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Contents

National Institute of Radiological Sciences

Meteorological Data

Strontium-90 and Cesium-137 in Rain and Dry Fallout

(Japan Analytical Chemistry Research Institute)

Since May 1963, the Japan Analytical Chemistry Research Institute has measured the level of strontium-90 and cesium-137 in samples acquired at various locations throughout Japan. Sampling and pre-treatment for concentration were performed by 25 prefectural public health laboratories throughout Japan.

Sampling locations are indicated in Figure 1.

The collection tray has an area of 5,000 cm^2, and is exposed to rain and dust for about a month. The depth of water in the tray is kept at 10 mm to prevent dust from being blown away. At the end of each month, water in the tray and water used to wash the tray are combined with strontium and cesium carriers, and passed through a column filled with sodium type cation exchange resin (Dowex 50W-X 8, 50~100 mesh). The column is then sent to the Japan Analytical Chemistry Research Institute for analysis.

After the fraction containing both strontium-90 and cesium-137 is eluted from the resin, radiochemical analysis is carried out using the method recommended by the Science and Technology Agency.

Results obtained during the period from April 1967 to March 1968 are shown in Table 1.

Figure 1. Rain and Dry Fallout Sampling Locations

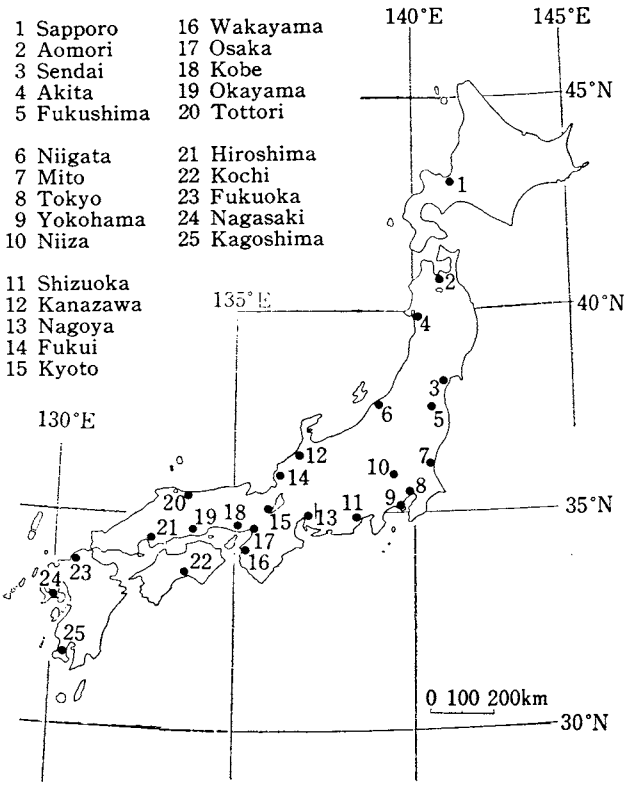


Table 1. ^{90}Sr and ^{137}Cs in Rain and Dry Fallout —Apr., 1967 to Mar., 1968—

By T. Asari, M. Chiba and M. Kuroda

(Japan Analytical Chemistry Research Institute)

(Continued from Table 1, Issue No. 15, of this Publication)

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Apr. 1967				
Sapporo, HOKKAIDO	31	55.7	0.08	0.13
Aomori, AOMORI	30	48.6	0.10	0.14
Sendai, MIYAGI	30	91.2	0.14	0.52
Akita, AKITA	26	160.3	0.20	0.26
Fukushima, FUKUSHIMA	13	48.7	0.10	0.15

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Niigata, NIIGATA	30	92.3	0.13	0.20
Mito, IBARAKI	30	100.0	0.13	0.21
TOKYO	30	100.3	0.12	0.25
Yokohama, KANAGAWA	32	112.3	0.12	0.20
Niiza, SAITAMA	31	78.3	0.11	0.11
Shizuoka, SHIZUOKA	34	255.3	0.26	0.40
Kanazawa, ISHIKAWA	30	196.6	0.11	0.24
Nagoya, AICHI	32	221.9	0.20	0.27
Fukui, FUKUI	30	227.3	0.16	0.25
Kyoto, KYOTO	30	261.9	0.20	0.28
Wakayama, WAKAYAMA	30	208.0	0.10	0.15
Osaka, OSAKA	32	238.6	0.14	0.21
Kobe, HYOGO	31		0.17	0.23
Okayama, OKAYAMA	30	251.7	0.15	0.19
Tottori, TOTTORI	31	206.9	0.16	0.30
Hiroshima, HIROSHIMA	31	290.0	0.14	0.20
Kochi, KOCHI	35	502.0	0.46	0.67
Fukuoka, FUKUOKA	30	219.1	0.14	0.24
Nagasaki, NAGASAKI	31	332.4	0.23	0.34
Kagoshima, KAGOSHIMA	32	321.6	0.18	0.28
May '67				
Sapporo, HOKKAIDO	32	44.6	0.09	0.14
Aomori AOMORI	31	56.5	0.11	0.05
Sendai, MIYAGI	31	91.2	0.12	0.18
Akita, AKITA	32	45.0	0.17	0.22
Fukushima, FUKUSHIMA	31	47.7	0.09	0.16
Niigata, NIIGATA	31	52.6	0.11	0.12
Mito, IBARAKI	31	75.6	0.13	0.16
TOKYO	31	37.8	0.08	0.10
Yokohama, KANAGAWA	32		0.10	0.13
Niiza, SAITAMA	31	66.6	0.10	0.13
Shizuoka, SHIZUOKA	24	8.7	0.03	0.05
Kanazawa, ISHIKAWA	31	47.3	0.06	0.11
Nagoya, AICHI	32	95.2	0.08	0.09
Fukui, FUKUI	31	49.6	0.07	0.08
Kyoto, KYOTO	31	93.6	0.10	0.10
Wakayama, WAKAYAMA	31	58.5	0.03	0.08
Osaka, OSAKA	30	59.5	0.14	0.05
Kobe, HYOGO	32	52.6	0.04	0.06
Okayama, OKAYAMA	31	150.5	0.08	0.07
Tottori, TOTTORI	31	88.9	0.10	0.15
Hiroshima, HIROSHIMA	31	74.8	0.13	0.09
Kochi, KOCHI	31	243.1	0.13	0.19
Fukuoka, FUKUOKA	32	60.2	0.05	0.03
Nagasaki, NAGASAKI	32	105.1	0.10	0.14
Kagoshima, KAGOSHIMA	32	183.4	0.12	0.11
Jun. '67				
Sapporo, HOKKAIDO	31	114.7	0.12	0.12
Aomori, AOMORI	30	75.9	0.10	0.21
Sendai, MIYAGI	30	151.6	0.30	0.58
Akita, AKITA	31	62.6	0.18	0.19
Fukushima, FUKUSHIMA	31	170.1	0.20	0.26
Niigata, NIIGATA	30	88.7	0.13	0.14
Mito, IBARAKI	30	176.7	0.15	0.19
TOKYO	30	160.0	0.11	0.15
Yokohama, KANAGAWA	33	87.9	0.14	0.17
Niiza, SAITAMA	30	60.5	0.12	0.13
Shizuoka, SHIZUOKA	29	247.7	0.18	0.27
Kanazawa, ISHIKAWA	30	132.9	0.06	0.09
Nagoya, AICHI	31	157.4	0.12	0.17
Fukui, FUKUI	31	139.9	0.06	0.13
Kyoto, KYOTO	30	77.2	0.07	0.09
Wakayama, WAKAYAMA	30	43.8	0.04	0.06
Osaka, OSAKA	30	109.9	0.05	0.09
Kobe, HYOGO	33	123.3	0.09	0.15
Okayama, OKAYAMA	30	91.4	0.04	0.04
Tottori, TOTTORI	30	103.6	0.07	0.10

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Hiroshima, HIROSHIMA	31	162.3	0.07	0.14
Kochi, KOCHI	30	164.6	0.09	0.10
Fukuoka, FUKUOKA	31	61.8	0.05	0.09
Nagasaki, NAGASAKI	31	118.0	0.03	0.04
Kagoshima, KAGOSHIMA	31	309.3	0.06	0.10
Jul. '67				
Sapporo, HOKKAIDO	32	97.3	0.07	0.10
Aomori, AOMORI	31	46.3	0.05	0.08
Sendai, MIYAGI	31	132.9	0.12	0.17
Akita, AKITA	32	133.6	0.09	0.10
Fukushima, FUKUSHIMA	32	102.5	0.15	0.15
Niigata, NIIGATA	31	90.6	0.05	0.07
Mito, IBARAKI	31	114.5	0.06	0.07
TOKYO	31	55.6	0.07	0.07
Yokohama, KANAGAWA	30	70.8	0.04	0.05
Niiza, SAITAMA	31	150.8	0.14	0.17
Shizuoka, SHIZUOKA	32	280.0	0.10	0.12
Kanazawa, ISHIKAWA	31	237.2	0.07	0.10
Nagoya, AICHI	32	270.7	0.09	0.10
Fukui, FUKUI	31	227.9	0.08	0.09
Kyoto, KYOTO	31	471.8	0.10	0.10
Wakayama, WAKAYAMA	31	20.9	0.05	0.06
Osaka, OSAKA	32	298.3	0.10	0.13
Kobe, HYOGO	29	511.7	0.05	0.06
Okayama, OKAYAMA	31	250.5	0.11	0.15
Tottori, TOTTORI	31	338.5	0.09	0.13
Hiroshima, HIROSHIMA	32	352.7	0.06	0.08
Kochi, KOCHI	31	434.8	0.08	0.13
Fukuoka, FUKUOKA	32	403.6	0.06	0.10
Nagasaki, NAGASAKI	32	260.0	0.04	0.04
Kagoshima, KAGOSHIMA	32	312.3	0.03	0.04
Aug. '67				
Sapporo, HOKKAIDO	32	87.2	0.06	0.06
Aomori, AOMORI	32	136.6	0.06	0.07
Sendai, MIYAGI	31	88.2	0.03	0.05
Akita, AKITA	31	225.8	0.05	0.05
Fukushima, FUKUSHIMA	32	138.5	0.02	0.02
Niigata, NIIGATA	31	352.0	0.02	0.03
Mito, IBARAKI	31	68.6	0.02	0.02
TOKYO	31	114.6	0.04	0.04
Yokohama, KANAGAWA	32	109.1	0.03	0.05
Niiza, SAITAMA	31	55.9	0.02	0.03
Shizuoka, SHIZUOKA	32	208.2	0.05	0.03
Kanazawa, ISHIKAWA	31	291.3	0.04	0.05
Nagoya, AICHI	32	92.9	0.02	0.02
Fukui, FUKUI	31	151.2	0.03	0.04
Kyoto, KYOTO	31	59.8	0.02	0.03
Wakayama, WAKAYAMA	30	2.5	0.01	0.02
Osaka, OSAKA	32	64.1	0.02	0.02
Kobe, HYOGO	32	46.6	0.01	0.02
Okayama, OKAYAMA	31	25.1	0.01	0.01
Tottori, TOTTORI	31	142.4	0.04	0.03
Hiroshima, HIROSHIMA	32	8.0	0.02	0.02
Kochi, KOCHI	31	239.0	0.05	0.06
Fukuoka, FUKUOKA	32	61.8	0.02	0.02
Nagasaki, NAGASAKI	32	86.4	0.04	0.06
Kagoshima, KAGOSHIMA	32	127.8	0.03	0.05
Sept. '67				
Sapporo, HOKKAIDO	32	165.4	0.06	0.07
Aomori, AOMORI	30	182.9	0.05	0.06
Sendai, MIYAGI	30	178.1	0.06	0.08
Akita, AKITA	31	189.6	0.05	0.06
Fukushima, FUKUSHIMA	30	163.1	0.03	0.03
Niigata, NIIGATA	30	123.4	0.05	0.06
Mito, IBARAKI	31	232.4	0.04	0.05
TOKYO	30	118.2	0.04	0.05
Yokohama, KANAGAWA	34	117.1	0.05	0.05
Niiza, SAITAMA	31	178.6	0.05	0.06

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Shizuoka, SHIZUOKA	34	109.0	0.02	0.03
Kanazawa, ISHIKAWA	31	126.6	0.05	0.05
Nagoya, AICHI	34	166.7	0.03	0.03
Fukui, FUKUI	29	149.5	0.03	0.04
Kyoto, KYOTO	32	35.4	0.02	0.03
Wakayama, WAKAYAMA	33	60.4	0.02	0.02
Osaka, OSAKA	32	130.2	0.02	0.04
Kobe, HYOGO	33	32.2	0.02	0.02
Okayama, OKAYAMA	31	21.9	0.01	0.01
Tottori, TOTTORI	31	212.9	0.07	0.07
Hiroshima, HIROSHIMA	31	12.6	0.02	0.02
Kochi, KOCHI	31	11.8	0.03	0.02
Fukuoka, FUKUOKA	31	13.2	0.01	0.02
Nagasaki, NAGASAKI	31	1.8	0.01	0.01
Kagoshima, KAGOSHIMA	32	51.6	0.01	0.03
Oct. '67				
Sapporo, HOKKAIDO	31	92.6	0.04	0.06
Aomori, AOMORI	31	150.4	0.08	0.14
Sendai, MIYAGI	31	131.2	0.02	0.04
Akita, AKITA	31	183.3	0.07	0.11
Fukushima, FUKUSHIMA	32	112.7	0.04	0.05
Niigata, NIIGATA	31	118.6	0.07	0.09
Mito, IBARAKI	31	158.1	0.03	0.04
TOKYO	31	122.4	0.04	0.07
Yokohama, KANAGAWA	32	126.4	0.03	0.05
Niiza, SAITAMA	30	189.8	0.04	0.05
Shizuoka, SHIZUOKA	31	179.1	0.04	0.05
Kanazawa, ISHIKAWA	31	181.1	0.06	0.10
Nagoya, AICHI	29	216.9	0.02	0.04
Fukui, FUKUI	32	123.8	0.04	0.09
Kyoto, KYOTO	30	135.9	0.02	0.03
Wakayama, WAKAYAMA	35	156.2	0.03	0.05
Osaka, OSAKA	31	134.7	0.02	0.02
Kobe, HYOGO	30	144.5	0.02	0.03
Okayama, OKAYAMA	30	147.0	0.02	0.03
Tottori, TOTTORI	30	194.5	0.05	0.06
Hiroshima, HIROSHIMA	32	116.4	0.02	0.03
Kochi, KOCHI	31	325.5	0.05	0.07
Fukuoka, FUKUOKA	31	102.2	0.04	0.05
Nagasaki, NAGASAKI	32	98.6	0.02	0.02
Kagoshima, KAGOSHIMA	30	122.5	0.02	0.02
Nov. '67				
Sapporo, HOKKAIDO	31	56.2	0.04	0.05
Aomori, AOMORI	30	144.6	0.14	0.25
Sendai, MIYAGI	30	30.3	0.02	0.01
Akita, AKITA	31	165.2	0.09	0.14
Fukushima, FUKUSHIMA	31	61.6	0.02	0.02
Niigata, NIIGATA	30	137.3	0.04	0.09
Mito, IBARAKI	30	54.8	0.02	0.02
TOKYO	30	30.8	0.01	0.04
Yokohama, KANAGAWA	29	68.1	0.04	0.03
Niiza, SAITAMA	30	37.6	0.01	0.02
Shizuoka, SHIZUOKA	30	227.3	0.05	0.05
Kanazawa, ISHIKAWA	30	226.2	0.08	0.09
Nagoya, AICHI	31	67.6	0.02	0.03
Fukui, FUKUI	30	156.6	0.07	0.09
Kyoto, KYOTO	30	75.7	0.02	0.03
Wakayama, WAKAYAMA	34	63.3	0.02	0.04
Osaka, OSAKA	31	83.0	0.02	0.02
Kobe, HYOGO	34	62.6	0.02	0.03
Okayama, OKAYAMA	30	66.8	0.01	0.02
Tottori, TOTTORI	30	122.1	0.05	0.06
Hiroshima, HIROSHIMA	31	113.6	0.04	0.05
Kochi, KOCHI	30	91.6	0.04	0.03
Fukuoka, FUKUOKA	31	94.5	0.02	0.04
Nagasaki, NAGASAKI	31	145.1	0.04	0.05
Kagoshima, KAGOSHIMA	31	99.0	0.02	0.02

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Dec. '67				
Sapporo, HOKKAIDO	35	101.1	0.02	0.03
Aomori, AOMORI	35	184.1	0.11	0.22
Sendai, MIYAGI	31	43.2	0.01	0.06
Akita, AKITA	28	180.7	0.01	0.02
Fukushima, FUKUSHIMA	32	44.9	0.02	0.03
Niigata, NIIGATA	28	334.1	0.09	0.14
Mito, IBARAKI	36	43.0	0.01	0.02
TOKYO	35	23.2	0.01	0.01
Yokohama, KANAGAWA	35	51.1	0.01	0.03
Niiza, SAITAMA	35	31.8	0.06	0.02
Shizuoka, SHIZUOKA	35	15.5	0.02	0.02
Kanazawa, ISHIKAWA	28	515.9	0.08	0.12
Nagoya, AICHI	36	30.8	0.01	0.02
Fukui, FUKUI	27	516.7	0.21	0.27
Kyoto, KYOTO	34	16.7	0.01	0.02
Wakayama, WAKAYAMA	29	56.6	0.02	0.04
Osaka, OSAKA	36	25.4	0.02	0.02
Kobe, HYOGO	35	10.3	0.02	0.02
Okayama, OKAYAMA	36	4.6	0.01	0.01
Tottori, TOTTORI	35	65.8	0.05	0.04
Hiroshima, HIROSHIMA	32	6.9	0.01	0.02
Kochi, KOCHI	36	25.8	0.02	0.02
Fukuoka, FUKUOKA	32	59.0	0.07	0.10
Nagasaki, NAGASAKI	32	87.8	0.01	0.08
Kagoshima, KAGOSHIMA	36	46.1	0.03	0.04
Jan. 1968				
Sapporo, HOKKAIDO	28	109.1	0.04	0.05
Aomori, AOMORI	27	238.5	0.03	0.18
Sendai, MIYAGI	31	12.2	0.02	0.10
Akita, AKITA	23	85.3	0.14	0.21
Fukushima, FUKUSHIMA	32	16.5	0.03	0.03
Niigata, NIIGATA	34	218.5	0.16	0.27
Mito, IBARAKI	27	20.4	0.02	0.03
TOKYO	28	4.3	0.02	0.01
Yokohama, KANAGAWA	28	36.5	0.02	0.03
Niiza, SAITAMA	26	3.8	0.13	0.02
Shizuoka, SHIZUOKA	24	46.5	0.03	0.06
Kanazawa ISHIKAWA	35	232.0	0.26	0.26
Nagoya, AICHI	27	24.2	0.02	0.03
Fukui, FUKUI	35	527.1	0.30	0.34
Kyoto, KYOTO	28	38.5	0.11	0.05
Wakayama, WAKAYAMA	28	34.5	0.02	0.02
Osaka, OSAKA	28	42.0	0.03	0.04
Kobe, HYOGO	25	26.7	0.02	0.02
Okayama, OKAYAMA	27	26.0	0.02	0.02
Tottori, TOTTORI	26	165.8	0.26	0.34
Hiroshima, HIROSHIMA	32	44.2	0.03	0.03
Kochi, KOCHI	27	51.7	0.07	0.09
Fukuoka, FUKUOKA	31	74.8	0.07	0.12
Nagasaki, NAGASAKI	32	88.0	0.08	0.10
Kagoshima, KAGOSHIMA	28	94.5	0.05	0.06
Feb. '68				
Sapporo, HOKKAIDO	30	102.0	0.06	0.08
Aomori, AOMORI	29	101.0	0.12	0.18
Sendai, MIYAGI	29	28.5	0.05	0.15
Akita, AKITA	29	118.2	0.17	0.19
Fukushima, FUKUSHIMA	30	29.5	0.04	0.05
Niigata, NIIGATA	29	133.6	0.16	0.23
Mito, IBARAKI	29	62.0	0.03	0.04
TOKYO	29	46.2	0.05	0.06
Yokohama, KANAGAWA	30	59.0	0.04	0.05
Niiza, SAITAMA	29	41.0	0.04	0.03
Shizuoka, SHIZUOKA	33	108.0	0.19	0.17
Kanazawa, ISHIKAWA	29	322.7	0.27	0.36
Nagoya, AICHI	30	62.4	0.05	0.09
Fukui, FUKUI	29	357.5	0.35	0.44
Kyoto, KYOTO	29	78.6	0.07	0.09

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Wakayama, WAKAYAMA	26	106.0	0.02	0.06
Osaka, OSAKA	30	55.5	0.03	0.05
Kobe, HYOGO	30	57.3	0.05	0.08
Okayama, OKAYAMA	29	61.7	0.06	0.08
Tottori, TOTTORI	29	202.1	0.22	0.26
Hiroshima, HIROSHIMA	30	46.0	0.05	0.06
Kochi, KOCHI	29	28.9	0.06	0.06
Fukuoka, FUKUOKA	29	96.3	0.16	0.21
Nagasaki, NAGASAKI	30	107.5	0.11	0.13
Kagoshima, KAGOSHIMA	29	57.4	0.10	0.15
Mar. '68				
Sapporo, HOKKAIDO	32	36.5	0.06	0.07
Aomori, AOMORI	21	72.5	0.14	0.22
Sendai, MIYAGI	31	38.6	0.04	0.09
Akita, AKITA	26	53.5	0.17	0.24
Fukushima, FUKUSHIMA	32	49.0	0.07	0.14
Niigata, NIIGATA	31	124.5	0.19	0.27
Mito, IBARAKI	31	90.9	0.17	0.22
TOKYO	31	51.3	0.09	0.15
Yokohama, KANAGAWA	30	103.5	0.09	0.14
Niiza, SAITAMA	27	40.9	0.06	0.08
Shizuoka, SHIZUOKA	35	279.5	0.23	0.35
Kanazawa, ISHIKAWA	31	179.5	0.30	0.37
Nagoya, AICHI	32	101.7	0.13	0.20
Fukui, FUKUI	31	99.3	0.18	0.32
Kyoto, KYOTO	31	112.4	0.11	0.15
Wakayama, WAKAYAMA	42	106.5	0.12	0.04
Osaka, OSAKA	31	96.8	0.08	0.12
Kobe, HYOGO	33		0.10	0.15
Okayama, OKAYAMA	31	70.0	0.09	0.10
Tottori, TOTTORI	31	108.9	0.22	0.30
Hiroshima, HIROSHIMA	31	88.5	0.14	0.09
Kochi, KOCHI	28	142.0	0.16	0.24
Fukuoka, FUKUOKA	32	71.8	0.10	0.14
Nagasaki, NAGASAKI	32	81.0	0.10	0.13
Kagoshima, KAGOSHIMA	32	85.3	0.16	0.22

Table 2 shows the monthly mean values of strontium-90 and cesium-137 collected by the 25 locations during the period from April 1967 to March 1968.

Table 3 shows the total amount of strontium -90 and cesium-137 deposits in each sampling location during the period from April 1967 to March 1968.

Table 2. Monthly Mean Values of ^{90}Sr and ^{137}Cs Collected by the 25 Locations
—Apr., 1967 to Mar., 1968—
(Continued from Table 2, Issue No. 15, of this Publication)

Month	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)	$^{137}Cs/^{90}Sr$
Apr. 1967	193	0.16	0.26	1.6
May 〃	79	0.09	0.11	1.2
Jun. 〃	128	0.11	0.15	1.4
Jul. 〃	227	0.08	0.10	1.3
Aug. 〃	119	0.03	0.04	1.3
Sept. 〃	111	0.03	0.04	1.3
Oct. 〃	151	0.04	0.06	1.5
Nov. 〃	99	0.04	0.05	1.3
Dec. 〃	101	0.04	0.06	1.5
Jan. 1968	90	0.08	0.10	1.3
Feb. 〃	99	0.10	0.13	1.3
Mar. 〃	91	0.13	0.18	1.4
Average	124	0.08	0.11	1.3

Table 3. Total Deposits of ^{90}Sr and ^{137}Cs in each Sampling Location
—Apr., 1967 to Mar., 1968—
(Continued from Table 3, Issue No. 15 of this Publication)

Location	^{90}Sr (mCi/km²)	^{137}Cs (mCi/km²)
1 Hokkaido	0.74	0.96
2 Aomori	1.09	1.80
3 Miyagi	0.94	2.03
4 Akita	1.39	1.79
5 Fukushima	0.81	1.09
6 Niigata	1.20	1.71
7 Ibaraki	0.81	1.07
8 Tokyo	0.68	1.00
9 Kanagawa	0.71	0.98
10 Saitama	0.88	0.85
11 Shizuoka	1.20	1.60
12 Ishikawa	1.44	1.94
13 Aichi	0.79	1.09
14 Fukui	1.58	2.18
15 Kyoto	0.85	1.03
16 Wakayama	0.48	0.64
17 Osaka	0.68	0.81
18 Hyogo	0.61	0.87
19 Okayama	0.61	0.73
20 Tottori	1.32	1.84
21 Hiroshima	0.73	0.83
22 Kochi	1.24	1.68
23 Fukuoka	0.79	1.16
24 Nagasaki	0.81	1.14
25 Kagoshima	0.81	1.12

Strontium-90, Cesium-137 and Cerium-144 in Air-borne Dust

(Japan Analytical Chemistry Research Institute)

Since April 1964, the Japan Analytical Chemistry Research Institute started the analyses of strontium-90, cesium-137 and cerium-144 content in air-borne dust.

Samples are collected by 8 prefectural public health laboratories, using a cottrell type dust collector (1,200 liters per hour). Figure 2 shows the sampling locations.

Results obtained during the period from April 1967 to March 1968, are shown in Table 4.

Figure 2. Air-borne Dust Sampling Locations

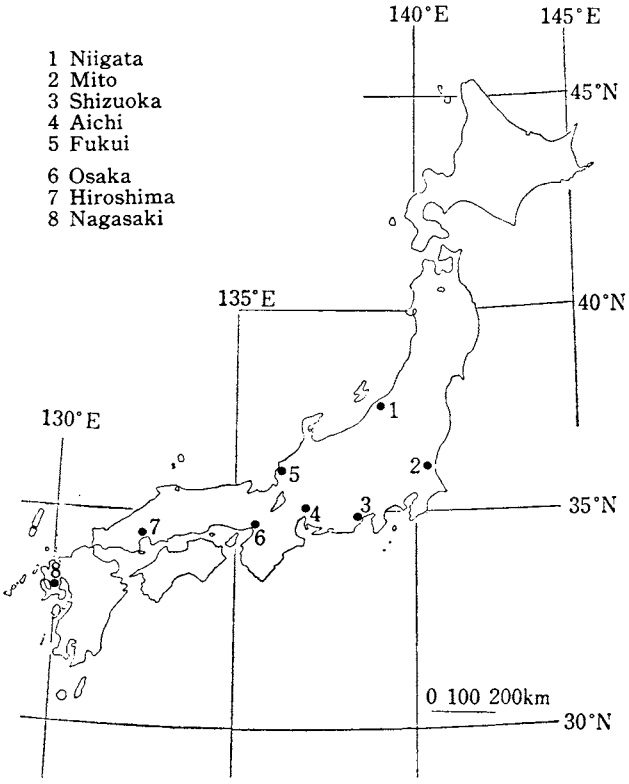


Table 4. ^{90}Sr, ^{137}Cs and ^{144}Ce in Air-borne Dust —Apr., 1967 to Mar., 1968—

By T. Asari, M. Chiba and M. Kuroda

(Japan Analytical Chemistry Research Institute)

(Continued from Table 4, Issue No. 15, of this Publication)

Location	Duration (days)	Air Inhaled (m^3)	Efficiency of Cottrell (%)	^{90}Sr (pCi/10^6 l)	^{137}Cs (pCi/10^6 l)	^{144}Ce (pCi/10^6 l)
Apr. 1967						
Niigata, NIIGATA	17	1296	95	2.18	1.92	3.19
Mito, IBARAKI	25	5760	70	1.63	2.32	1.96
Shizuoka, SHIZUOKA	17	3240	90	0.75	0.44	2.63
Nagoya, AICHI	14	3960	95	0.93	1.17	4.67
Fukui, FUKUI	18	620	96	0.98	1.09	2.07
Osaka, OSAKA	23	6135	90	2.74	3.86	5.66
Hiroshima, HIROSHIMA	23	7600	80	2.34	4.64	9.44
Nagasaki, NAGASAKI	24	1800	90	7.29	12.03	18.36
May '67						
Niigata, NIIGATA	21	1728	95	0.94	1.65	3.17
Mito, IBARAKI	23	6480	70	2.34	2.92	2.27
Shizuoka, SHIZUOKA	31	4320	90	1.80	1.68	4.19
Nagoya, AICHI	18	3540	95	2.44	4.27	4.80
Fukui, FUKUI	22	744	96	7.84	13.03	18.95
Osaka, OSAKA	26	7950	90	5.88	10.78	11.17
Hiroshima, HIROSHIMA	25	7600	80	4.98	7.44	6.53
Nagasaki, NAGASAKI	21	1800	90	6.83	10.91	6.32
Jun. '67						
Niigata, NIIGATA	10	5616	95	0.87	1.22	0.64
Mito, IBARAKI	29	43650	70	0.91	1.33	0.96
Shizuoka, SHIZUOKA	10	2160	90	2.54	4.52	9.67
Nagoya, AICHI		3240	95	2.55	3.76	5.09
Fukui, FUKUI	30	1944	96	6.89	9.50	9.42
Osaka, OSAKA	29	12624	90	2.45	4.48	3.18
Hiroshima, HIROSHIMA	26	6700	80	3.01	3.72	3.29
Nagasaki, NAGASAKI	26	2500	90	3.77	5.82	6.87
Jul. '67						
Niigata, NIIGATA	26	1296	95	1.19	1.51	1.06
Mito, IBARAKI	29	70560	70	0.26	0.57	0.70
Shizuoka, SHIZUOKA	19	3240	90	0.88	1.40	3.24
Nagoya, AICHI	14	2700	95	0.73	0.75	1.57
Fukui, FUKUI	13	480	96	2.66	4.70	7.58
Osaka, OSAKA	26	5460	90	0.30	0.95	1.64
Hiroshima, HIROSHIMA	24	8000	80	0.55	0.76	1.38
Nagasaki, NAGASAKI	14	1800	90	0.82	1.32	4.15
Aug. '67						
Niigata, NIIGATA	10	864	95	0.43	1.11	1.23
Mito, IBARAKI	31	60480	70	0.46	0.76	0.81
Shizuoka, SHIZUOKA	19	3240	90	0.59	0.51	1.88
Nagoya, AICHI	27	3420	95	0.92	0.22	0.34
Fukui, FUKUI	22	720	96	2.62	3.80	3.93
Osaka, OSAKA	23	4350	90	1.25	2.01	2.89
Hiroshima, HIROSHIMA	27	7900	80	0.76	1.14	4.96
Nagasaki, NAGASAKI	27	1800	90	1.16	1.25	1.16
Sept. '67						
Niigata, NIIGATA	15	864	95	0.28	0.99	1.00
Mito, IBARAKI	28	34560	70	0.25	0.38	0.36
Shizuoka, SHIZUOKA	14	3240	90	0.46	0.72	4.43
Nagoya, AICHI	18	3420	95	0.61	0.28	0.40
Fukui, FUKUI	21	720	96	2.77	4.26	5.03
Osaka, OSAKA	27	4875	90	0.69	1.43	1.68
Hiroshima, HIROSHIMA	25	6700	80	1.14	2.10	2.51
Nagasaki, NAGASAKI	22	1800	90	1.01	1.23	1.82
Oct. '67						
Niigata, NIIGATA	22	1296	95	0.71	0.90	9.15
Mito, IBARAKI	15	17280	70	0.66	0.89	1.25
Shizuoka, SHIZUOKA	8	4320	90	0.37	0.63	1.31
Nagoya, AICHI	15	2880	95	0.30	0.86	1.26
Fukui, FUKUI	21	720	96	3.46	6.19	6.09

Location	Duration (days)	Air Inhaled (m^3)	Efficiency of Cottrell (%)	^{90}Sr (pCi/10^6 l)	^{137}Cs (pCi/10^6 l)	^{144}Ce (pCi/10^6 l)
Osaka, OSAKA	25	5430	90	1.08	1.24	1.73
Hiroshima, HIROSHIMA	26	7900	80	1.27	1.90	4.38
Nagasaki, NAGASAKI	22	1800	90	2.32	4.01	13.44
Nov. '67						
Niigata, NIIGATA	16	864	95	1.05	0.87	6.68
Mito, IBARAKI	18	25920	70	0.25	0.44	2.29
Shizuoka, SHIZUOKA	15	2160	90	0.38	0.62	0.60
Nagoya, AICHI	12	2520	95	0.50	0.40	4.50
Fukui, FUKUI	24	720	96	2.97	4.52	69.55
Osaka, OSAKA	18	4410	90	0.92	1.23	6.11
Hiroshima, HIROSHIMA	20	4300	80	0.92	1.70	2.60
Nagasaki, NAGASAKI	21	1800	90	1.99	2.55	12.87
Dec. '67						
Niigata, NIIGATA	27	4104	95	0.34	0.56	2.33
Mito, IBARAKI	27	37440	70	0.24	0.41	2.34
Shizuoka, SHIZUOKA	2	2160	90	0.58	1.78	2.31
Nagoya, AICHI	23	3420	95	0.19	0.42	1.95
Fukui, FUKUI	25	1224	96	0.97	2.03	14.99
Osaka, OSAKA	29	7312	90	0.82	1.49	8.14
Hiroshima, HIROSHIMA	25	9100	80	0.83	1.80	6.31
Nagasaki, NAGASAKI	25	2200	90	1.53	1.75	25.04
Jan. 1968						
Niigata, NIIGATA	21	1296	95	1.08	2.40	10.15
Mito, IBARAKI	30	73440	70	0.34	0.62	5.32
Shizuoka, SHIZUOKA	26	6480	90	0.51	1.13	3.14
Nagoya, AICHI	22	3420	95	0.66	1.27	6.50
Fukui, FUKUI	16	1020	96	1.85	3.22	20.01
Osaka, OSAKA	16	3549	90	1.26	2.16	25.73
Hiroshima, HIROSHIMA	26	7700	80	1.61	2.25	16.48
Nagasaki, NAGASAKI	19	1800	90	2.82	3.09	33.14
Feb. '68						
Niigata, NIIGATA	22	1296	95	0.46	1.61	11.54
Mito, IBARAKI	26	34560	70	0.28	0.49	5.53
Shizuoka, SHIZUOKA	8	4320	90	0.71	2.01	4.50
Nagoya, AICHI	21	1350	95	1.30	1.02	8.47
Fukui, FUKUI	22	720	96	3.10	5.23	36.39
Osaka, OSAKA	24	5421	90	2.13	3.40	28.58
Hiroshima, HIROSHIMA	29	6000	80	2.16	3.15	27.04
Nagasaki, NAGASAKI	23	1800	90	7.07	12.09	121.00
Mar. '68						
Niigata, NIIGATA	20	1296	95	1.97	2.90	26.38
Mito, IBARAKI	29	38250	70	1.47	3.00	30.94
Shizuoka, SHIZUOKA	5	2160	90	0.74	1.02	6.51
Nagoya, AICHI	22	3510	95	1.30	1.45	24.21
Fukui, FUKUI	18	752	96	4.94	7.56	74.68
Osaka, OSAKA	24	4341	90	3.90	7.26	88.92
Hiroshima, HIROSHIMA	21	7400	80	2.22	3.45	41.15
Nagasaki, NAGASAKI	22	1800	90	6.05	10.31	134.30

External Dose Data

External Doses of Radiation from Fallout

(Institute of Physical and Chemical Research, National Institute of Radiological Sciences)

External dosages of radiation from fallout materials have been observed in Tokyo since 1958, and in Chiba since 1962*.

Observing locations are indicated in Figure 3. Direct dose measurements are made by spherical ionization chambers** and a scintillation counter with a specially designed shield around the NaI (Tl) crystal***. Scintillation survey meters are used for gamma-ray dosimetry.

In Tokyo, continuous measurements are made using an ordinary scintillation counter. An ionization chamber and the specially designed scintillation counter are used for comparison. In Chiba, a scintillation survey meter with a NaI (Tl) crystal is used and sometimes a plastic scintillation counter**** and an ionization chamber are used for comparison.

Measurements in Chiba are made in an open field at one meter above grassy ground. Measurements in Tokyo are made on the roof of the building of Institute of Physical and Chemical Research. Dose values at the level of one meter above the paved ground is obtained by correcting the results measured on the roof*.

Monthly external doses from fallout materials observed at these two locations during the period from January 1967 to July 1968 are shown in Table 5 and 6.

* F. Yamasaki, M. Okano, T. Nagahara and H. Watanabe: External Doses of Radiation from Fallout in Tokyo and its Vicinity, Journal of Radiation Research Vol. 5, No. 2 (1964) pp. 113-115.

** T. Doke, H. Takahashi, T. Higashimura, M. Takeuchi, Y. Nagahara, H. Watanabe, H. Otsuka, M. Okano, and F. Yamasaki: External Gamma Dose Rates from Natural Radionuclides in Japan, Science Papers Institute of Physical and Chemical Research, Vol. 56, No. 1 (1962) pp. 40-46.

*** M. Okano: Low Level Gamma Ray Dosimetry with Scintillation Counter, Reports Institute of Physical and Chemical Research, 37: 355 (1961).

**** T. Doke, Y. Takami, A. Takamoto, and A. Sasaki: Measurements of Radiation Dose due to Background Gamma Rays by Plastic Scintillators, Journal Radiation Research, Vol. 1 (1960) pp. 46-53.

Figure 3. External Doses of Radiation Observing Location

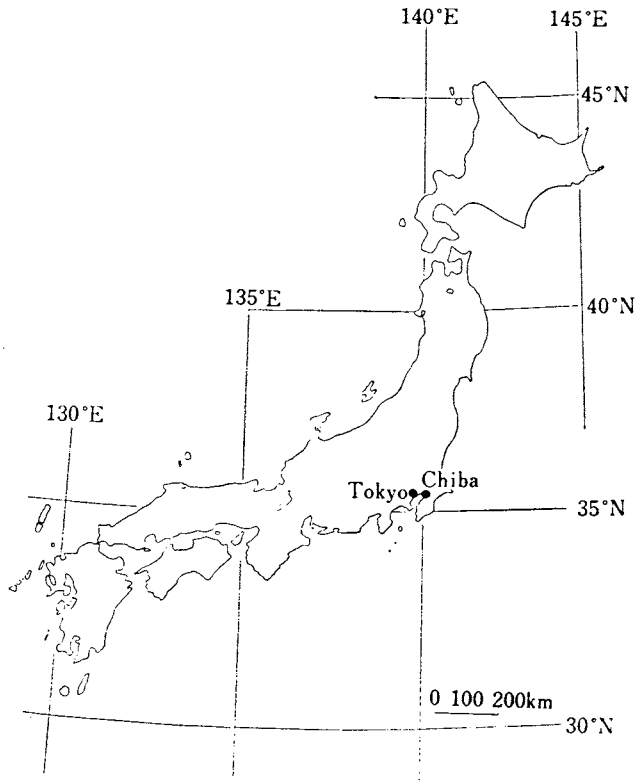


Table 5. Monthly External Doses due to Fallout in Tokyo —Jan., 1967 to May, 1968—

By M. Okano

(Institute of Physical and Chemical Research)

(Continued from Table 5, Issue No. 15, of this Publication)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly External Doses (mR)	1967	2.0	0.8	0.4	0.5	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.3
	1968	0.4	0.3	0.2	0.2	0.2							

Table 6. Monthly External Doses due to Fallout in Chiba —Jan., 1967 to Jul., 1968—

By H. Watanabe

(National Institute of Radiological Sciences)

(Continued from Table 6, Issue No. 15, of this Publication)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Monthly External Doses (mR)	1967	4.3	0.8	1.2	0.5	0.6	0.3	0.4	1.0	1.0	0.9	0.2	0.7
	1968	0.6	0.4	0.4	0.3	0.3	0.6	0.8					

External Exposure due to Natural Radiation

(National Institute of Radiological Sciences)

A field survey of exposure rates due to natural radiation has been conducted throughout the Shikoku district of Japan during October, 1967. The situation of the Shikoku district in Japan is shown in Figure 4. Distribution of observed locations in the district is indicated in Figure 5. In each location, from one to three sites containing at least 5 stations were chosen for observation and measurements were made there. A total of 44 sites were measured.

Observations were made using a spherical ionization chamber and a scintillation surveymeter. The spherical plastic ionization chamber of which inner diameter and wall thickness are respectively 200 mm and 3 mm (acrylate) has adequate sensitivity for field survey. The chamber was used as a standard of measurement, but it is difficult to observe all locations only by the apparatus, so that a surveymeter which contained a detector consisting of a NaI(Tl) $1\phi'' \times 1''$ scintillator was used for regular measurements. In 12 sites, both the chamber and the surveymeter were used for measurment of given stations and their readings are compared for drawing a relationship between them.

Practically the direct readings of the surveymeter were reduced into the readings of the plastic chamber corresponding to it from the relationship of linear proportion. Systematic error at calibration (^{60}Co) and reading error (random) of the plastic chamber were respectively within $\pm 6\%$ (maximum overall error) and within $\pm 2.5\%$ (standard error). Reading error of the surveymeter is about $\pm 2\%$ (standard error).

Measurements in open bare field were made at one meter above the ground and outdoor gamma-ray exposure rates (μR/hr) were due to cosmic rays as well as terrestrial radiation, so that it may be considered that the contribution of fallout due to artificial origin was very slight.

Gamma-ray exposure rates due to natural radiation in each location are shown in Table 7 and population dose due to natural radiation in each prefecture of the Shikoku district is shown in Table 8.

Figure 4. The Situation of Shikoku District in Japan

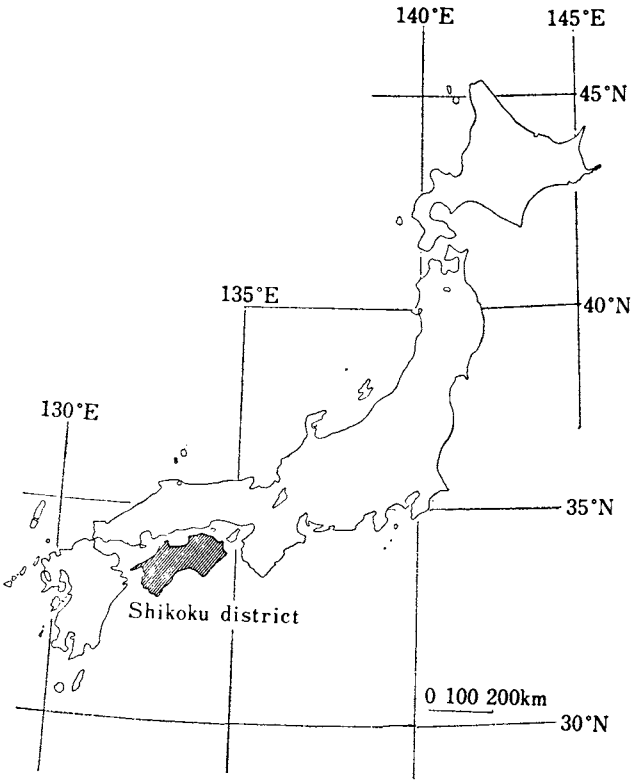


Figure 5. Distribution of Observed Locations

1 On a ferry boat
2 Marugame
3 Utazu
4 Takamatsu
5 Shido
6 Ouchi
7 Ikeda
8 Naruto
9 Tokushima
10 Anan
11 Hiwasa
12 Kainan
13 Sakihama
14 Muroto
15 Aki
16 Kochi
17 Tosa
18 Susaki
19 Saga
20 Nakamura
21 Sukumo
22 Misho
23 Tsushima
24 Uwajima
25 Uwa
26 Ozu
27 Iyo
28 Matsuyama
29 Dogo
30 Hojo
31 Namikata
32 Imabari
33 Niihama
34 Iyo-mishima

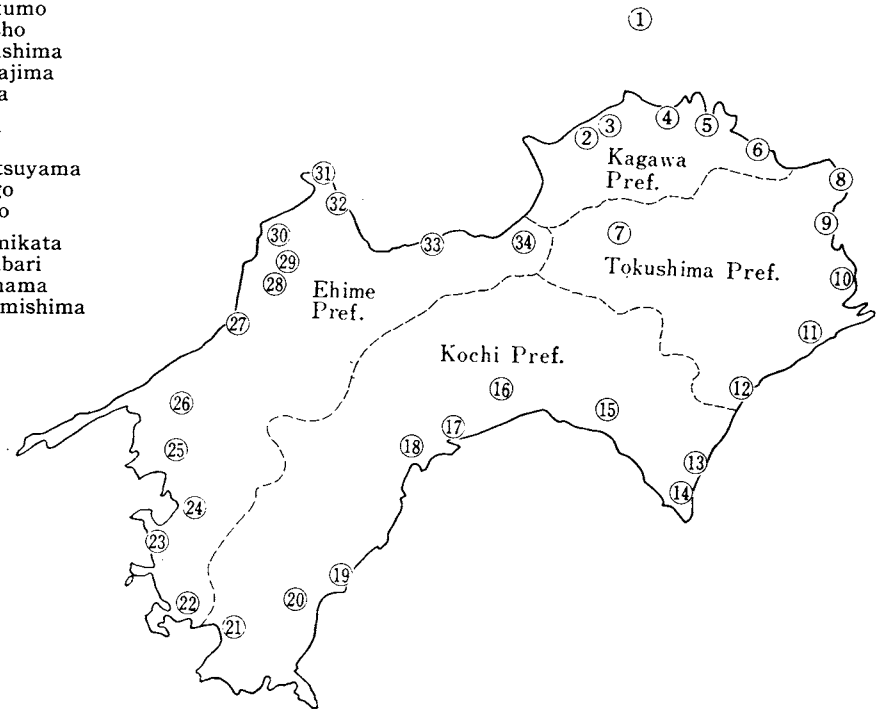


Table 7. Gamma-ray Exposure Rates due to Natural Radiation in each Location —Oct. 1967—

By S. Abe, N. Sekiguchi, K. Shimizu and H. Watanabe

(National Institute of Radiological Sciences)

Prefecture	Location	Exposure Rate (μR/hr)	Apparatus	Number of Sites measured in each Location
Kagawa	1 On a ferry boat	4.4	A, B	1
	2 Marugame	12.0	A, B	1
	3 Utazu	11.0	B	1
	4 Takamatsu	12.7	A, B	3
	5 Shido	10.9	B	1
	6 Ouchi	12.9	A, B	1
Tokushima	7 Ikeda	7.5	B	1
	8 Naruto	7.4	B	1
	9 Tokushima	8.0	A, B	3
	10 Anan	11.4	A, B	1
	11 Hiwasa	10.4	B	1
	12 Kainan	10.3	B	2
Kochi	13 Sakihama	10.5	B	1
	14 Muroto	12.6	B	1
	15 Aki	9.3	A, B	1
	16 Kochi	7.2	A, B	1
	17 Tosa	11.0	B	1
	18 Susaki	11.6	B	1
	19 Saga	12.2	B	1
	20 Nakamura	10.5	B	1
	21 Sukumo	13.2	A, B	1
Ehime	22 Misho	11.4	B	1
	23 Tsushima	12.4	B	1
	24 Uwajima	11.0	A, B	1
	25 Uwa	10.2	B	1
	26 Ozu	7.6	A, B	1
	27 Iyo	12.0	B	1
	28 Matsuyama	12.7	A, B	3
	29 Dogo	14.8	B	2
	30 Hojo	11.0	B	1
	31 Namikata	8.6	B	1
	32 Imabari	11.6	B	1
	33 Niihama	11.8	B	1
	34 Iyo-mishima	10.5	B	3

Note. A: Spherical Ionization Chamber
B: Scintillation Surveymeter

Table 8. Population Dose due to Natural Radiation in each Prefecture of the Shikoku district.

By S. Abe, N. Sekiguchi, K. Shimizu and H. Watanabe

(National Institute of Radiological Sciences)

Prefecture	Population* ($\times$1,000)	Exposure Rate (μR/hr)
Kagawa	920	12.0
Tokushima	850	8.9
Kochi	850	10.0
Ehime	1500	11.5
All Shikoku	4120	10.8

* National Census in 1960

Dietary Data

Concentration of Carbon-14 in Fermented Alcohol

(National Institute of Radiological Sciences)

Since 1963, the concentration of carbon-14 in fermented alcohol has been measured by liquid scintillation counter, because alcohol is unlimitedly soluble in liquid scintillator. As the alcohol is manufactured by fermentation of starch in sweet potato and molasses which is fixed from carbon dioxide by anabolism, so it is well reflected upon the variation of carbon-14 in biosphere.

All samples of alcohol are received from the Alcohol Factory of Ministry of International Trade and Industry in several prefectures where the sweet potato is caltivated and some of them can be backed to the past stock till 1949. Sweet potato sampling locations are shown in Figure 6. The molasses are imported from some countries of Asia and Africa.

In earlier period, the scintillator which was consisted of the sample alcohol 80 ml and toluene (contained 0.4% PPO and 0.012% Dimethyl POPOP) 80 ml was measured by TRI-CARB 314 A (Packard) Liquid Scintillation Spectrometer using the Kaufman's aluminum vessel and calibrated by internal standard method. As the counting system, especially on the point of efficiency and quenching correction, is improved during recent few years, a new scintillator consisting of the sample alcohol 15 ml and toluene (0.8% PPO, 0.02% Dimethyl POPOP, and 5% naphthalene) 6 ml in usual low potassium glass vial is counted by Mark I (Nuclear Chicago) Liquid Scintillation Counter and calibrated by external standard method. However, the all values are corrected uniformly and represented as the same unit: dpm per gram carbon.

Results obtained are shown in Table 9, and the annual variation of carbon-14 concentration in Ethanol is indicated in Figure 7.

Figure 6. Sweet Potato Sampling Locations

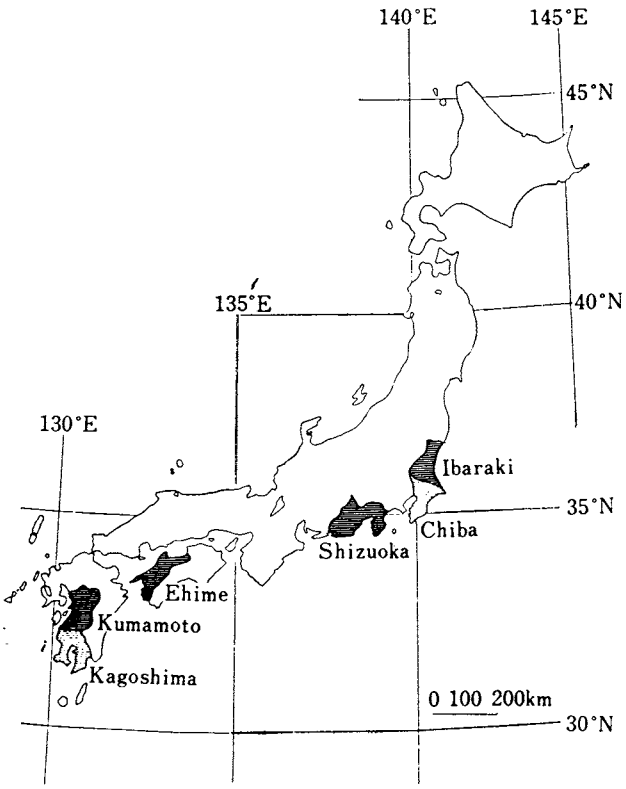


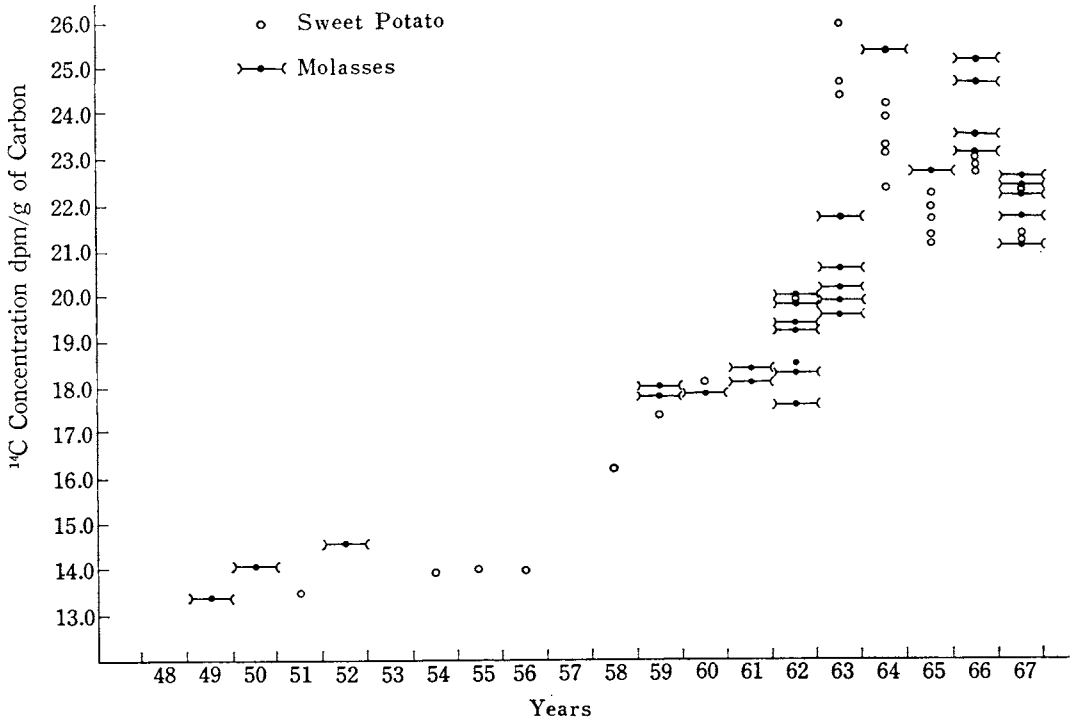
Table 9. Annual Variation of ^{14}C Concentration in Ethanol —1949 to 1967—

By Y. Kasida and T. Iwakura

(National Institute of Radiological Sciences)

Sample / Year of Harvest	Sweet Potato: Prefecture in Japan	Sweet Potato: dpm/g Carbon	Molasses: Foreign Country	Molasses: dpm/g Carbon
1949			Philippines	13.37
1950			Philippines	14.16
1951	Okinawa	13.45		
1952			Philippines	14.54
1953				
1954	Kumamoto	13.90		
1955	Ibaraki	14.02		
1956	Shizuoka	14.01		
1957				
1958	Ibaraki	16.22		
1959	Kumamoto	17.42	Formosa	17.87
			Philipinnes	17.91
1960	Ibaraki	18.10	Philippines	17.86
1961			Philippines	18.35
			Philippines	18.11
1962	Ibaraki	19.84	Cuba	19.37
	Ehime	18.43	Philippines	19.96
	Chiba	19.79	Philippines	19.39
			Philippines	17.60
			Formosa	18.28
			Pakistan	19.89
1963	Kumamoto	25.86	Thailand	20.62
	Kagoshima	24.66	Formosa	20.17
	Chiba	24.38	Philippines	21.69
			Philippines	19.87
			India	19.59
1964	Kagoshima	23.26	Philippines	25.28
	Kumamoto	23.90		
	Ehime	24.15		
	Ibaraki	22.33		
	Shizuoka	24.16		
1965	Kumamoto	21.95	Philippines	22.57
	Ehime	21.37		
	Ibaraki	22.31		
	Kagoshima	21.24		
	Kagoshima	21.71		
1966	Kumamoto	22.86	Indonesia	24.63
	Ibaraki	22.78	Indonesia	23.07
	Kagoshima	22.99	Philippines	23.50
			Formosa	25.12
1967	Kumamoto	21.10	Durban	22.42
	Ehime	22.46	Indonesia	21.10
	Ibaraki	21.28	South Africa	*21.69*
			South Africa	22.17
			South Africa	22.60

Figure 7. Annual Variation of ^{14}C Concentration in Ethanol —1949 to 1967—



Water Data

Strontium-90 and Cesium-137 in Source Water

(Japan Analytical Chemistry Research Institute)

Since May 1963, the Japan Analytical Chemistry Research Institute has analyzed the strontium-90 and cesium-137 content in source water from 21 locations in Japan.

Sampling locations are shown in Figure 8. To concentrate the strontium-90 and cesium-137, the ion exchange method has been used. The column, filled with sodium cation exchange resin (Dowex 50 W-X 8, 50~80 mesh), and 100 ml of carrier solution containing both 100 mg of strontium and cesium, were sent in advance from the Japan Analytical Chemistry Research Institute to each prefectural public health laboratory.

At each prefectural public health laboratory, a 100 liter of water sample was passed through the column at the rate of 12 liters per hour, then the column was returned to the Japan Analytical Chemistry Research Institute.

At the Japan Analytical Chemistry Research Institute, after 2 liters of 5%-oxalic acid was passed through the column to remove other metals by complex ionization, strontium and cesium adsorbed on the resin were eluted by 3 liters of 3 N-hydrochloric acid. The hydrochloric acid fraction was analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the period Aplil 1967 to March 1968 are shown in Table 10.

Figure 8. Source Water Sampling Locations

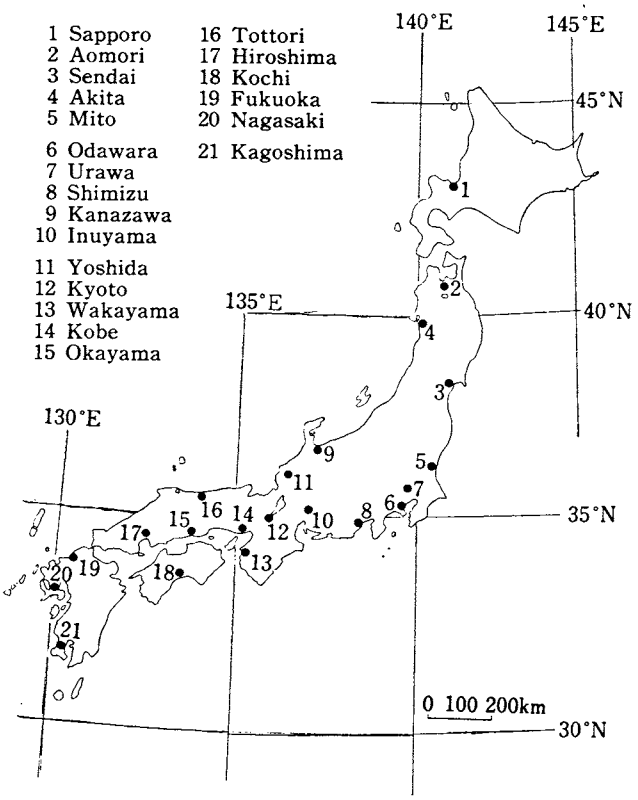


Table 10. ^{90}Sr and ^{137}Cs in Source Water —Apr., 1967 to Mar., 1968—

By T. Asari, M. Chiba and M. Kuroda

(Japan Analytical Chemistry Research Institute)

(Continued from Table 19, Issue No. 15, of this Publication)

Location	Source	^{90}Sr (pCi/l)	^{137}Cs (pCi/l)	Nature of Water	
				pH	Appearance
Apr. 1967					
Sapporo, HOKKAIDO	Water Purification Station	0.32	0.05	7.1	slight muddy
Aomori, AOMORI	〃 〃	0.12	0.09	6.8	clear
Sendai, MIYAGI	〃 〃	0.17	0.07	6.9	slight muddy (brawn)
Akita, AKITA	〃 〃	0.14	0.06	6.7	clear
Mito, IBARAKI	〃 〃	0.11	0.04	7.0	muddy
Odawara, KANAGAWA	Station Intake	0.05	0.02	6.8	clear
Urawa, SAITAMA	Water Purification Station	0.02	0.01	7.2	〃
Shimizu, SHIZUOKA	〃 〃	0.12	0.02	7.1	〃
Kanazawa, ISHIKAWA	〃 〃	0.34	0.08	7.4	〃
Inuyama, AICHI	Station Intake	0.14	0.03	6.9	〃
Eiheiji, FUKUI	Water Purification Station	0.13	0.04	7.4	〃
Kyoto, KYOTO	〃 〃	0.81	0.07	7.1	〃
Wakayama, WAKAYAMA	〃 〃	0.20	0.04	7.0	〃
Kobe, HYOGO	Reservoir	0.16	0.04	6.8	slight muddy (yellow)
Okayama, OKAYAMA	Water Purification Station	0.11	0.06	7.2	slight muddy (white)
Tottori, TOTTORI	Reservoir	0.22	0.08	6.9	〃 〃
Kochi, KOCHI	Water Purification Station	0.10	0.03	7.2	clear
Fukuoka, FUKUOKA	〃 〃	0.34	0.04	6.8	〃
Nagasaki, NAGASAKI	Reservoir	0.19	0.10	7.6	slight muddy (yellow)
Kagoshima, KAGOSHIMA	〃	0.03	0.03	6.8	clear
May '67					
Wakkanai, HOKKAIDO	Water Purification Station	0.92	0.12		muddy (yellow)
Shiga, SHIGA	〃 〃	0.70	0.04	7.5	clear
Hiroshima, HIROSHIMA	〃 〃	0.16	0.07	7.0	〃
Jun. '67					
Sapporo, HOKKAIDO	Water Purification Station	0.25	0.03	7.1	clear
Mito, IBARAKI	〃 〃	0.23	0.06	7.0	muddy
Odawara, KANAGAWA	Station Intake	0.04	0.02		clear
Kanazawa, ISHIKAWA	〃 〃	0.38	0.07	7.2	〃
Inuyama, AICHI	〃 〃	0.16	0.05	6.8	〃
Kyoto, KYOTO	〃 〃	0.93	0.06	7.3	〃
Kobe, HYOGO	Reservoir	0.13	0.03	7.4	slight muddy (yellow)
Fukuoka, FUKUOKA	〃	0.46	0.04	6.8	clear
Jul. '67					
Wakkanai, HOKKAIDO	Water Purification Station	0.75	0.10		muddy (yellow)
Aomori, AOMORI	〃 〃	0.21	0.07	6.8	clear
Sendai, MIYAGI	〃 〃	0.19	0.08	6.9	slight muddy (brawn)
Akita, AKITA	〃 〃	0.12	0.06	7.0	muddy (yellow)
Urawa, SAITAMA	〃 〃	0.04	0.01	7.2	clear
Shimizu, SHIZUOKA	〃 〃	0.09	0.02	7.0	clear
Eiheiji, FUKUI	〃 〃	0.11	0.03	7.5	slight muddy
Wakayama, WAKAYAMA	〃 〃	0.23	0.05	6.9	slight muddy (yellow)
Okayama, OKAYAMA	Station Intake	0.17	0.05	6.8	slight muddy
Tottori, TOTTORI	Reservoir	0.18	0.06	6.7	muddy (white)
Hiroshima, HIROSHIMA	Water Purification Station	0.11	0.03	7.0	clear
Kochi, KOCHI	〃 〃	0.11	0.03	7.2	〃
Nagasaki, NAGASAKI	Reservoir	0.15	0.15	6.8	slight muddy (yellow)
Kagoshima, KAGOSHIMA	〃	0.02	0.03	6.8	clear
Aug. '67					
Sapporo, HOKKAIDO	Water Purification Station	0.28	0.12	7.1	slight muddy (yellow)
Odawara, KANAGAWA	Station Intake	0.06	0.05	6.8	clear
Inuyama, AICHI	〃 〃	0.20	0.03	6.9	〃
Kyoto, KYOTO	〃 〃	0.89	0.03	7.3	〃
Kobe, HYOGO	Reservoir	0.23	0.03	7.2	muddy (yellow)
Fukuoka, FUKUOKA	〃	0.29	0.03	6.8	clear
Sept. '67					
Wakkanai, HOKKAIDO	Water Purification Station	0.96	0.07		muddy (yellow)
Shiga, SHIGA	〃 〃	0.80	0.04	7.8	clear

Location	Source	^{90}Sr (pCi/l)	^{137}Cs (pCi/l)	Nature of Water	
				pH	Appearance
Oct. '67					
Sapporo, HOKKAIDO	Water Purification Station	0.19	0.05	7.1	clear
Aomori, AOMORI	〃 〃	0.11	0.07	6.7	〃
Sendai, MIYAGI	〃 〃	0.18	0.08	6.9	slight muddy (brawn)
Akita, AKITA	〃 〃	0.29	0.05	6.8	clear
Mito, IBARAKI	〃 〃	0.11	0.03	7.2	〃
Odawara, KANAGAWA	Station Intake	0.04	0.02	6.8	〃
Urawa, SAITAMA	Water Purification Station	0.02	0.01	7.2	〃
Shimizu, SHIZUOKA	Reservoir	0.06	0.01	7.1	〃
Kanazawa, ISHIKAWA	Station Intake	0.54	0.07	7.2	〃
Inuyama, AICHI	〃 〃	0.15	0.03	6.8	〃
Eiheiji, FUKUI	Water Purification Station	0.09	0.04	7.5	〃
Kyoto, KYOTO	Station Intake	0.61	0.06	7.6	〃
Wakayama, WAKAYAMA	Water Purification Station	0.12	0.01	7.4	〃
Kobe, HYOGO	〃 〃	0.21	0.03	7.4	muddy (yellow)
Okayama, OKAYAMA	〃 〃	0.15	0.04	7.1	slight muddy (white)
Tottori, TOTTORI	Reservoir	0.17	0.05	7.1	slight muddy (brawn)
Hiroshima, HIROSHIMA	Station Intake	0.21	0.03	7.1	clear
Kochi, KOCHI	Water Purification Station	0.14	0.02	7.1	〃
Fukuoka, FUKUOKA	〃 〃	0.21	0.03	6.9	〃
Nagasaki, NAGASAKI	〃 〃	0.14	0.16	7.2	muddy (brawn)
Kagoshima, KAGOSHIMA	Reservoir	0.02	0.05	6.8	clear
Nov. '67					
Wakkanai, HOKKAIDO	Water Purification Station	0.75	0.09	6.4	slight muddy (yellow)
Dec. '67					
Sapporo, HOKKAIDO	Water Purification Station	0.19	0.04	7.1	clear
Odawara, KANAGAWA	Station Intake	0.04	0.01	6.8	〃
Kanazawa, ISHIKAWA	Water Purification Station	0.23	0.07	7.1	〃
Inuyama, AICHI	Station Intake	0.07	0.03	7.0	〃
Kyoto, KYOTO	Water Purification Station	0.74	0.05	7.2	〃
Kobe, HYOGO	〃 〃	0.19	0.03	7.1	slight muddy (yellow)
Fukuoka, FUKUOKA	〃 〃	0.16	0.02	6.9	clear
Jan. 1968					
Wakkanai, HOKKAIDO	Water Purification Station	0.98	0.06		clear
Aomori, AOMORI	〃 〃	0.07	0.06	6.9	〃
Sendai, MIYAGI	〃 〃	0.15	0.03	6.7	slight muddy (white)
Akita, AKITA	〃 〃	0.26	0.05	6.6	clear
Urawa, SAITAMA	〃 〃	0.01	0.02	7.2	〃
Shimizu, SHIZUOKA	Reservoir	0.07	0.01	7.0	〃
Eiheiji, FUKUI	Water Purification Station	0.09	0.04	7.4	〃
Wakayama, WAKAYAMA	〃 〃	0.10	0.02	6.7	slight muddy (white)
Okayama, OKAYAMA	〃 〃	0.15	0.05	7.0	clear
Tottori, TOTTRI	Reservoir	0.19	0.07	6.9	muddy (brawn)
Hiroshima, HIROSHIMA	Station Intake	0.20	0.04	7.0	clear
Kochi, KOCHI	Water Purification Station	0.10	0.06	7.2	〃
Nagasaki, NAGASAKI	Reservoir	0.18	0.08	7.5	muddy (yellow)
Kagoshima, KAGOSHIMA	〃	0.01	0.03	6.8	clear
Feb. '68					
Sapporo, HOKKAIDO	Water Purification Station	0.22	0.09	7.1	clear
Mito, IBARAKI	〃 〃	0.08	0.02	7.1	muddy
Odawara, KANAGAWA	Station Intake	0.03	0.01	6.8	clear
Inuyama, AICHI	〃 〃	0.15	0.02	6.9	〃
Shiga, SHIGA	Water Purification Station	0.64	0.03	7.5	〃
Kyoto, KYOTO	Station Intake	0.71	0.04	7.5	〃
Kobe, HYOGO	Water Purification Station	0.17	0.02	7.1	slight muddy (yellow)
Fukuoka, FUKUOKA	〃 〃	0.18	0.05	6.8	clear
Mar. '68					
Wakkanai, HOKKAIDO	〃 〃	0.56	0.08	6.2	muddy (brawn)