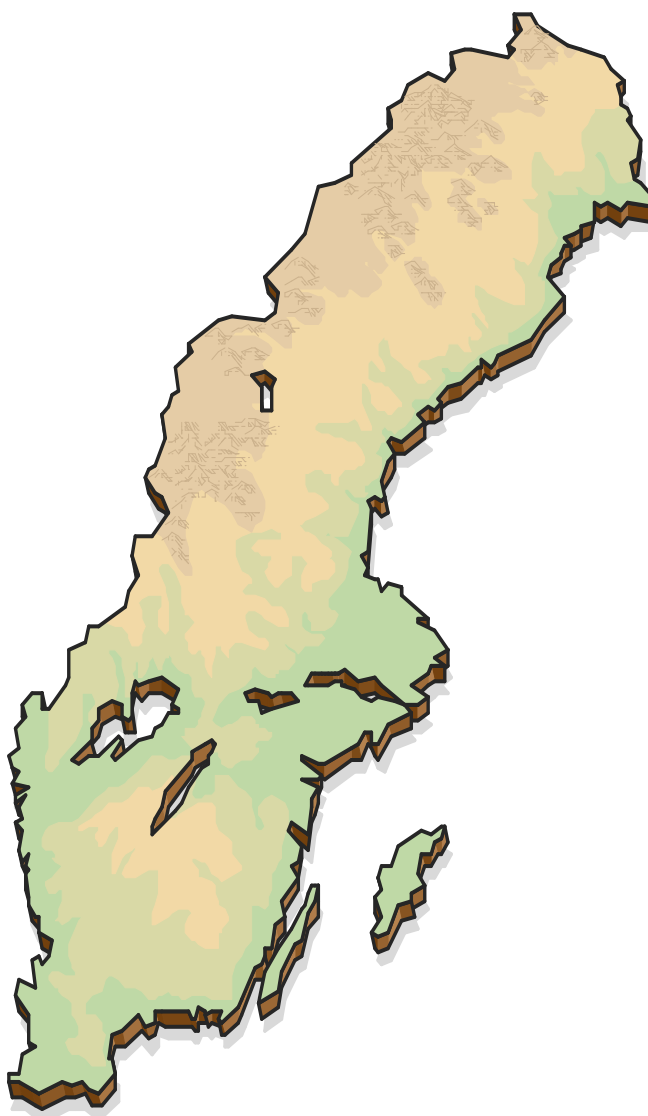


Radionuclide particles in ground level air in Sweden during 2019

K. ELMGREN, C. HELLESEN, M. GOLIATH,
L. KARLKVIST, J. KASTLANDER, H. OLSSON
AND C. SÖDERSTRÖM



K. Elmgren, C. Hellesen, M. Goliath, L. Karlkvist, J. Kastlander,
H. Olsson and C. Söderström

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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 collected at four of the stations: Kiruna, Gävle, Kista and Ljungbyhed. The samples are ashed and the contents of radionuclides are measured. Weekly activity concentrations of ^7Be and ^{137}Cs during 2019 in air and precipitation are presented for the different stations. Other anthropogenic radionuclides detected are also presented.

Keywords

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

Sammanfattning

Stationer för filtrering av markluft finns på sex orter i Sverige: Kiruna, Umeå, Gävle, Kista, Visby och Ljungbyhed. Filtren pressas och analyseras veckovis med hjälp av gammaspektroskopi. Nederbörd samlas in på fyra av stationerna: Kiruna, Gävle, Kista och Ljungbyhed. Nederbördsproverna askas in och mäts därefter med hjälp av gammaspektroskopi. Veckovisa aktivitetskoncentrationer av ^7Be och ^{137}Cs under 2019 för luft och nederbörd presenteras för de olika stationerna. I de fall andra antropogena radionuklider detekterats presenteras även dessa.

Nyckelord

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

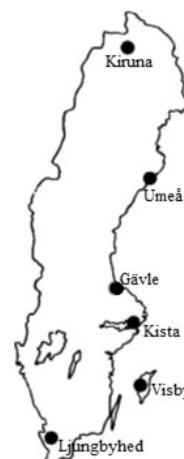
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1 Sampling and analysis procedures

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

Location	Latitude	Longitude	Height (asl)
Kiruna	67.84°N	20.42°E	415m
Umeå	63.85°N	20.34°E	46m
Gävle	60.67°N	17.19°E	7m
Kista	59.40°N	17.95°E	30m
Visby	57.61°N	18.32°E	59m
Ljungbyhed	56.08°N	13.22°E	45m



At five stations, 1000 m³/h of air is filtered through glass fibre filters (HB5773). At each station the filters are changed twice a week (Monday and Thursday or Friday) and sent by mail to FOI's laboratory in Kista for activity measurement and analysis. At the station in Kista 1600 m³/h of air is filtered and the filters are changed every 28th hour.

Weekly samples are made from each station by taking 3/4 of each filter and compressing them together into a disc (60 mm diameter and 13 mm thick). The remaining 1/4 of each filter is archived. The compressed samples are measured 3-4 days after collection, on shielded High Purity Germanium (HPGe) detectors. From the station in Kista, the filters are assembled in a Marinelli-like geometry by pressing them into one circular disc (94 mm diameter, 16 mm thickness), placed on top of the detector, and into six rectangular bricks (77 × 48 × 13 mm) placed around the detector.

At all of the stations, except the one in Visby, a small part of the air flow (12 m³/h) downstream the filter is passed through an activated charcoal cartridge in order to collect gaseous iodine. The cartridges are changed weekly, but only analysed if particulate iodine has been detected in the filter.

The stations at Kiruna, Gävle, Kista and Ljungbyhed are equipped with stainless steel funnels (1 m 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 columns are changed weekly and sent by mail to FOI's laboratory in Kista. Four subsequent samples from each station are combined into a monthly sample which is concentrated by ashing. The total deposition is calculated by measuring the activity in the monthly samples using HPGe detectors. From these measurements the total deposition is calculated.

The particulate radionuclides detected in the filters are normally due to the naturally occurring radon daughters and ⁷Be. In addition ¹³⁷Cs is commonly detected at most stations due to resuspension of the Chernobyl fallout. In Tables 2.1, 2.2, 3.1 and 3.2 and in Figures 1 and 2, the activity concentrations of ⁷Be and ¹³⁷Cs are presented. The precipitation measurement results are presented in Tables 4.1-4.4. Other anthropogenic radionuclides detected are presented in Tables 5.1 and 5.2.

Uncertainties are given as relative combined standard uncertainty according to GUM¹.

¹ See FOI Report "Implementation of uncertainty of measurement according to GUM" (FOI-D-0643-SE, internal report, in Swedish) for a detailed description

2 Concentrations of ^7Be in air

Table 2.1. ^7Be concentrations in Sweden, 2019

Week Starting	Kiruna	Umeå	Gävle	Kista	Visby	Ljungbyhed
31 Dec	1690 (5.0)	1110 (2.8)	1030 ³ (2.7)	1490 (2.8)	1540 (5.0)	1380 (2.9)
6 Jan	1310 (2.7)	1490 (4.9)	1310 (2.8)	1950 (2.8)	2770 (2.8)	1810 (2.7)
13 Jan	1280 (4.9)	1870 (2.8)	1600 (2.7)	2060 (2.8)	2180 (2.8)	2070 (2.7)
20 Jan	1130 (2.7)	1280 (4.9)	2070 (2.7)	2410 (2.8)	3470 (2.8)	2910 (4.9)
27 Jan	1200 (2.7)	1480 (4.9)	1950 ⁴ (2.9)	1130 (2.8)	1010 (2.8)	1540 (2.7)
3 Feb	1500 (2.8)	1050 (2.8)	830 (5.6)	1390 (2.8)	1690 (2.7)	1970 (2.7)
10 Feb	1460 (2.7)	2410 (4.9)	2580 (2.8)	3410 (2.8)	3840 (2.8)	3090 (2.8)
17 Feb	1800 (2.8)	2540 (4.9)	2500 (2.7)	3560 (2.8)	4200 (2.8)	4440 (2.7)
24 Feb	1970 (2.7)	1730 (4.9)	2380 (2.8)	3380 (2.8)	4020 (2.8)	3090 (2.8)
3 Mar	2280 (2.8)	2400 (2.7)	1770 (2.7)	2680 (2.8)	3400 (4.9)	2740 (2.8)
10 Mar	2360 (2.7)	1230 (2.8)	940 (2.8)	1580 (2.8)	2020 (4.9)	1770 (2.8)
17 Mar	2420 (2.8)	2480 (2.8)	1930 (2.7)	2480 (2.8)	2640 (2.8)	2270 (4.9)
24 Mar	2380 (2.8)	2350 (2.8)	2040 (2.7)	3350 (2.8)	3700 (4.9)	2960 (2.7)
31 Mar	1760 (2.8)	2260 (2.7)	2070 (2.7)	3800 (2.8)	4550 (2.8)	5650 (4.9)
7 Apr	3250 (2.8)	2730 (2.8)	2030 (4.9)	2890 (2.8)	3140 (2.7)	3420 (2.7)
14 Apr	5740 (2.7)	5410 ¹ (4.9)	4410 ¹ (2.8)	5570 (2.8)	6720 (2.8)	8030 (2.7)
21 Apr	8550 (2.7)	7240 ² (4.9)	6580 ² (2.8)	9660 (6.6)	8030 (2.8)	6280 (2.7)
28 Apr	2550 (4.9)	3160 (2.8)	2920 (2.7)	5090 (2.8)	3980 (2.7)	4520 (2.8)
5 May	2550 (2.7)	2800 (4.9)	2260 (2.8)	3380 (2.8)	3620 (2.8)	3320 (2.7)
12 May	6120 (2.7)	3250 (2.7)	2960 (2.8)	4570 (2.8)	5130 (2.8)	4250 (2.7)
19 May	4730 (2.7)	3060 (4.9)	1790 (2.8)	5460 ⁵ (4.4)	5040 (2.8)	3640 (2.7)
26 May	2160 (2.8)	2500 (2.8)	2260 (2.8)	2060 (2.8)	3120 (2.8)	3960 (4.9)
2 Jun	3200 (2.8)	3670 (4.9)	3890 (5.0)	5450 (4.1)	6490 (2.9)	4180 (2.7)
9 Jun	5680 (2.8)	3320 (4.9)	1950 (2.8)	4500 (5.3)	5530 (2.8)	4740 (2.7)
16 Jun	2760 (2.8)	3010 (2.7)	3070 (4.9)	4220 (2.8)	4290 (4.9)	3750 (2.8)
23 Jun	1810 (2.8)	2610 (2.7)	3120 (4.9)	4700 (2.8)	5170 (2.8)	5590 (4.9)

Values are reported in $\mu\text{Bq m}^{-3}$

When ^7Be is not detected minimal detectable concentration (MDC) is given

Relative combined standard uncertainty ($1\sigma\%$) within brackets

¹Eight days sampling 15/4-23/4

²Six days sampling 23/4-29/4

³Nine days sampling 29/12-7/1

⁴Four days sampling 28/1-1/2

⁵Five days sampling 19/5-25/5

Table 2.2. ^7Be concentrations in Sweden, 2019

Week Starting	Kiruna	Umeå	Gävle	Kista	Visby	Ljungbyhed
30 Jun	1810 (2.7)	1060 (4.9)	1050 (2.8)	1640 (2.8)	2070 (2.8)	2610 (2.8)
7 Jul	6630 (2.8)	3530 (2.8)	2660 (2.8)	4120 (2.8)	4490 (2.7)	3540 (2.7)
14 Jul	4180 (2.7)	3150 (4.9)	3150 (2.7)	4110 (2.8)	3480 (2.8)	3900 ³ (2.9)
21 Jul	5980 (2.8)	2770 (4.9)	1680 (2.8)	3200 (2.8)	3800 (2.7)	3460 ⁴ (2.7)
28 Jul	3960 (2.8)	2440 (2.8)	2080 (2.8)	3410 (2.8)	3790 (4.9)	4000 (2.7)
4 Aug	4360 (2.7)	3390 (2.8)	2460 (2.8)	4100 (2.8)	4300 (4.9)	3920 ⁵ (2.7)
11 Aug	1900 (4.7)	2040 (4.6)	2230 (4.9)	3880 (2.8)	4380 (2.8)	3870 ⁶ (2.7)
18 Aug	2930 (4.9)	2470 (4.9)	2300 (2.8)	3300 (2.8)	4110 (2.7)	5150 ⁷ (2.8)
25 Aug	5440 (2.7)	4810 (4.9)	4330 (2.7)	6010 (2.8)	6280 (2.8)	4780 ⁸ (2.8)
1 Sep	1200 (2.7)	1290 (2.8)	1470 (4.9)	2840 (2.8)	2480 (2.8)	2930 (2.7)
8 Sep	2360 (2.7)	1850 (4.9)	1430 (2.8)	2690 (2.8)	2730 (2.8)	2680 (2.7)
15 Sep	1180 (2.7)	1820 (2.8)	1830 (4.9)	2460 (2.8)	2810 (2.8)	2390 (2.7)
22 Sep	2300 (2.7)	2790 (4.9)	2810 (2.8)	3750 (2.8)	3720 (2.7)	3500 (2.8)
29 Sep	1410 (2.7)	1420 ¹ (2.8)	1920 (4.9)	2330 (2.8)	2170 (2.8)	2500 (2.7)
6 Oct	800 (2.7)	1070 ² (5.1)	1390 (2.8)	2560 (2.8)	3360 (2.8)	3020 (4.9)
13 Oct	1350 (2.8)	1050 (4.9)	740 (2.8)	1950 (2.8)	2280 (2.7)	2190 (2.8)
20 Oct	1070 (2.8)	960 (4.9)	2260 (2.8)	3270 (2.8)	2790 (2.7)	2230 (2.8)
27 Oct	1390 (2.8)	1420 (2.8)	1190 (4.9)	1940 (2.8)	2180 (2.8)	1690 (2.7)
3 Nov	1000 (2.7)	1010 (4.9)	1290 (2.8)	2130 (2.8)	1920 (2.8)	2250 (2.7)
10 Nov	990 (2.7)	730 (2.8)	1000 (2.7)	1920 (2.8)	3130 (2.7)	1910 (4.9)
17 Nov	500 (2.7)	1940 (4.9)	1860 (2.8)	3090 (2.8)	2670 (2.8)	1990 (2.7)
24 Nov	1330 (2.7)	1340 (4.9)	1200 (5.0)	1650 (2.8)	1680 (2.8)	1200 (2.8)
1 Dec	1300 (2.8)	1640 (4.9)	1230 (2.8)	1920 (2.8)	2170 (2.7)	2240 (2.7)
8 Dec	1010 (2.8)	1220 (2.8)	1060 (2.7)	1930 (2.8)	2420 (4.9)	2060 (2.7)
15 Dec	510 (2.7)	420 (5.0)	760 (2.8)	2320 (2.8)	2890 (2.8)	2970 (2.8)
22 Dec	1480 (2.7)	1070 (4.9)	940 (2.8)	1880 (2.8)	2400 (2.8)	960 (2.8)

Values are reported in $\mu\text{Bq m}^{-3}$ When ^7Be is not detected minimal detectable concentration (MDC) is givenRelative combined standard uncertainty ($1\sigma\%$) within brackets¹Four days sampling 30/9-4/10⁶Six days sampling 13/8-19/8²Six days sampling 8/10-14/10⁷Eleven days sampling 19/8-30/8³Four days sampling 15/7-19/7⁸Three days sampling 30/8-2/9⁴Ten days sampling 19/7-29/7⁵Eight days sampling 5/8-13/8

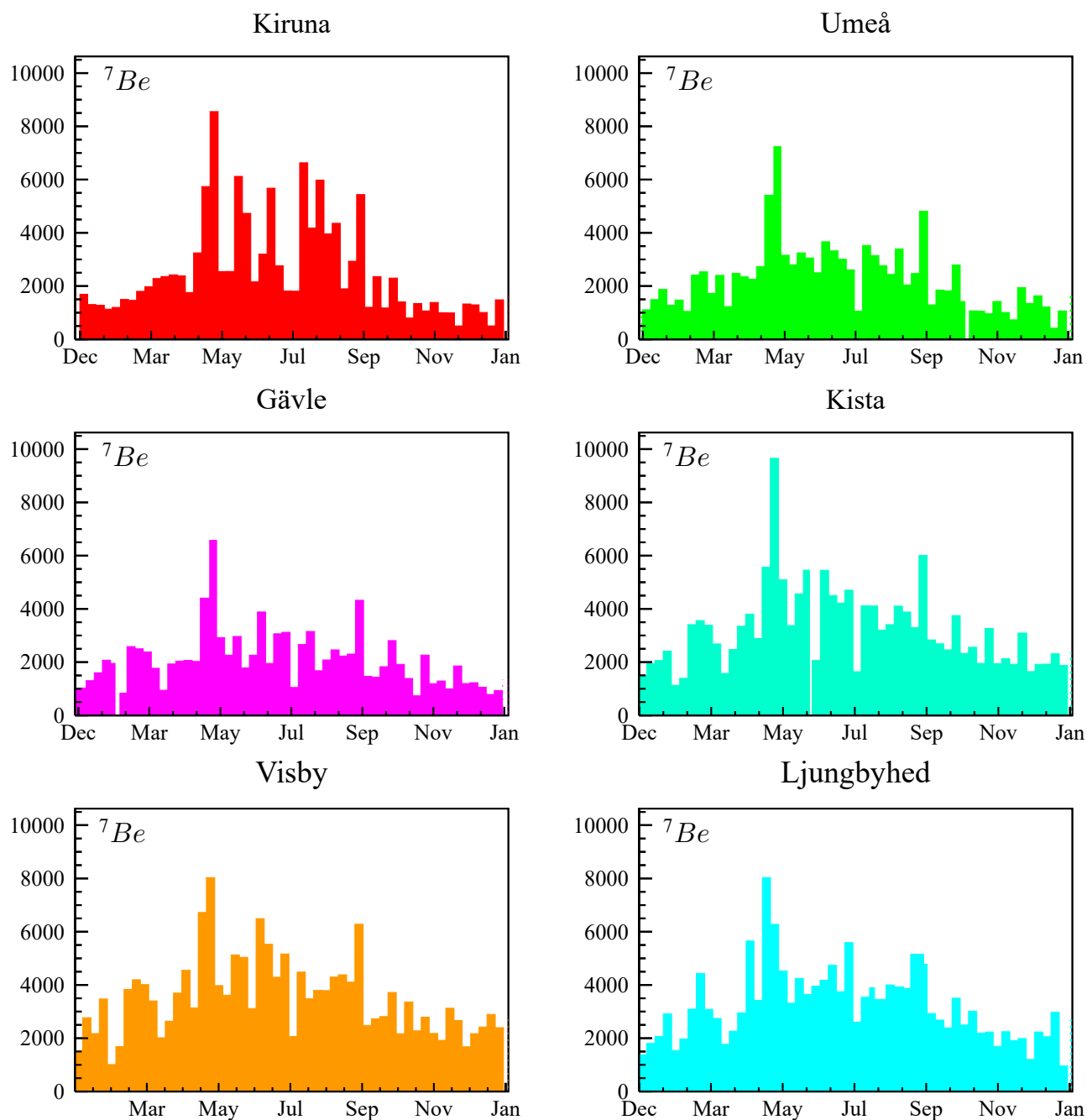


Figure 1. Activity concentrations ($\mu\text{Bq m}^{-3}$) in ground level air of ^7Be in the Swedish network during 2019

3 Concentrations of ^{137}Cs in air

Table 3.1. ^{137}Cs concentrations in Sweden, 2019

Week Starting	Kiruna	Umeå	Gävle	Kista	Visby	Ljungbyhed
31 Dec	< 0.2	1.1 (12)	0.6 ³ (8)	0.7 (4)	0.4 (18)	0.5 (13)
6 Jan	< 0.2	1.4 (6)	0.7 (17)	0.7 (5)	0.3 (17)	0.2 (51)
13 Jan	< 0.2	1.1 (11)	0.9 (5)	0.8 (5)	0.2 (11)	0.3 (18)
20 Jan	< 0.2	1.1 (6)	2.4 (3)	1.5 (4)	0.6 (6)	0.9 (12)
27 Jan	0.3 (8)	1.7 (4)	2.5 ⁴ (5)	1.0 (4)	0.7 (6)	0.6 (12)
3 Feb	0.1 (42)	1.7 (8)	0.6 (24)	0.3 (12)	0.1 (41)	0.6 (11)
10 Feb	< 0.2	0.7 (10)	0.4 (15)	0.4 (7)	0.7 (25)	< 0.8
17 Feb	< 0.4	1.6 (6)	1.1 (6)	0.4 (7)	0.4 (18)	0.7 (10)
24 Feb	< 0.2	0.6 (14)	0.9 (8)	0.3 (8)	0.2 (33)	1.0 (17)
3 Mar	< 0.2	1.3 (7)	0.5 (12)	0.3 (7)	0.3 (24)	1.1 (8)
10 Mar	< 0.2	0.7 (9)	0.5 (26)	0.3 (7)	< 0.3	0.2 (24)
17 Mar	< 0.4	0.9 (13)	0.9 (5)	0.5 (6)	0.2 (26)	0.4 (23)
24 Mar	< 0.2	1.1 (12)	1.4 (4)	0.7 (5)	0.3 (23)	0.6 (14)
31 Mar	0.2 (50)	1.1 (6)	1.7 (4)	1.7 (4)	3.2 (4)	2.0 (6)
7 Apr	0.2 (13)	0.9 (12)	1.2 (6)	0.4 (6)	0.4 (7)	0.5 (12)
14 Apr	< 0.2	1.1 ¹ (6)	2.5 ¹ (4)	0.7 (5)	0.6 (7)	0.6 (13)
21 Apr	2.2 (5)	3.0 ² (4)	7.0 ² (4)	7.5 (25)	4.2 (4)	1.2 (5)
28 Apr	0.3 (24)	1.0 (12)	2.6 (4)	0.9 (5)	0.3 (20)	0.9 (8)
5 May	< 0.2	0.9 (6)	2.3 (6)	0.6 (6)	0.6 (5)	0.3 (8)
12 May	0.1 (19)	2.9 (4)	4.5 (3)	1.3 (4)	1.0 (4)	1.5 (4)
19 May	0.1 (36)	5.5 (3)	2.5 (7)	1.6 ⁵ (5)	1.6 (6)	0.2 (27)
26 May	< 0.4	2.4 (4)	5.4 (4)	0.2 (8)	0.5 (13)	< 0.3
2 Jun	< 0.6	16.8 (3)	5.0 (3)	0.5 (7)	0.3 (39)	0.3 (13)
9 Jun	0.3 (50)	5.3 (3)	1.2 (7)	0.3 (8)	0.2 (14)	0.2 (15)
16 Jun	0.3 (24)	2.6 (4)	1.0 (8)	0.2 (10)	0.3 (19)	0.3 (21)
23 Jun	0.2 (27)	1.3 (7)	1.1 (9)	0.3 (8)	0.5 (31)	< 0.4

Values are reported in $\mu\text{Bq m}^{-3}$ When ^{137}Cs is not detected minimal detectable concentration (MDC) is givenRelative combined standard uncertainty ($1\sigma\%$) within brackets¹Eight days sampling 15/4-23/4²Six days sampling 23/4-29/4³Nine days sampling 29/12-7/1⁴Four days sampling 28/1-1/2⁵Five days sampling 19/5-25/5

Table 3.2. ^{137}Cs concentrations in Sweden, 2019

Week Starting	Kiruna	Umeå	Gävle	Kista	Visby	Ljungbyhed
30 Jun	< 0.2	1.1 (5)	0.9 (6)	0.4 (6)	0.2 (11)	< 1.0
7 Jul	< 0.3	1.1 (9)	0.9 (8)	0.4 (6)	0.3 (17)	0.2 (32)
14 Jul	0.2 (15)	0.9 (9)	0.9 (8)	0.4 (6)	0.2 (30)	< 0.4 ³
21 Jul	< 0.2	1.3 (6)	1.8 (4)	0.3 (8)	< 0.5	0.3 ⁴ (17)
28 Jul	< 0.1	0.7 (8)	1.4 (11)	0.2 (10)	0.2 (29)	0.1 (48)
4 Aug	0.1 (51)	1.3 (5)	1.4 (6)	0.2 (10)	< 0.2	< 0.4 ⁵
11 Aug	< 0.3	1.2 (28)	1.1 (7)	0.1 (17)	0.2 (15)	< 0.3 ⁶
18 Aug	< 0.2	1.8 (5)	1.4 (10)	0.4 (7)	0.2 (25)	0.4 ⁷ (12)
25 Aug	0.4 (18)	2.9 (4)	2.0 (5)	0.6 (5)	0.6 (10)	< 0.5 ⁸
1 Sep	0.1 (35)	5.2 (3)	1.6 (7)	0.5 (6)	< 0.2	0.2 (17)
8 Sep	0.4 (13)	6.2 (3)	1.0 (13)	0.7 (5)	0.3 (8)	0.1 (18)
15 Sep	< 0.1	2.9 (5)	1.2 (5)	0.6 (4)	0.2 (18)	0.2 (45)
22 Sep	< 0.2	3.2 (4)	2.6 (5)	0.7 (5)	0.8 (6)	0.5 (14)
29 Sep	< 0.2	2.2 ¹ (7)	0.8 (8)	0.3 (7)	0.1 (36)	0.5 (11)
6 Oct	< 0.2	1.7 ² (7)	1.8 (6)	0.8 (5)	0.4 (13)	0.2 (40)
13 Oct	< 0.2	1.0 (8)	1.2 (12)	0.3 (8)	0.5 (14)	0.6 (15)
20 Oct	< 0.4	1.2 (6)	1.2 (7)	0.5 (5)	0.4 (14)	0.5 (19)
27 Oct	< 0.2	0.6 (12)	1.0 (8)	0.9 (4)	0.2 (44)	0.4 (10)
3 Nov	0.1 (51)	0.6 (8)	0.7 (8)	0.4 (6)	0.3 (18)	0.5 (6)
10 Nov	< 0.1	0.6 (12)	0.6 (8)	0.6 (7)	0.6 (8)	0.6 (16)
17 Nov	< 0.2	1.0 (10)	1.1 (8)	1.5 (4)	1.7 (9)	0.6 (12)
24 Nov	< 0.2	0.4 (15)	0.6 (14)	0.7 (5)	0.8 (19)	0.6 (14)
1 Dec	< 0.2	0.6 (13)	0.4 (15)	0.2 (10)	0.2 (33)	0.3 (12)
8 Dec	< 0.2	0.6 (6)	0.4 (7)	0.2 (9)	0.3 (24)	0.6 (8)
15 Dec	< 0.2	0.6 (14)	0.5 (30)	0.4 (7)	0.4 (22)	0.5 (16)
22 Dec	< 0.2	0.5 (12)	0.7 (9)	0.8 (5)	0.2 (20)	0.6 (31)

Values are reported in $\mu\text{Bq m}^{-3}$ When ^{137}Cs is not detected minimal detectable concentration (MDC) is givenRelative combined standard uncertainty ($1\sigma\%$) within brackets¹Four days sampling 30/9-4/10⁶Six days sampling 13/8-19/8²Six days sampling 8/10-14/10⁷Eleven days sampling 19/8-30/8³Four days sampling 15/7-19/7⁸Three days sampling 30/8-2/9⁴Ten days sampling 19/7-29/7⁵Eight days sampling 5/8-13/8

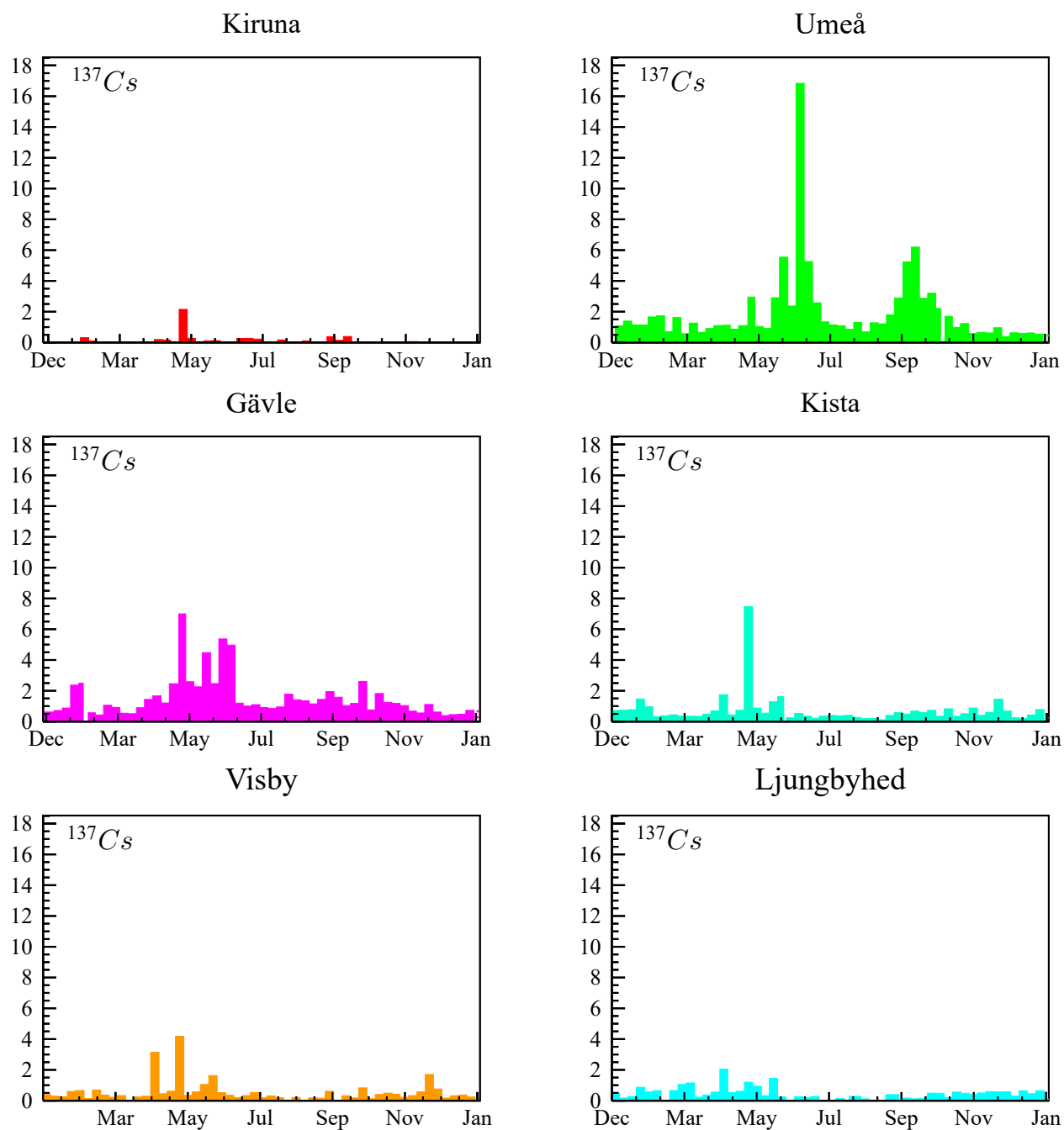


Figure 2. Activity concentrations ($\mu\text{Bq m}^{-3}$) in ground level air of ^{137}Cs in the Swedish network during 2019

4 Deposition measurements

Table 4.1. Kiruna

Period	⁷ Be	¹³⁷ Cs	Precipitation (mm)
31 Dec - 28 Jan	5900 (5)	< 8	7.0
28 Jan - 22 Feb*	8200 (5)	4 (40)	15.0
25 Feb* - 25 Mar	5800 (5)	< 8	12.4
25 Mar - 22 Apr	4900 (5)	< 7	11.1
22 Apr - 20 May	28 500 (5)	5 (27)	37.6
20 May - 17 Jun	58 200 (5)	20 (8)	67.8
17 Jun - 15 Jul	94 400 (5)	13 (20)	87.5
15 Jul - 9 Aug	35 100 (5)	6 (22)	20.7
9 Aug - 9 Sep*	66 800 (5)	8 (36)	88.8
16 Sep* - 14 Oct	25 100 (5)	3 (54)	64.9
14 Oct - 4 Nov	20 500 (5)	14 (35)	16.9
4 Nov - 2 Dec	7800 (5)	< 7	19.1
2 Dec - 30 Dec	12 000 (5)	< 7	30.9

*Sampling discontinued

Values are reported in mBq m⁻²

Relative combined standard uncertainty (1σ%) within brackets

Table 4.2. Gävle

Period	⁷ Be	¹³⁷ Cs	Precipitation (mm)
25 Dec - 21 Jan	15 700 (5)	11 (18)	39.2
21 Jan - 18 Feb	40 600 (5)	23 (10)	57.3
18 Feb - 18 Mar	17 100 (5)	17 (14)	47.7
18 Mar - 16 Apr	18 400 (5)	21 (23)	28.6
16 Apr - 13 May	1400 (5)	5 (19)	9.5
13 May - 10 Jun	31 000 (5)	208 (5)	63.7
10 Jun - 8 Jul	84 900 (5)	72 (6)	54.1
8 Jul - 5 Aug	61 400 (5)	49 (8)	50.9
5 Aug - 2 Sep	106 400 (5)	52 (7)	98.0
2 Sep - 30 Sep	26 300 (5)	17 (31)	29.9
30 Sep - 28 Oct	71 600 (5)	28 (10)	129.6
28 Oct - 25 Nov	37 400 (5)	20 (11)	44.6
25 Nov - 23 Dec	36 500 (5)	26 (10)	76.4

Values are reported in mBq m⁻²

Relative combined standard uncertainty (1σ%) within brackets

Table 4.3. Kista

Period	^7Be	^{137}Cs	Precipitation (mm)
17 Dec - 14 Jan	21 500 (5)	3 (57)	11.1
14 Jan - 11 Feb	48 700 (5)	12 (14)	56.0
11 Feb - 11 Mar	29 900 (5)	3 (51)	27.1
11 Mar - 8 Apr	25 900 (5)	5 (40)	26.1
8 Apr - 6 May	31 700 (5)	10 (14)	15.6
6 May - 3 Jun	48 800 (5)	17 (12)	30.6
3 Jun - 1 Jul	79 000 (5)	8 (22)	28.6
3 Jun - 1 Jul	79 000 (5)	8 (22)	28.6
1 Jul - 29 Jul	62 100 (5)	8 (28)	48.7
29 Jul - 26 Aug	82 400 (5)	< 14	68.4
26 Aug - 23 Sep	52 100 (5)	6 (19)	30.2
23 Sep - 21 Oct	103 100 (5)	6 (14)	54.1
21 Oct - 18 Nov	100 700 (5)	3 (57)	50.0
18 Nov - 16 Dec	94 000 (5)	12 (15)	105.7

Values are reported in mBq m^{-2}

Relative combined standard uncertainty ($1\sigma\%$) within brackets

Table 4.4. Ljungbyhed

Period	^7Be	^{137}Cs	Precipitation (mm)
10 Dec - 7 Jan	24 700 (5)	< 7	10.2
7 Jan - 4 Feb	57 700 (5)	4 (34)	37.9
4 Feb - 4 Mar	80 000 (5)	< 22	75.8
4 Mar - 1 Apr	86 500 (5)	< 6	104.1
1 Apr - 29 Apr	21 900 (5)	8 (12)	21.3
29 Apr - 27 May	45 400 (5)	26 (7)	31.8
27 May - 24 Jun	110 100 (5)	13 (17)	60.2
24 Jun - 19 Jul	35 500 (5)	4 (33)	14.0
19 Jul - 19 Aug	122 700 (5)	6 (16)	90.7
19 Aug - 16 Sep	108 500 (5)	7 (21)	67.5
16 Sep - 14 Oct	110 900 (5)	< 8	91.7
14 Oct - 11 Nov	67 100 (5)	3 (55)	50.6
11 Nov - 9 Dec	111 900 (5)	6 (26)	62.4

Values are reported in mBq m^{-2}

Relative combined standard uncertainty ($1\sigma\%$) within brackets

5 Other detections

5.1 Detections of ^{131}I during week 14, 2019.

Low concentrations of ^{131}I were detected at some of the stations during April 1-8, 2019. During the same period, detections were made in Helsinki as well². No source for the detections has been identified. Detections of low concentrations of ^{131}I within the network are not unusual.

Table 5.1. Air concentrations of ^{131}I in the Swedish network during April 1-8, 2019.

Station	Sampling Period	^{131}I
Kiruna	1 Apr - 8 Apr	< 0.7
Umeå	1 Apr - 8 Apr	< 0.6
Gävle	1 Apr - 8 Apr	0.2 (34)
Kista	31 Mar - 7 Apr	1.1 (13)
Visby	1 Apr - 8 Apr	1.6 (11)
Ljungbyhed	1 Apr - 8 Apr	< 0.8

Values are reported in $\mu\text{Bq m}^{-3}$

When the nuclide is not detected minimal detectable concentration (MDC) is given

Relative combined standard uncertainty ($1\sigma\%$) within brackets

²<https://www.stuk.fi/web/en/topics/environmental-radiation/radioactivity-in-outdoor-air>

5.2 Detections of ^7Be , ^{137}Cs and ^{131}I during week 17, 2019.

During April 22-29, 2019, increased air concentrations of ^7Be and ^{137}Cs were measured, mainly at the station in Kista. ^{131}I was also detected during parts of the period. The individual 28 hours filters for the station in Kista were measured separately during the period.

The elevated levels of Be and Cs coincided with high levels of dust-particles that originated from sand storms in the Sahara desert a few weeks earlier.

Table 5.2. Air concentrations of ^7Be , ^{137}Cs and ^{131}I in the Swedish network during April 22-29, 2019.

Station	Sampling Period	^7Be	^{137}Cs	^{131}I
Kiruna	22 Apr - 29 Apr	8550 (2.7)	2.2 (5)	< 0.9
Umeå	23 Apr - 29 Apr	7240 (4.9)	3.0 (4)	< 1.0
Gävle	23 Apr - 29 Apr	6580 (2.8)	7.0 (4)	0.6 (47)
Kista	21 Apr - 23 Apr	7160 (2.7)	1.3 (14)	< 3.3
Kista	23 Apr - 24 Apr	10 070 (2.7)	3.1 (11)	3.7 (21)
Kista	24 Apr - 25 Apr	11 840 (2.7)	14.5 (5)	1.7 (36)
Kista	25 Apr - 26 Apr	10 960 (2.7)	20.5 (3)	0.9 (71)
Kista	26 Apr - 27 Apr	10 460 (2.7)	3.0 (10)	1.0 (50)
Kista	27 Apr - 28 Apr	7550 (2.6)	2.8 (14)	< 2.2
Visby	22 Apr - 29 Apr	8030 (2.8)	4.2 (4)	< 1.0
Ljungbyhed	22 Apr - 29 Apr	6280 (2.7)	1.2 (5)	< 0.9

Values are reported in $\mu\text{Bq m}^{-3}$

When the nuclide is not detected minimal detectable concentration (MDC) is given

Relative combined standard uncertainty ($1\sigma\%$) within brackets

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FOI
Defence Research Agency
SE-164 90 Stockholm

Phone: +46 8 555 030 00
Fax: +46 8 555 031 00

www.foi.se