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RADIOACTIVITY SURVEY DATA in Japan

Part 1
= Environmental Materials =

NUMBER 92
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National Institute of Radiological Sciences
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Radioactivity Survey Data in Japan

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Contents

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Environmental and Dietary Materials*

(Japan Chemical Analysis Center)

1. Collection and pretreatment of samples

(1) Rain and dry fallout

Rain and dry fallout was collected monthly on a sampling tray, approximately 5000 cm^2 in area, which was filled with water to a depth of 1 cm at the beginning of every month.

Strontium and cesium carrier solutions were added after the sample was filtered. The tray was washed with 5 ℓ of distilled water and the washing was combined to the filtrate.

The sample was passed through a cation exchange column (500 mℓ of Dowex 50W X8, 50 ~ 100 mesh, Na form) at a rate flow of 80 mℓ/min.

(2) Airborne dust

Airborne dust was collected by an electrostatic precipitator or a filter air sampler for every three months at a rate of more than 3000 m^3 per month. The sampling was done 1 to 1.5 meters above the ground.

(3) Service water and freshwater

Service water, 100 ℓ each, was collected at the intake of the water-treatment plant and at the tap after water was left running for five minutes. Strontium and cesium carriers were added to the filtered water sample. The subsequent process was the same as that described in the section (1). Freshwater was treated in the same way as the service water.

(4) Soil

Soil was collected from the location in the spacious and flat area without past surface disturbance caused by duststorms, inflow and outflow due to precipitation, etc.. Any places located under trees in a forest, in a stony area or inside of river banks were avoided. Soil was taken from two layers of different depths, 0-5cm and 5-20cm. The soil lumps were crushed by hands and dried in a drying oven regulated 105 ℃ . The soil was then passed through a 2 mm sieve to remove plant roots and pebbles.

(5) Sea water

Sea water was collected at the fixed stations where the effect of terrestrial fresh water from rivers was expected to be negligibly small. A special consideration was also given to weather conditions. The sampling was carried out when there was no rainfall for the last few days. To prevent contamination, water samples were collected at the bow of a sampling boat just before she stood still by scooping surface water using a polyethylene bucket. Immediately after the collection, the samples were acidified to a pH lower than 3 by adding concentrated hydrochloric acid in a ratio of 1mℓ to 1 ℓ of sea water, and then stored in 20 ℓ polyethylene containers. The sampling equipments as well as containers were thoroughly rinsed with dilute hydrochloric acid and then with distilled water before use. Two hundred milliliters of sea water was also collected at the same stations for the determination of chlorinity.

(6) Sea sediments

Sediment was collected in the same area as that for the sea water sample, taking the following criteria into account:

a. The depth of water exceeds 1 m at low tide.
b. No significant sedimental movement is observed in the vicinity of concern.
c. Mud, silt and fine sand are preferable.

A conventional sediment sampling device was used for collecting the top few centimeters of surface sediment. Approximately 4kg of the sample in wet weight was spread on a stenless steel dish after removed of the pebbles, shells and other foreign materials, and dried in a drying oven regulated at 105℃ .

(7) Total diet

A full one day ordinary diet including three meals, water, tea and other in-between snacks for five persons was collected as a sample of "total diet". The sample in a large stainless steel pan was carbonized carefully by direct application of gas flame, and was transfered to a porcelain dish and then ashed at 450 ℃ in an electric muffle furnace.

(8) Rice

Polished rice was collected in producing districts at the harvest and in consuming areas when new crops were first put on sale. The sample was carbonized and ashed in a porcelain dish.

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* Samples were sent to the Center from 32 contracted prefectures.

(9) Milk

Raw milk was collected in producing districts and commercial milk was purchased in consuming districts. Milk in a stainless steel pan or a porcelain dish was evaporated to dryness followed by carbonization and ashing.

(10) Vegetables

Spinach and Japanese radish were selected as the representatives for leaf vegetables and for non-starch roots, respectively. After removing soil, the edible part of vegetable sample was dried and carbonized in a stainless steel pan or a porcelain dish.

(11) Tea

Five hundred grams of manufactured green tea was collected, carbonized and ashed in a stainless steel pan or a porcelain dish.

(12) Fish, shellfish and seaweeds

a. Sea fish and freshwater fish

Fish was rinsed with water and blotted with a filter paper. Only the edible part was used in case of larger sized fish, and the whole part was used in case of smaller ones. Each sample was weighed and placed in a stainless steel pan or a porcelain dish. After carbonized, the sample was ashed in an electric muffle furnace.

b. Shellfish

Approximately 4 kg of shellfish including the shells was collected or purchased. After removing the shells, it was treated in the same way as that for the sea fish.

c. Seaweeds

Edible seaweeds were collected and rinsed with water to remove sand and other adhering matters on the surface. These were removed of excess water, weighed dried and ashed.

Table 1 shows detailes of sample collection.

Table 1 Details of sample collection

Sample	Frequency of sampling	Quantity of sample
=Environmental materials=		
(1) Rain and dry fallout		
1. For domestic program	monthly	
2. For WHO program	monthly	
(2) Airborne dust	quarterly	>3000 m^3/month
(3) Service water and freshwater		
1. Service water (source water)	semiyearly	100 ℓ
2. Service water (tap water)	semiyearly	100 ℓ
3. Freshwater	yearly (fishing season)	100 ℓ
(4) Soil		
1. 0～5 cm	yearly	4 kg
2. 5～20cm	yearly	4 kg
(5) Sea water	yearly	40 ℓ
(6) Sea sediments	yearly	4 kg
=Dietary materials=		
(7) Total diet	semiyearly	daily amount for 5 persons
(8) Rice		
1. Producing districts	yearly (harvesting season)	5 kg (polished rice)
2. Consuming districts	yearly (harvesting season)	5 kg (polished rice)
(9) Milk		
1. Producing districts for WHO program	quarterly (February, May, August and November)	3 ℓ
2. Producing districts for domestic program	semiyearly (February and August)	3 ℓ

Sample	Frequency of sampling	Quantity of sample
3. Consuming districts	semiyearly (February and August)	3 ℓ
4. Powdered milk	semiyearly (April and October)	2～3 kg
(10) Vegetables		
1. Producing districts	yearly (harvesting season)	4 kg
2. Consuming districts	yearly (harvesting season)	4 kg
(11) Tea	yearly (the first harvesting season)	500g (manufactured tea)
(12) Fish, shellfish and seaweeds		
1. Sea fish	yearly (fishing season)	4 kg
2. Freshwater fish	yearly (fishing season)	4 kg
3. Shellfish	yearly (fishing season)	4 kg
4. Seaweeds	yearly (fishing season)	2～3 kg

2. Preparation of samples for analysis

(1) Rain, service water and freshwater

Strontium and cesium were eluted with hydrochloric acid from the cation exchange column. The residue of rain sample on the filter paper was ashed in an electric muffle furnace and the ash was dissolved in hydrochloric acid. The insoluble part was filtered and washed. The filtrate and the washings were combined to the previous eluate and used for radiochemical analysis.

(2) Soil and Sea sediment

Dried soil was crushed to smaller ones than 0.25 mm in size by a crusher. The sieved sample was ashed in an electric muffle furnace regulated at 450℃ . The sample was then heated with hydrochloric acid, strontium and cesium carrier solutions and the mixture was heated. The insoluble constituent was filtered off and washed with water.

The dried sample was crushed to smaller ones than 0.25 mm by a crushing machine. The further preparation of the sample was the same as that described in the section 2-(2).

(3) Rice

The ashed sample was pulverized with a porcelain mortar and passed through a 0.35 mm sieve. The sieved sample to which both strontium and cesium carriers were added, was digested with nitric acid by heating. After the sample was heated again with nitric acid to dryness, strontium and cesium were extracted with hydrochloric acid and water. The insoluble constituent was filtered and washed. The filtrate and washings were combined for subsequent radiochemical analysis.

(4) Airborne dust, diet, milk, vegetables, fish and shellfish, seaweeds, tea and others

These ashed samples were treated with the same procedure as that described in the section 2-(4).

3. Separation of strontium-90 and cesium-137

(1) Strontium-90

Sample solutions, prepared as in the foregoing sections 2-(1) through 2-(4), were neutralized with sodium hydroxide. After sodium carbonate was added, the precipitate of strontium and calcium carbonates was separated. The supernatant solution was retained for cesium-137 determination. The carbonates were dissolved in hydrochloric acid and strontium and calcium were precipitated as oxalates. The precipitate was dissolved in nitric acid and strontium was separated from calcium by successive fuming nitric acid separation. Iron scavenge was made after addition of ferric iron carrier followed by barium chromate separation after addition of barium carrier to remove radium, its daughters and lead. Strontium was recovered as carbonate, and the precipitate was dried and weighed to determine strontium recovery. The strontium carbonate was dissolved in hydrochloric acid and iron carrier was added. The solution was allowed to stand for two weeks for strontium-90 and yttrium-90 to attain equilibrium. Yttrium-90 was coprecipitated with ferric hydroxide and the precipitate was filtered off, washed and counted.

(2) Cesium-137

The supernatant separated from the strontium fraction was acidified with hydrochloric acid. While stirring, cesium was adsorbed on the ammonium molyb-

dophosphate added.

After filtered off and washed with hydrochlotric acid the precipitate was dissolved in 2.5N sodium hydroxide solution. The solution was adjusted to pH 8.2 with hydrochloric acid and allowed to cool. Resultant molybdenum hydroxide which separated out in the solution, was filtered off and washed with water. EDTA was added to the filtrate and washings. Cesium and rubidium were adsorbed on a cation exchange column and cesium was separated from rubidium by eluting with hydrochloric acid.

The eluate was evaporated to dryness and was dissolved. The solution was filtered. Chloroplatinic acid was added to precipitate cesium. The precipitate was filtered onto a tared paper using a demountable filter and washed with water and then ethanol. After drying, the chemical yield of cesium was determined by weighing the precipitate. Cesium-137 radioactivity was measured for this precipitate.

4. Determination of stable strontium, calcium and potassium

A weighed amount of soil or sea sediment was heated in a electric muffle furnace at 450 ℃ and then treated with hydrochloric acid for extraction. A weighed aliquot of ashed samples of total diet, vegetables, milk, fish, shellfish or seaweeds was digested with hydrofluoric acid and nitric acid.
The extract was made up to an appropriate volume with dilute hydrochloric acid. The sample solution was analyzed for calcium by titration with standard potassium permanganate solution after separating calcium as oxalate. Atomic absorption spectroscopy was applied when appropriate. Stable strontium and potassium were determined by atomic absorption and flame emission spectrometry, respectively.

5. Counting

After the radiochemical separation the mounted precipitates were counted for activity using low background beta counters normally for 60 to 90 min. Net sample counting rates were corrected for counter efficiency, recovery, self-absorption and decay to obtain the content of strontium-90 and cesium-137 per sample aliquot. From the results, concentrations of these nuclides in the original samples were calculated.

6. Results

(1)-1 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for domestic program)
(from Jul. 1989 to Jul. 1990)

-continued from NO. 90 of this publication-

Table (1)-1: Strontium-90 and Cesium-137 in Rain and Dry Fallout

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
July, 1989				
Kyoto, KYOTO	32	141.8	0.003±0.017	0.01 ±0.015
August, 1989				
Kyoto, KYOTO	32	178.5	0.01 ±0.017	0.00 ±0.015
September, 1989				
Kyoto, KYOTO	32	381.5	0.01 ±0.017	0.01 ±0.015
October, 1989				
Shinjuku, TOKYO	31	230.7	0.08 ±0.027	0.04 ±0.016
Kyoto, KYOTO	31	37.7	0.03 ±0.019	0.01 ±0.014
Wakayama, WAKAYAMA	39	41.6	0.01 ±0.024	0.02 ±0.017
Matsuyama, EHIME	33	46.5	0.01 ±0.016	0.02 ±0.016
November, 1989				
Morioka, IWATE	31	73.6	0.00 ±0.015	0.001±0.016
Mito, IBARAGI	31	30.5	0.03 ±0.017	0.02 ±0.014
Shinjuku, TOKYO	31	48.1	0.00 ±0.020	0.00 ±0.013
Kyoto, KYOTO	31	28.5	0.02 ±0.020	0.01 ±0.014
Wakayama, WAKAYAMA	22	41.9	0.00 ±0.021	0.02 ±0.017
Matsue, SHIMANE	31	95.2	0.03 ±0.012	0.04 ±0.012
Matsuyama, EHIME	31	64.0	0.00 ±0.015	0.01 ±0.015
Takamatsu, KAGAWA	31	43.0	0.04 ±0.018	0.03 ±0.016
Saga, SAGA	31	53.1	0.01 ±0.016	0.01 ±0.013
Kumamoto, KUMAMOTO	31	89.3	0.00 ±0.018	0.02 ±0.014
December, 1989				
Onagawa-machi, MIYAGI	33	63.2	0.05 ±0.019	0.02 ±0.016
Morioka, IWATE	36	51.2	0.00 ±0.019	0.01 ±0.016
Ookuma-machi, FUKUSHIMA	26	30.8	0.07 ±0.019	0.06 ±0.020
Mito, IBARAGI	36	24.5	0.005±0.016	0.03 ±0.013
Shinjuku, TOKYO	35	24.4	0.04 ±0.026	0.02 ±0.015
Kosugi-machi, TOYAMA	35	197.7	0.07 ±0.019	0.05 ±0.017
Fukui, FUKUI	32	305.5	0.17 ±0.100	0.04 ±0.068
Shizuoka, SHIZUOKA	36	33.0	0.02 ±0.017	0.05 ±0.017

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Nagoya, AICHI	35	30.4	0.02 ± 0.018	0.03 ± 0.017
Ootsu, SHIGA	35	24.9	0.02 ± 0.019	0.01 ± 0.015
Kyoto, KYOTO	35	10.5	0.03 ± 0.019	0.02 ± 0.013
Wakayama, WAKAYAMA	36	30.0	0.01 ± 0.019	0.02 ± 0.014
Matsue, SHIMANE	28	88.3	0.01 ± 0.011	0.02 ± 0.011
Hiroshima, HIROSHIMA	32	8.8	0.16 ± 0.024	0.03 ± 0.016
Matsuyama, EHIME	35	26.0	0.01 ± 0.018	0.06 ± 0.018
Takamatsu, KAGAWA	33	7.0	0.01 ± 0.016	0.00 ± 0.013
Dazaifu, FUKUOKA	35	50.2	0.00 ± 0.016	0.05 ± 0.018
Saga, SAGA	35	31.6	0.05 ± 0.019	0.02 ± 0.015
Kumamoto, KUMAMOTO	35	28.9	0.005 ± 0.018	0.001 ± 0.013
Miyazaki, MIYAZAKI	35	18.8	0.02 ± 0.018	0.18 ± 0.025
Yonagusuku-mura, OKINAWA	37	93.0	0.00 ± 0.015	0.002 ± 0.014
January, 1990				
Sapporo, HOKKAIDO	36	92.0	0.02 ± 0.018	0.02 ± 0.015
Aomori, AOMORI	29	110.0	0.03 ± 0.020	0.14 ± 0.023
Onagawa-machi, MIYAGI	28	16.6	0.04 ± 0.020	0.05 ± 0.018
Morioka, IWATE	28	54.3	0.02 ± 0.021	0.04 ± 0.017
Yamagata, YAMAGATA	29	45.9	0.02 ± 0.017	0.07 ± 0.018
Ookuma-machi, FUKUSHIMA	37	21.5	0.08 ± 0.031	0.29 ± 0.030
Mito, IBARAGI	28	39.5	0.02 ± 0.016	0.04 ± 0.017
Shinjuku, TOKYO	29	44.2	0.03 ± 0.023	0.05 ± 0.016
Yokohama, KANAGAWA	35	45.0	0.04 ± 0.017	0.10 ± 0.022
Utsunomiya, TOCHIGI	29	43.3	0.003 ± 0.016	0.05 ± 0.015
Kosugi-machi, TOYAMA	29	227.8	0.02 ± 0.016	0.07 ± 0.018
Fukui, FUKUI	27	235.9	0.13 ± 0.097	0.08 ± 0.078
Koufu, YAMANASHI	29	30.5	0.04 ± 0.019	0.05 ± 0.016
Shizuoka, SHIZUOKA	28	91.0	0.02 ± 0.017	0.11 ± 0.020
Nagoya, AICHI	29	77.4	0.00 ± 0.020	0.05 ± 0.018
Tsu, MIE	29	37.0	0.03 ± 0.018	0.07 ± 0.019
Ootsu, SHIGA	29	43.7	0.02 ± 0.020	0.00 ± 0.015
Kyoto, KYOTO	29	61.9	0.02 ± 0.019	0.00 ± 0.012
Kobe, HYOGO	35	33.0	0.03 ± 0.018	0.04 ± 0.017
Nara, NARA	37	125.9	0.03 ± 0.020	0.02 ± 0.013
Wakayama, WAKAYAMA	28	92.3	0.00 ± 0.020	0.02 ± 0.015
Tottori, TOTTORI	29	303.4	0.06 ± 0.019	0.15 ± 0.023
Matsue, SHIMANE	36	149.8	0.03 ± 0.014	0.21 ± 0.020
Hiroshima, HIROSHIMA	28	88.8	0.10 ± 0.022	0.02 ± 0.015
Matsuyama, EHIME	29	91.5	0.02 ± 0.039	0.02 ± 0.016

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Takamatsu, KAGAWA	31	50.0	0.03 ± 0.018	0.04 ± 0.017
Dazaifu, FUKUOKA	29	92.4	0.03 ± 0.017	0.01 ± 0.016
Saga, SAGA	29	97.1	0.01 ± 0.019	0.03 ± 0.015
Nagasaki, NAGASAKI	29	68.5	0.03 ± 0.018	0.01 ± 0.015
Kumamoto, KUMAMOTO	29	89.5	0.00 ± 0.022	0.03 ± 0.020
Ooita, OOITA	29	60.0	0.002 ± 0.018	0.005 ± 0.014
Miyazaki, MIYAZAKI	29	76.4	0.04 ± 0.018	0.11 ± 0.022
Yonagusuku-mura, OKINAWA	27	85.0	0.00 ± 0.017	0.00 ± 0.014
February, 1990				
Sapporo, HOKKAIDO	29	35.0	0.005 ± 0.019	0.04 ± 0.018
Aomori, AOMORI	29	12.8	0.005 ± 0.019	0.07 ± 0.019
Onagawa-machi, MIYAGI	29	98.4	0.00 ± 0.017	0.004 ± 0.015
Morioka, IWATE	29	85.3	0.001 ± 0.018	0.02 ± 0.016
Yamagata, YAMAGATA	29	37.9	0.001 ± 0.018	0.01 ± 0.017
Ookuma-machi, FUKUSHIMA	29	121.1	0.02 ± 0.018	0.001 ± 0.015
Mito, IBARAGI	29	84.0	0.03 ± 0.017	0.01 ± 0.016
Shinjuku, TOKYO	29	115.0	0.04 ± 0.023	0.05 ± 0.015
Yokohama, KANAGAWA	29	170.6	0.06 ± 0.018	0.11 ± 0.021
Utsunomiya, TOCHIGI	28	103.3	0.03 ± 0.017	0.02 ± 0.015
Kosugi-machi, TOYAMA	29	154.3	0.002 ± 0.016	0.07 ± 0.019
Fukui, FUKUI	31	133.6	0.12 ± 0.090	0.06 ± 0.080
Koufu, YAMANASHI	29	96.0	0.02 ± 0.018	0.05 ± 0.016
Shizuoka, SHIZUOKA	29	276.0	0.01 ± 0.018	0.06 ± 0.022
Nagoya, AICHI	29	117.1	0.05 ± 0.022	0.01 ± 0.015
Tsu, MIE	29	99.5	0.03 ± 0.018	0.13 ± 0.021
Ootsu, SHIGA	29	173.5	0.00 ± 0.018	0.001 ± 0.015
Kyoto, KYOTO	29	117.1	0.04 ± 0.024	0.00 ± 0.014
Kobe, HYOGO	29	145.7	0.01 ± 0.017	0.02 ± 0.016
Nara, NARA	28	184.0	0.00 ± 0.021	0.00 ± 0.013
Wakayama, WAKAYAMA	29	188.1	0.03 ± 0.025	0.05 ± 0.017
Tottori, TOTTORI	28	118.9	0.02 ± 0.017	0.07 ± 0.019
Matsue, SHIMANE	29	68.6	0.03 ± 0.014	0.07 ± 0.012
Hiroshima, HIROSHIMA	30	105.3	0.02 ± 0.020	0.01 ± 0.020
Matsuyama, EHIME	29	115.5	0.01 ± 0.017	0.00 ± 0.015
Ishii-machi, TOKUSHIMA	29	113.5	0.00 ± 0.023	0.002 ± 0.021
Takamatsu, KAGAWA	29	62.5	0.01 ± 0.017	0.004 ± 0.015
Dazaifu, FUKUOKA	29	120.0	0.00 ± 0.019	0.00 ± 0.013
Saga, SAGA	29	167.3	0.00 ± 0.018	0.01 ± 0.024
Nagasaki, NAGASAKI	29	182.0	0.02 ± 0.016	0.02 ± 0.015

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Kumamoto, KUMAMOTO	29	140.7	0.07 ± 0.024	0.05 ± 0.022
Ooita, OOITA	30	99.0	0.003 ± 0.026	0.005 ± 0.015
Miyazaki, MIYAZAKI	29	170.6	0.04 ± 0.019	0.07 ± 0.020
Yonagusuku-mura, OKINAWA	31	182.5	0.01 ± 0.017	0.00 ± 0.020
March, 1990				
Sapporo, HOKKAIDO	31	22.5	0.30 ± 0.035	0.04 ± 0.021
Aomori, AOMORI	31	36.0	0.09 ± 0.024	0.09 ± 0.020
Onagawa-machi, MIYAGI	33	72.4	0.07 ± 0.018	0.05 ± 0.017
Morioka, IWATE	31	40.5	0.01 ± 0.018	0.05 ± 0.019
Yamagata, YAMAGATA	33	30.8	0.04 ± 0.019	0.14 ± 0.022
Ookuma-machi, FUKUSHIMA	33	64.0	0.05 ± 0.018	0.05 ± 0.018
Mito, IBARAGI	33	113.0	0.06 ± 0.020	0.11 ± 0.021
Shinjuku, TOKYO	33	97.6	0.03 ± 0.022	0.03 ± 0.017
Yokohama, KANAGAWA	32	61.5	0.07 ± 0.022	0.16 ± 0.026
Utsunomiya, TOCHIGI	33	78.8	0.04 ± 0.017	0.12 ± 0.021
Kosugi-machi, TOYAMA	33	136.1	0.02 ± 0.017	0.04 ± 0.018
Fukui, FUKUI	33	147.0	0.12 ± 0.100	0.04 ± 0.077
Koufu, YAMANASHI	33	58.5	0.00 ± 0.016	0.03 ± 0.021
Shizuoka, SHIZUOKA	34	195.5	0.01 ± 0.018	0.09 ± 0.023
Nagoya, AICHI	32	116.3	0.002 ± 0.019	0.04 ± 0.016
Ootsu, SHIGA	32	146.3	0.02 ± 0.019	0.02 ± 0.016
Kyoto, KYOTO	31	99.3	0.00 ± 0.020	0.02 ± 0.014
Kobe, HYOGO	32	98.4	0.00 ± 0.019	0.03 ± 0.020
Nara, NARA	31	139.1	0.01 ± 0.026	0.09 ± 0.019
Wakayama, WAKAYAMA	33	87.6	0.09 ± 0.026	0.05 ± 0.016
Tottori, TOTTORI	33	127.7	0.06 ± 0.023	0.08 ± 0.020
Matsue, SHIMANE	33	65.5	0.00 ± 0.014	0.13 ± 0.016
Hiroshima, HIROSHIMA	30	68.5	0.10 ± 0.023	0.01 ± 0.021
Matsuyama, EHIME	33	114.0	0.06 ± 0.020	0.03 ± 0.016
Ishii-machi, TOKUSHIMA	32	112.0	0.00 ± 0.039	0.10 ± 0.030
Takamatsu, KAGAWA	33	90.0	0.02 ± 0.021	0.04 ± 0.018
Dazaifu, FUKUOKA	33	95.7	0.02 ± 0.020	0.04 ± 0.017
Saga, SAGA	33	113.4	0.00 ± 0.055	0.04 ± 0.016
Nagasaki, NAGASAKI	33	159.0	0.02 ± 0.018	0.02 ± 0.016
Kumamoto, KUMAMOTO	33	137.7	0.01 ± 0.028	0.05 ± 0.021
Miyazaki, MIYAZAKI	33	135.1	0.02 ± 0.020	0.30 ± 0.030
Yonagusuku-mura, OKINAWA	32	60.5	0.00 ± 0.018	0.00 ± 0.020
April, 1990				
Sapporo, HOKKAIDO	32	79.5	0.10 ± 0.036	0.19 ± 0.029

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Aomori, AOMORI	32	56.5	0.07 ±0.033	0.16 ±0.023
Onagawa-machi, MIYAGI	30	148.5	0.02 ±0.019	0.06 ±0.017
Morioka, IWATE	32	186.7	0.06 ±0.022	0.10 ±0.020
Yamagata, YAMAGATA	30	87.2	0.05 ±0.029	0.13 ±0.022
Ookuma-machi, FUKUSHIMA	30	211.3	0.04 ±0.018	0.07 ±0.018
Mito, IBARAGI	30	131.5	0.06 ±0.020	0.12 ±0.021
Shinjuku, TOKYO	30	130.4	0.00 ±0.025	0.05 ±0.016
Yokohama, KANAGAWA	32	261.0	0.02 ±0.022	0.12 ±0.021
Utsunomiya, TOCHIGI	30	172.7	0.03 ±0.018	0.21 ±0.026
Kosugi-machi, TOYAMA	30	114.2	0.04 ±0.021	0.18 ±0.025
Fukui, FUKUI	30	125.8	0.00 ±0.17	0.13 ±0.075
Shizuoka, SHIZUOKA	30	189.0	0.01 ±0.017	0.11 ±0.023
Nagoya, AICHI	31	107.7	0.00 ±0.019	0.05 ±0.017
Tsu, MIE	30	62.0	0.04 ±0.019	0.24 ±0.027
Ootsu, SHIGA	31	102.8	0.00 ±0.027	0.09 ±0.018
Kobe, HYOGO	29	90.3	0.02 ±0.032	0.04 ±0.017
Tottori, TOTTORI	30	165.0	0.07 ±0.038	0.19 ±0.029
Hiroshima, HIROSHIMA	32	149.5	0.05 ±0.018	0.03 ±0.020
Matsuyama, EHIME	30	86.5	0.002 ±0.029	0.06 ±0.017
Takamatsu, KAGAWA	30	64.5	0.01 ±0.018	0.06 ±0.021
Dazaifu, FUKUOKA	30	107.9	0.03 ±0.020	0.07 ±0.017
Saga, SAGA	30	130.1	0.00 ±0.019	0.06 ±0.017
Nagasaki, NAGASAKI	30	147.0	0.01 ±0.024	0.08 ±0.018
Kumamoto, KUMAMOTO	30	128.9	0.03 ±0.019	0.10 ±0.020
Miyazaki, MIYAZAKI	30	160.5	0.00 ±0.027	0.10 ±0.023
Yonagusuku-mura, OKINAWA	30	350.0	0.00 ±0.029	0.02 ±0.015
May, 1990				
Sapporo, HOKKAIDO	32	27.5	0.08 ±0.036	0.09 ±0.021
Aomori, AOMORI	34	20.5	0.06 ±0.034	0.06 ±0.018
Onagawa-machi, MIYAGI	32	75.5	0.02 ±0.019	0.05 ±0.017
Morioka, IWATE	32	57.4	0.002 ±0.018	0.12 ±0.021
Yamagata, YAMAGATA	32	41.3	0.02 ±0.019	0.09 ±0.019
Ookuma-machi, FUKUSHIMA	32	48.7	0.01 ±0.017	0.04 ±0.016
Mito, IBARAGI	32	70.0	0.01 ±0.017	0.04 ±0.016
Shinjuku, TOKYO	32	59.7	0.05 ±0.030	0.05 ±0.021
Yokohama, KANAGAWA	31	122.5	0.002 ±0.029	0.10 ±0.020
Utsunomiya, TOCHIGI	32	111.7	0.01 ±0.018	0.07 ±0.018
Kosugi-machi, TOYAMA	32	121.9	0.01 ±0.019	0.06 ±0.018

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Fukui, FUKUI	32	160.6	0.04 ± 0.089	0.01 ± 0.073
Shizuoka, SHIZUOKA	31	400.0	0.00 ± 0.016	0.06 ± 0.021
Nagoya, AICHI	32	146.6	0.00 ± 0.020	0.01 ± 0.014
Tsu, MIE	32	52.5	0.05 ± 0.019	0.19 ± 0.027
Ootsu, SHIGA	32	173.7	0.04 ± 0.021	0.04 ± 0.015
Kobe, HYOGO	35	184.4	0.02 ± 0.019	0.05 ± 0.017
Tottori, TOTTORI	35	212.6	0.04 ± 0.037	0.09 ± 0.021
Hiroshima, HIROSHIMA	31	163.6	0.01 ± 0.016	0.02 ± 0.019
Matsuyama, EHIME	32	157.0	0.02 ± 0.016	0.08 ± 0.022
Takamatsu, KAGAWA	32	95.5	0.03 ± 0.019	0.04 ± 0.016
Dazaifu, FUKUOKA	32	124.9	0.00 ± 0.017	0.03 ± 0.016
Saga, SAGA	32	140.4	0.00 ± 0.017	0.03 ± 0.015
Nagasaki, NAGASAKI	32	203.5	0.00 ± 0.028	0.03 ± 0.015
Kumamoto, KUMAMOTO	32	232.7	0.02 ± 0.019	0.01 ± 0.014
Yonagusuku-mura, OKINAWA	31	206.0	0.05 ± 0.020	0.02 ± 0.015
June, 1990				
Sapporo, HOKKAIDO	32	33.0	0.07 ± 0.040	0.06 ± 0.020
Onagawa-machi, MIYAGI	32	86.5	0.04 ± 0.021	0.01 ± 0.014
Morioka, IWATE	32	216.9	0.004 ± 0.019	0.05 ± 0.017
Yamagata, YAMAGATA	32	121.8	0.00 ± 0.019	0.07 ± 0.018
Mito, IBARAGI	32	63.5	0.01 ± 0.017	0.03 ± 0.014
Yokohama, KANAGAWA	31	127.2	0.02 ± 0.031	0.10 ± 0.020
Utsunomiya, TOCHIGI	32	68.6	0.01 ± 0.017	0.04 ± 0.015
Kosugi-machi, TOYAMA	32	167.9	0.60 ± 0.041	0.09 ± 0.020
Fukui, FUKUI	34	250.7	0.00 ± 0.10	0.00 ± 0.074
Ootsu, SHIGA	31	142.6	0.01 ± 0.018	0.04 ± 0.015
Kobe, HYOGO	31	156.6	0.00 ± 0.025	0.02 ± 0.023
Tottori, TOTTORI	29	74.2	0.22 ± 0.044	0.06 ± 0.018
Saga, SAGA	32	662.4	0.02 ± 0.021	0.05 ± 0.016
Nagasaki, NAGASAKI	32	418.0	0.02 ± 0.035	0.00 ± 0.013
July, 1990				
Yamagata, YAMAGATA	31	93.2	0.02 ± 0.018	0.02 ± 0.014

(1)-2 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for WHO program) (from Apr. 1989 to Jul. 1990)

-continued from NO. 90 of this publication-

Table (1)-2: Strontium-90 and Cesium-137 in Rain and Dry Fallout

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
April, 1989				
Niigata, NIIGATA	31	87.8	0.07 ± 0.022	0.15 ± 0.023
May, 1989				
Niigata, NIIGATA	32	52.6	0.07 ± 0.023	0.05 ± 0.017
June, 1989				
Niigata, NIIGATA	31	69.1	0.08 ± 0.023	0.02 ± 0.014
July, 1989				
Niigata, NIIGATA	32	135.7	0.06 ± 0.022	0.05 ± 0.017
August, 1989				
Niigata, NIIGATA	32	71.6	0.08 ± 0.026	0.02 ± 0.015
September, 1989				
Niigata, NIIGATA	32	226.3	0.01 ± 0.020	0.01 ± 0.015
October, 1989				
Chiba, CHIBA	30	220.4	0.001 ± 0.017	0.02 ± 0.012
Niigata, NIIGATA	31	87.5	0.01 ± 0.020	0.01 ± 0.016
November, 1989				
Chiba, CHIBA	31	90.5	0.03 ± 0.019	0.03 ± 0.013
Niigata, NIIGATA	31	123.8	0.03 ± 0.024	0.03 ± 0.017
Nagano, NAGANO	31	49.8	0.01 ± 0.017	0.02 ± 0.016
December, 1989				
Chiba, CHIBA	36	35.9	0.00 ± 0.017	0.04 ± 0.013
Niigata, NIIGATA	35	152.7	0.03 ± 0.020	0.04 ± 0.057
Nagano, NAGANO	35	34.8	0.03 ± 0.018	0.00 ± 0.013
Kochi, KOCHI	36	8.4	0.14 ± 0.023	0.00 ± 0.015
Kagoshima, KAGOSHIMA	27	16.0	0.07 ± 0.020	0.02 ± 0.018
January, 1990				
Akita, AKITA	33	139.4	0.08 ± 0.020	0.06 ± 0.020
Chiba, CHIBA	32	71.0	0.03 ± 0.018	0.04 ± 0.013
Niigata, NIIGATA	29	108.2	0.08 ± 0.023	0.23 ± 0.051

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Kanazawa, ISHIKAWA	37	327.5	0.06 ± 0.018	0.05 ± 0.017
Nagano, NAGANO	29	41.1	0.01 ± 0.017	0.04 ± 0.016
Osaka, OSAKA	29	79.2	0.04 ± 0.019	0.03 ± 0.015
Okayama, OKAYAMA	28	30.9	0.01 ± 0.016	0.02 ± 0.015
Yamaguchi, YAMAGUCHI	29	110.5	0.04 ± 0.018	0.06 ± 0.017
Kochi, KOCHI	28	121.4	0.12 ± 0.023	0.01 ± 0.016
Kagoshima, KAGOSHIMA	36	152.0	0.16 ± 0.031	0.06 ± 0.021
February, 1990				
Akita, AKITA	29	76.0	0.05 ± 0.019	0.04 ± 0.019
Chiba, CHIBA	25	83.8	0.04 ± 0.023	0.04 ± 0.014
Niigata, NIIGATA	29	71.5	0.09 ± 0.023	0.04 ± 0.018
Kanazawa, ISHIKAWA	29	148.0	0.04 ± 0.016	0.05 ± 0.018
Nagano, NAGANO	29	46.3	0.03 ± 0.020	0.03 ± 0.016
Osaka, OSAKA	28	142.2	0.03 ± 0.017	0.00 ± 0.016
Okayama, OKAYAMA	29	86.0	0.01 ± 0.015	0.02 ± 0.014
Yamaguchi, YAMAGUCHI	29	135.5	0.04 ± 0.018	0.01 ± 0.015
Kagoshima, KAGOSHIMA	30	214.5	0.07 ± 0.037	0.02 ± 0.017
March, 1990				
Akita, AKITA	33	99.5	0.07 ± 0.021	0.31 ± 0.031
Chiba, CHIBA	34	96.3	0.02 ± 0.021	0.06 ± 0.015
Niigata, NIIGATA	32	49.2	0.10 ± 0.024	0.05 ± 0.020
Kanazawa, ISHIKAWA	30	136.0	0.05 ± 0.021	0.07 ± 0.018
Nagano, NAGANO	33	59.4	0.00 ± 0.021	0.04 ± 0.018
Osaka, OSAKA	31	125.7	0.01 ± 0.018	0.03 ± 0.020
Okayama, OKAYAMA	33	101.2	0.01 ± 0.022	0.05 ± 0.020
Yamaguchi, YAMAGUCHI	33	104.0	0.01 ± 0.026	0.02 ± 0.015
April, 1990				
Akita, AKITA	30	119.0	0.07 ± 0.023	0.12 ± 0.022
Chiba, CHIBA	35	137.2	0.03 ± 0.021	0.06 ± 0.016
Kanazawa, ISHIKAWA	33	178.0	0.07 ± 0.025	0.20 ± 0.026
Nagano, NAGANO	30	62.4	0.01 ± 0.018	0.14 ± 0.021
Osaka, OSAKA	32	108.0	0.01 ± 0.019	0.03 ± 0.016
Okayama, OKAYAMA	36	117.9	0.01 ± 0.021	0.13 ± 0.023
Yamaguchi, YAMAGUCHI	30	214.5	0.04 ± 0.019	0.10 ± 0.020
Kochi, KOCHI	30	430.0	0.11 ± 0.022	0.22 ± 0.027
May, 1990				
Akita, AKITA	32	87.1	0.02 ± 0.018	0.05 ± 0.017
Chiba, CHIBA	26	78.3	0.01 ± 0.022	0.03 ± 0.015

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/Km^2)	^{137}Cs (MBq/Km^2)
Kanazawa, ISHIKAWA	31	157.5	0.06 ± 0.021	0.07 ± 0.018
Nagano, NAGANO	32	63.3	0.03 ± 0.019	0.07 ± 0.017
Osaka, OSAKA	31	148.1	0.00 ± 0.032	0.05 ± 0.016
Okayama, OKAYAMA	26	94.7	0.02 ± 0.033	0.06 ± 0.018
June, 1990				
Kanazawa, ISHIKAWA	33	233.0	0.04 ± 0.029	0.05 ± 0.019
Osaka, OSAKA	33	183.7	0.03 ± 0.019	0.04 ± 0.020
Okayama, OKAYAMA	32	170.8	0.05 ± 0.043	0.02 ± 0.015
July, 1990				
Osaka, OSAKA	30	181.5	0.03 ± 0.020	0.04 ± 0.015

(2) Strontium-90 and Cesium-137 in Airborne Dust (from Apr. 1989 to Mar. 1990)

-continued from NO. 90 of this publication-

Table (2): Strontium-90 and Cesium-137 in Airborne Dust

Location	Sampling period	Absorption volume (m^3)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
April～June, 1989				
Wakayama, WAKAYAMA	4～6	11,871	0.000 ± 0.0006	0.001 ± 0.0005
July～September, 1989				
Koufu, YAMANASHI	7～9	14,775	0.000 ± 0.0006	0.001 ± 0.0004
Wakayama, WAKAYAMA	7～9	10,953	0.000 ± 0.0008	0.0004 ± 0.0005
October～December, 1989				
Morioka, IWATE	10～12	12,404	0.0003 ± 0.0006	0.0003 ± 0.0004
Ookuma-machi, FUKUSHIMA	10～12	11,112	0.000 ± 0.0007	0.001 ± 0.0005
Mito, IBARAGI	10～12	8,485	0.001 ± 0.0009	0.000 ± 0.0006
Yokohama, KANAGAWA	10～12	8,364	0.000 ± 0.0009	0.001 ± 0.0007
Nagano, NAGANO	10～12	19,082	0.001 ± 0.0006	0.000 ± 0.0003
Koufu, YAMANASHI	10～12	10,467	0.002 ± 0.0009	0.0005 ± 0.0004
Hamaoka-machi, SHIZUOKA	10～12	10,251	0.002 ± 0.0009	0.002 ± 0.0007
Tsu, MIE	10～12	14,890	0.000 ± 0.0011	0.0002 ± 0.0007
Ootsu, SHIGA	10～12	12,867	0.003 ± 0.0015	0.002 ± 0.0009
Kyoto, KYOTO	10～12	7,839	0.001 ± 0.0010	0.0001 ± 0.0007
Osaka, OSAKA	10～12	14,682	0.000 ± 0.0006	0.0004 ± 0.0003
Wakayama, WAKAYAMA	10～12	8,922	0.001 ± 0.0011	0.001 ± 0.0006
Tottori, TOTTORI	10～12	12,894	0.002 ± 0.0008	0.0002 ± 0.0003
Hiroshima, HIROSHIMA	10～12	10,538	0.001 ± 0.0008	0.001 ± 0.0005
Yamaguchi, YAMAGUCHI	10～12	10,535	0.001 ± 0.0008	0.000 ± 0.0004
Takamatsu, KAGAWA	10～12	10,004	0.0004 ± 0.0007	0.000 ± 0.0005
Nagasaki, NAGASAKI	10～12	9,530	0.000 ± 0.0007	0.001 ± 0.0005
Kumamoto, KUMAMOTO	10～12	11,924	0.000 ± 0.0007	0.001 ± 0.0004
Ooita, OOITA	10～12	9,918	0.001 ± 0.0008	0.0002 ± 0.0005
November, 1990 ～January, 1990				
Saga, SAGA	11～1	17,885	0.000 ± 0.0006	0.000 ± 0.0002
January～March, 1990				
Morioka, IWATE	1～3	11,241	0.000 ± 0.0008	0.0001 ± 0.0004
Yamagata, YAMAGATA	1～3	12,960	0.0003 ± 0.0006	0.001 ± 0.0004
Mito, IBARAGI	1～3	8,061	0.000 ± 0.0011	0.001 ± 0.0007
Yokohama, KANAGAWA	1～3	8,412	0.0001 ± 0.0010	0.001 ± 0.0006
Utsunomiya, TOCHIGI	1～3	13,599	0.000 ± 0.0008	0.0004 ± 0.0006

Location	Sampling period	Absorption volume (m^3)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
Kosugi-machi, TOYAMA	1～3	18,365	0.0003 ± 0.0005	0.0002 ± 0.0003
Fukui, FUKUI	1～3	10,805	0.000 ± 0.0007	0.001 ± 0.0005
Nagano, NAGANO	1～3	17,524	0.000 ± 0.0005	0.000 ± 0.0003
Koufu, YAMANASHI	1～3	11,577	0.000 ± 0.0008	0.001 ± 0.0005
Hamaoka-machi, SHIZUOKA	1～3	9,981	0.001 ± 0.0010	0.003 ± 0.0007
Tsu, MIE	1～3	15,333	0.003 ± 0.0017	0.0001 ± 0.0006
Ootsu, SHIGA	1～3	10,404	0.003 ± 0.0022	0.001 ± 0.0009
Osaka, OSAKA	1～3	15,121	0.001 ± 0.0006	0.000 ± 0.0003
Kobe, HYOGO	1～3	10,166	0.001 ± 0.0009	0.001 ± 0.0006
Wakayama, WAKAYAMA	1～3	9,023	0.001 ± 0.0011	0.001 ± 0.0006
Tottori, TOTTORI	1～3	12,845	0.000 ± 0.0007	0.0002 ± 0.0004
Hiroshima, HIROSHIMA	1～3	10,779	0.001 ± 0.0010	0.002 ± 0.0005
Yamaguchi, YAMAGUCHI	1～3	10,892	0.001 ± 0.0010	0.001 ± 0.0005
Takamatsu, KAGAWA	1～3	10,111	0.000 ± 0.0008	0.000 ± 0.0005
Saga, SAGA	1～3	13,874	0.001 ± 0.0008	0.001 ± 0.0005
Nagasaki, NAGASAKI	1～3	10,321	0.000 ± 0.0008	0.001 ± 0.0005
Kumamoto, KUMAMOTO	1～3	16,444	0.0002 ± 0.0005	0.001 ± 0.0003
Miyazaki, MIYAZAKI	1～3	12,671	0.0003 ± 0.0017	0.005 ± 0.0012
February～March, 1990				
Ookuma-machi, FUKUSHIMA	2～3	10,034	0.000 ± 0.0008	0.004 ± 0.0008

(3) Strontium-90 and Cesium-137 in Service Water (from Jun. 1989 to Jun. 1990) (16)

-continued from NO. 90 of this publication-

Table (3): Strontium-90 and Cesium-137 in Service Water

Location	pH	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
(Source Water)			
December, 1989			
Katsushika, TOKYO	7.5	1.4 ±0.22	0.2 ±0.09
Inuyama, AICHI	6.7	2.4 ±0.19	0.1 ±0.08
Moriguchi, OSAKA	7.0	4.0 ±0.22	0.3 ±0.09
January, 1990			
Nagano, NAGANO	7.0	1.1 ±0.16	0.1 ±0.08
Kyoto, KYOTO	7.3	4.2 ±0.25	0.3 ±0.09
June, 1990			
Tsukui-machi, KANAGAWA	8.0	0.7 ±0.19	0.02 ±0.08
Moriguchi, OSAKA	7.0	4.3 ±0.24	0.1 ±0.08
(Tap Water)			
June, 1989			
Niigata, NIIGATA	7.2	3.6 ±0.22	0.2 ±0.08
October, 1989			
Sendai, MIYAGI	-	2.0 ±0.18	0.1 ±0.07
December, 1989			
Akita, AKITA	6.8	3.4 ±0.23	0.0 ±0.07
Morioka, IWATE	7.1	1.2 ±0.16	0.0 ±0.07
Fukushima, FUKUSHIMA	6.8	3.6 ±0.23	0.1 ±0.08
Mito, IBARAGI	7.4	1.5 ±0.16	0.2 ±0.07
Katsushika, TOKYO	7.1	1.6 ±0.25	0.3 ±0.10
Niigata, NIIGATA	7.2	3.4 ±0.23	0.04 ±0.07
Nagoya, AICHI	6.9	2.2 ±0.19	0.2 ±0.08
Tsu, MIE	7.0	2.7 ±0.19	0.1 ±0.07
Ootsu, SHIGA	6.8	4.2 ±0.24	0.04 ±0.07
Matsue, SHIMANE	-	2.8 ±0.21	0.1 ±0.07
Matsuyama, EHIME	7.8	1.5 ±0.16	0.03 ±0.08
Kochi, KOCHI	7.0	1.6 ±0.16	0.0 ±0.07
Takamatsu, KAGAWA	7.2	2.3 ±0.19	0.0 ±0.07
Kumamoto, KUMAMOTO	7.0	0.2 ±0.12	0.01 ±0.09
January, 1990			
Nagano, NAGANO	7.1	0.2 ±0.12	0.0 ±0.07

Location	pH	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
Kyoto, KYOTO	7.0	4.9 ±0.29	0.1 ±0.07
Hiroshima, HIROSHIMA	6.8	2.1 ±0.18	0.0 ±0.07
Tokushima, TOKUSHIMA	6.3	2.0 ±0.17	0.0 ±0.07
February, 1990			
Nara, NARA	6.0	2.8 ±0.23	0.03 ±0.07
Naha, OKINAWA	7.3	4.4 ±0.37	0.05 ±0.08
March, 1990			
Shinguu, WAKAYAMA	6.5	1.2 ±0.20	0.0 ±0.07
May, 1990			
Yamagata, YAMAGATA	7.2	1.9 ±0.18	0.1 ±0.07
June, 1990			
Aomori, AOMORI	7.4	1.9 ±0.32	0.6 ±0.11
Yokohama, KANAGAWA	6.7	0.9 ±0.20	0.03 ±0.07
Osaka, OSAKA	7.0	4.0 ±0.24	0.1 ±0.08
Kobe, HYOGO	7.6	3.9 ±0.23	0.3 ±0.10
Okayama, OKAYAMA	6.9	2.8 ±0.27	0.1 ±0.06
Saga, SAGA	7.3	2.1 ±0.22	0.03 ±0.07

(4) Strontium-90 and Cesium-137 in Freshwater (from Nov. 1989 to Dec. 1989)

-continued from NO. 90 of this publication-

Table (4): Strontium-90 and Cesium-137 in Freshwater

Location	pH	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
(Freshwater)			
November, 1989			
Toyanogata, NIIGATA	6.8	5.0 ±0.26	0.5 ±0.10
December, 1989			
Suwa-lake, NAGANO	7.2	1.0 ±0.14	0.3 ±0.09
Uji, KYOTO	5.9	0.03±0.14	0.0 ±0.07

(5) Strontium-90 and Cesium-137 in Soil (from Jul. 1989 to Aug. 1989)

-continued from NO. 90 of this publication-

Table (5): Strontium-90 and Cesium-137 in Soil

Location	Sampling Depth (cm)	^{90}Sr (Bq/Kg) (dried Soil)	^{90}Sr (MBq/Km^2)	^{137}Cs (Bq/Kg) (dried Soil)	^{137}Cs (MBq/Km^2)
July, 1989					
Aomori, AOMORI	0～5	1.3 ± 0.14	54 ± 5.8	2.8 ± 0.20	120 ± 8
〃	5～20	0.2 ± 0.10	22 ± 9.2	0.3 ± 0.12	27 ± 11
Miyazu, KYOTO	0～5	3.0 ± 0.20	140 ± 9	43 ± 0.7	2100 ± 30
〃	5～20	1.8 ± 0.17	500 ± 47	7.7 ± 0.29	2200 ± 80
Oota, SHIMANE	0～5	18 ± 0.5	260 ± 6	31 ± 0.6	440 ± 8
〃	5～20	5.4 ± 0.25	340 ± 16	7.8 ± 0.30	490 ± 19
August, 1989					
Takisawa-mura, IWATE	0～5	16 ± 0.5	320 ± 9	70 ± 0.9	1500 ± 20
〃	5～20	12 ± 0.4	1300 ± 40	8.0 ± 0.31	870 ± 33
Shinguu, WAKAYAMA	0～5	0.4 ± 0.11	26 ± 7.2	2.5 ± 0.18	160 ± 12
〃	5～20	0.2 ± 0.10	21 ± 8.6	1.1 ± 0.14	90 ± 12
Kujuu-machi, OOITA	0～5	4.0 ± 0.22	48 ± 2.6	110 ± 1.0	1300 ± 10
〃	5～20	3.3 ± 0.21	120 ± 8	17 ± 0.5	640 ± 16

(6) Strontium-90 and Cesium-137 in Sea Water (from Jul. 1989 to Jul. 1990)

-continued from NO. 90 of this publication-

Table (6): Strontium-90 and Cesium-137 in Sea Water

Location	Sample volume analyzed (ℓ)	Cl (‰)	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
July, 1989				
Yoichi-bay, HOKKAIDO	40.0	18.94	2.4 ±0.31	3.2 ±0.37
Niigata-Port, NIIGATA	40.0	18.3	2.9 ±0.36	3.6 ±0.38
Moji-Port, FUKUOKA	40.0	17.69	2.7 ±0.32	4.0 ±0.41
Kaseda, KAGOSHIMA	40.0	18.37	2.2 ±0.31	2.7 ±0.37
August, 1989				
Mutsu-bay, AOMORI	40.0	18.3	3.0 ±0.35	3.7 ±0.35
Matsukawaura, FUKUSHIMA	40.0	17.6	2.6 ±0.32	3.5 ±0.38
Ise-bay, AICHI	40.0	11.3	2.5 ±0.32	2.1 ±0.34
Osaka-Port, OSAKA	40.0	10.26	3.1 ±0.34	2.3 ±0.35
Yamaguchi-bay, YAMAGUCHI	40.0	19.8	2.4 ±0.32	3.4 ±0.39
September, 1989				
Odawa-bay, KANAGAWA	40.0	16.6	2.5 ±0.35	3.0 ±0.33
October, 1989				
Kinnakagusuku-bay, OKINAWA	40.0	19.18	2.5 ±0.33	3.6 ±0.34
July, 1990				
Ise-bay, AICHI	40.0	15.1	2.4 ±0.38	2.8 ±0.34

(7) Strontium-90 and Cesium-137 in Sea Sediments
(from Aug. 1989 to Oct. 1989)

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Table (7): Strontium-90 and Cesium-137 in Sea Sediments

Location	Depth (m)	^{90}Sr (Bq/Kg·dried Soil)	^{137}Cs (Bq/Kg·dried Soil)
August, 1989			
Mutsu-bay, AOMORI	13.5	0.39 ±0.10	6.6 ±0.28
October, 1989			
Kinnakagusuku-bay, OKINAWA	13.9	0.19 ±0.08	0.35 ±0.12

* * * Rain and Dry Fallout (for domestic program) * * *

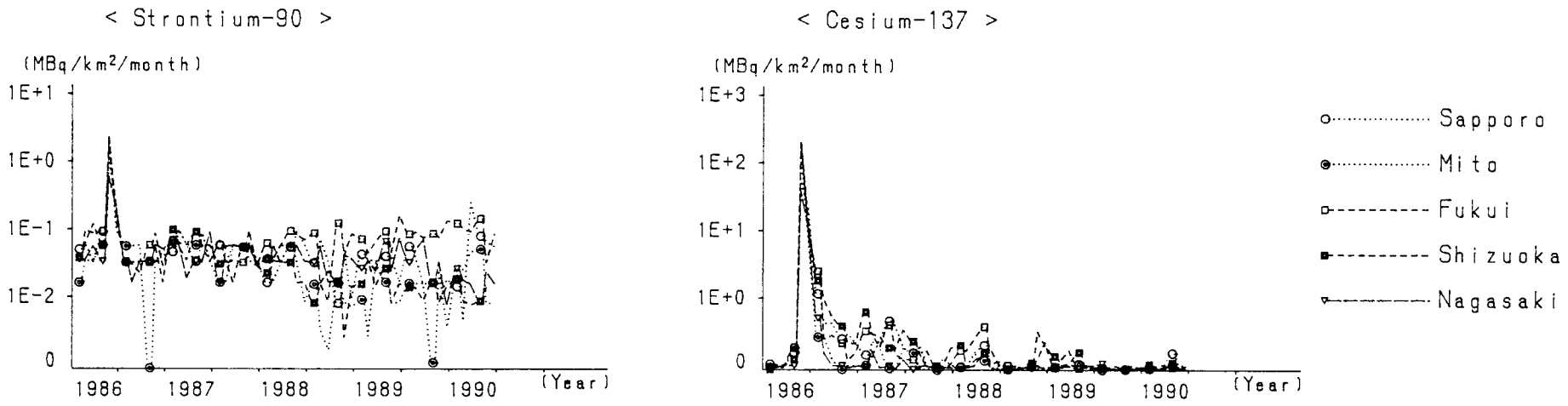

Fig. 1-1

* * * Rain and Dry Fallout (for WHO program) * * *

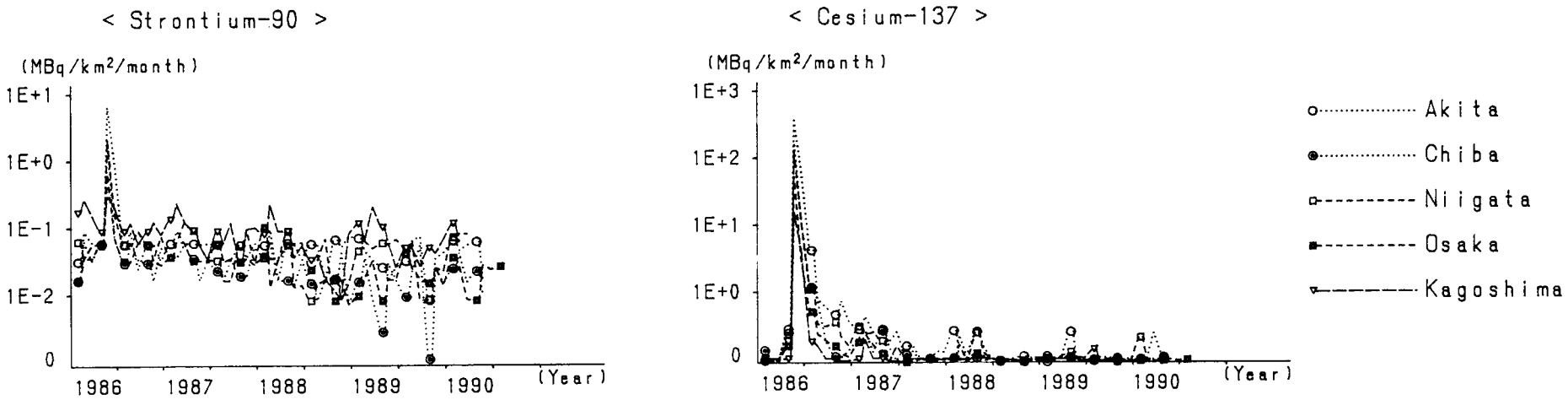

Fig. 1-2

* * * Airborne Dust * * *

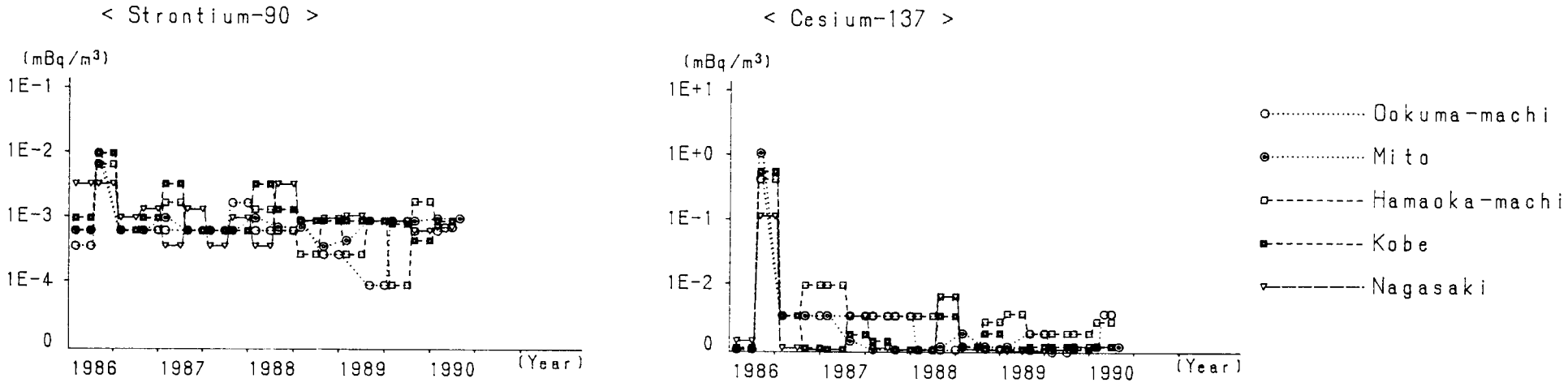

Fig. 2

＊ ＊ ＊　Tap water　＊ ＊ ＊

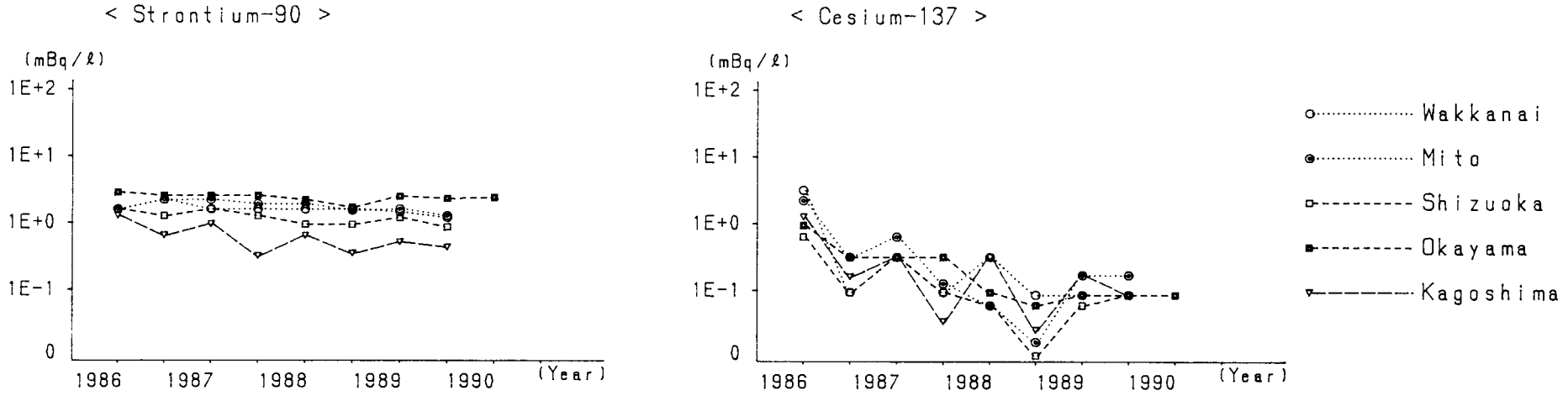

Fig.3

* * * Freshwater * * *

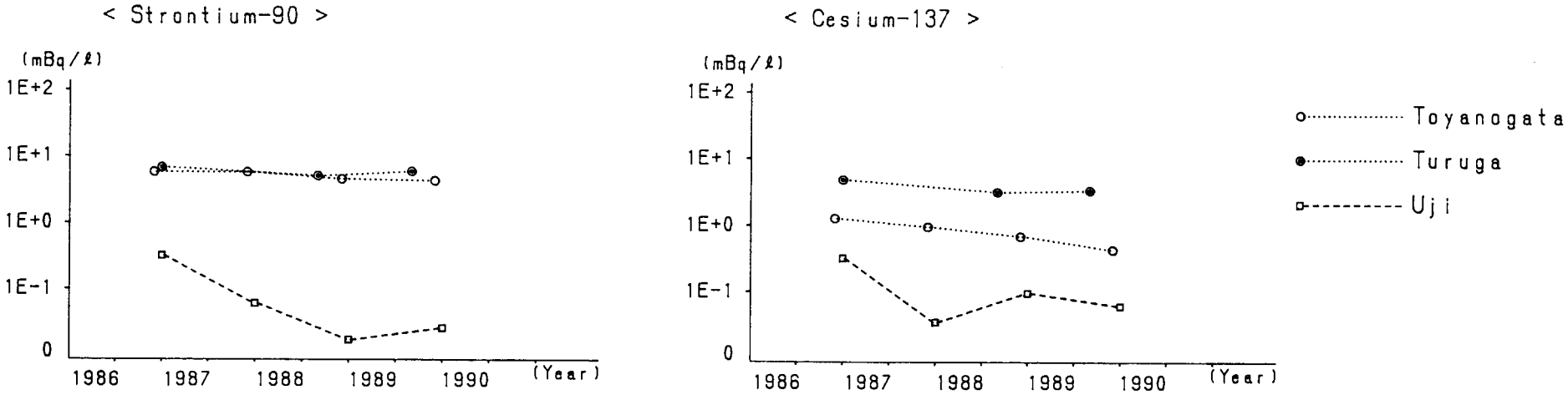

Fig. 4

＊ ＊ ＊　Soil　＊ ＊ ＊

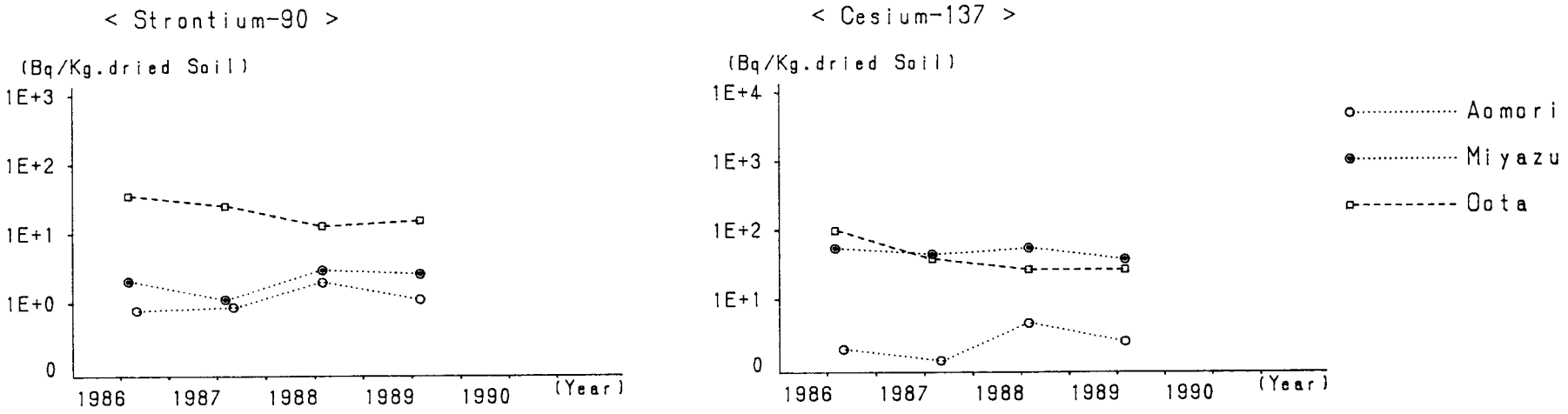

Fig.5-1 (Sampling Depth 0-5cm)

* * *　Soil　* * *

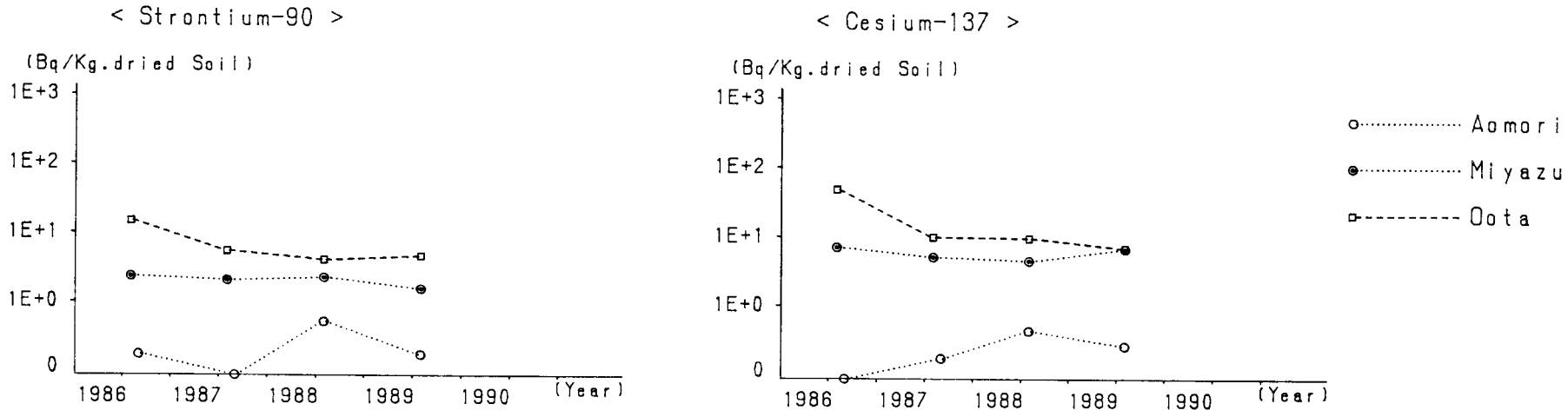

Fig.5-2 (Sampling Depth 5-20cm)

* * * Sea Sediments * * *

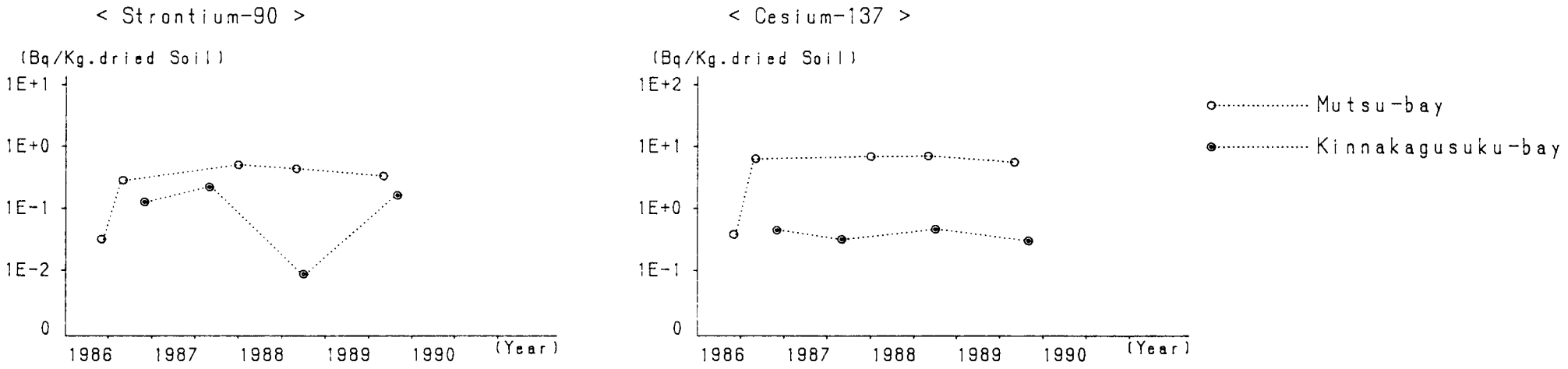

Fig.6

** Sampling Locations in Japan **

1 : Sapporo
2 : Aomori
3 : Morioka
4 : Akita
5 : Sendai
6 : Yamagata
7 : Fukushima
8 : Niigata
9 : Mito
10 : Utsunomiya
11 : Chiba
12 : Urawa
13 : Shinjuku
14 : Nagano
15 : Yokohama
16 : Kouhu
17 : Toyama
18 : Kanazawa
19 : Shizuoka
20 : Fukui
21 : Nagoya
22 : Ootsu
23 : Tsu
24 : Kyoto
25 : Osaka
26 : Tottori
27 : Kobe
28 : Wakayama
29 : Okayama
30 : Matsue
31 : Takamatsu
32 : Hiroshima
33 : Kochi
34 : Matsuyama
35 : Yamaguchi
36 : Ooita
37 : Fukuoka
38 : Saga
39 : Miyazaki
40 : Nagasaki
41 : Kagoshima
42 : Naha