ISSN 0441-2516
NIRS-RSD-112

RADIOACTIVITY SURVEY DATA in Japan

Part 1
= Environmental Materials =

NUMBER 112
March 1997

National Institute of Radiological Sciences
Chiba, Japan

Radioactivity Survey Data in Japan Number 112

February 1997 part 1 = Environmental Materials =

Contents

Editted by National Institute of Radiological Sciences, under the supervision of Science and Technology Agency of Japanese Government.

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 asampling tray, approximately 5000cm^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. Thetray was washed with 5ℓ of distilled water and the washing was combined to the filtrate.

The sample was passed through a cation exchange column (500mℓ of Dowex 50W X8, 50~100 mesh, Na form) at a rate flow of 80mℓ/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 3000m^3 per month.

The sampling was done 1 to 1.5 meters above the ground.

(3) Service water and freshwater

Service water, 100ℓ each, was collected at the intake of the water-treatment plant and at the tap after water was left running for five minutes. Strontium andcesium carriers were added to the filtered water sample. The subsequent process was the same as that describedin thesection (1). Freshwater was treated inthe sameway 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 out flow due to precipitation, etc.. Any places located under trees in a forest, in astony 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 driedin a drying oven regulated 105℃ . The soil was then passed through a 2mm 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 givento 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 20ℓ 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 1m 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 thesample in wet weight was spread on a stainless steel dish after removed of the pebbles, shells and other foreign materials, and ried in a drying oven regulated at 105 ℃.

(7) Total diet

A full one day ordinary diet including three meals, water, tea and otherin-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 areaswhen 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 46 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 left vegetables and for nonstarch roots, respectively. After removing soil, the edible part of vegetable samplewas dried and carbonized in a stainless steelpan 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 wasused 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 4kg of shellfish including the shells was collected or purchased. Afterremoving 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	yaerly (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 washeated. The insoluble constituent was filtered off and washed with water.

The dried sample was crushed to smaller ones than 0.25mm 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 0.35mm sieve. The sievedsample 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 thesame 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. Thesupernatant solution was retainedfor cesium-137 determination. The carbonates weredissolved 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 andthe precipitate was filtered off, washed and counted.

(2) Cesium-137

The supernatant separated from the strontium fraction was acidified with hydrochloricacid. While stirring, cesium was adsorbed on the ammonium molybdophosphate 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 cesiumwas 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 forextraction.
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 andpotassium were determined by atomic absorption andflame 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 90min. 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 theresults, concentrations of these nuclides in the original samples were calculated.

6. Results

(1)-1 Strontuim-90 and Cesium-137 in Rain and Dry Fallout (for domestic program) (from Oct. 1994 to Mar. 1995)

-continued from No. 110 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)
October, 1994				
Sapporo, HOKKAIDOU	33	140.0	0.025 ± 0.014	0.044 ± 0.018
Aomori, AOMORI	30	45.5	0.007 ± 0.014	0.022 ± 0.017
Morioka, IWATE	30	26.3	0.029 ± 0.0087	0.000 ± 0.012
Onagawa-machi, MIYAGI	31	53.0	0.015 ± 0.0080	0.000 ± 0.013
Yamagata, YAMAGATA	30	53.3	0.0011 ± 0.0055	0.000 ± 0.014
Ookuma-machi, FUKUSHIMA	30	42.5	0.0000 ± 0.0067	0.005 ± 0.012
Mito, IBARAKI	30	34.0	0.0020 ± 0.0057	0.018 ± 0.011
Utsunomiya, TOCHIGI	29	41.4	0.008 ± 0.010	0.001 ± 0.014
Maebashi, GUNMA	33	92.5	0.0052 ± 0.0072	0.000 ± 0.010
Urawa, SAITAMA	30	97.1	0.0000 ± 0.0081	0.0000 ± 0.0067
Ichihara, CHIBA	30	91.4	0.004 ± 0.013	0.026 ± 0.017
Shinjuku, TOKYO	30	66.9	0.012 ± 0.019	0.000 ± 0.013
Yokohama, KANAGAWA	32	54.1	0.000 ± 0.012	0.015 ± 0.012
Kosugi-machi, TOYAMA	30	147.6	0.003 ± 0.013	0.000 ± 0.011
Fukui, FUKUI	30	97.3	0.000 ± 0.034	0.000 ± 0.076
Koufu, YAMANASHI	30	56.0	0.016 ± 0.0057	0.006 ± 0.010
Gifu, GIFU	30	38.5	0.0000 ± 0.0084	0.000 ± 0.014
Shizuoka, SHIZUOKA	30	74.5	0.012 ± 0.0073	0.006 ± 0.015
Nagoya, AICHI	30	55.9	0.0066 ± 0.0063	0.000 ± 0.015
Tsu, MIE	30	63.0	0.010 ± 0.011	0.030 ± 0.017
Ootsu, SHIGA	30	37.2	0.026 ± 0.011	0.000 ± 0.014
Kyoto, KYOTO	32	35.5	0.012 ± 0.021	0.005 ± 0.015
Kobe, HYOUGO	32	27.3	0.0006 ± 0.0066	0.037 ± 0.017
Nara, NARA	30	43.7	0.017 ± 0.0098	0.013 ± 0.014
Wakayama, WAKAYAMA	37	26.0	0.005 ± 0.018	0.024 ± 0.014
Tottori, TOTTORI	30	99.3	0.12 ± 0.024	0.029 ± 0.013

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Matsue, SHIMANE	34	95.3	0.0019 ± 0.0081	0.023 ± 0.0084
Hiroshima, HIROSHIMA	32	55.8	0.016 ± 0.010	0.000 ± 0.013
Ishii-machi, TOKUSHIMA	34	132.5	0.012 ± 0.0072	0.027 ± 0.012
Matsuyama, EHIME	33	48.0	0.015 ± 0.0059	0.016 ± 0.016
Matsuyama, EHIME	33	79.5	0.022 ± 0.015	0.002 ± 0.012
Dazaifu, FUKUOKA	30	22.1	0.0062 ± 0.0066	0.0000 ± 0.0085
Saga, SAGA	30	14.2	0.0000 ± 0.0079	0.000 ± 0.016
Nagasaki, NAGASAKI	30	18.0	0.029 ± 0.0081	0.000 ± 0.011
Kumamoto, KUMAMOTO	30	27.1	0.011 ± 0.010	0.006 ± 0.014
Ooita, OOITA	30	78.4	0.015 ± 0.0060	0.011 ± 0.013
Miyazaki, MIYAZAKI	30	171.8	0.025 ± 0.0080	0.017 ± 0.012
Yonagusuku-mura, Okinawa	32	321.5	0.01 ± 0.022	0.000 ± 0.012
November, 1994				
Sapporo, HOKKAIDOU	31	73.5	0.032 ± 0.020	0.003 ± 0.011
Aomori, AOMORI	31	61.0	0.000 ± 0.012	0.000 ± 0.016
Morioka, IWATE	31	16.6	0.032 ± 0.0099	0.012 ± 0.014
Onagawa-machi, MIYAGI	30	20.5	0.021 ± 0.018	0.006 ± 0.013
Yamagata, YAMAGATA	31	13.9	0.0067 ± 0.0063	0.005 ± 0.014
Ookuma-machi, FUKUSHIMA	31	11.5	0.0000 ± 0.0068	0.013 ± 0.011
Mito, IBARAKI	31	32.0	0.0096 ± 0.0065	0.026 ± 0.012
Utsunomiya, TOCHIGI	32	39.7	0.008 ± 0.010	0.001 ± 0.014
Maebashi, GUNMA	31	16.0	0.0000 ± 0.0064	0.009 ± 0.012
Urawa, SAITAMA	31	33.3	0.011 ± 0.0087	0.0023 ± 0.0078
Ichihara, CHIBA	31	77.4	0.029 ± 0.016	0.000 ± 0.014
Shinjuku, TOKYO	31	48.0	0.010 ± 0.020	0.015 ± 0.014
Yokohama, KANAGAWA	32	31.9	0.023 ± 0.0068	0.000 ± 0.014
Kosugi-machi, TOYAMA	31	174.1	0.000 ± 0.013	0.028 ± 0.013

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Fukui, FUKUI	36	194.4	0.013 ± 0.036	0.068 ± 0.076
Koufu, YAMANASHI	31	11.0	0.011 ± 0.011	0.000 ± 0.015
Gifu, GIFU	31	55.0	0.019 ± 0.014	0.000 ± 0.014
Shizuoka, SHIZUOKA	31	65.0	0.021 ± 0.020	0.029 ± 0.015
Nagoya, AICHI	29	34.4	0.035 ± 0.014	0.000 ± 0.012
Tsu, MIE	31	32.0	0.0091 ± 0.0063	0.028 ± 0.012
Ootsu, SHIGA	31	24.4	0.024 ± 0.011	0.000 ± 0.014
Kyoto, KYOTO	31	29.5	0.01 ± 0.021	0.000 ± 0.015
Kobe, HYOUGO	31	19.6	0.020 ± 0.0075	0.017 ± 0.015
Nara, NARA	31	36.1	0.006 ± 0.012	0.000 ± 0.014
Tottori, TOTTORI	31	128.4	0.079 ± 0.022	0.033 ± 0.013
Matsue, SHIMANE	30	45.1	0.0074 ± 0.0087	0.0023 ± 0.0074
Hiroshima, HIROSHIMA	32	44.0	0.000 ± 0.026	0.011 ± 0.020
Ishii-machi, TOKUSHIMA	30	103.5	0.027 ± 0.0085	0.004 ± 0.011
Matsuyama, EHIME	31	18.5	0.0000 ± 0.0084	0.000 ± 0.011
Matsuyama, EHIME	31	40.5	0.000 ± 0.012	0.006 ± 0.011
Dazaifu, FUKUOKA	31	33.9	0.0000 ± 0.0080	0.016 ± 0.013
Saga, SAGA	31	40.7	0.013 ± 0.018	0.009 ± 0.011
Nagasaki, NAGASAKI	31	37.0	0.022 ± 0.0077	0.021 ± 0.013
Kumamoto, KUMAMOTO	31	5.3	0.015 ± 0.0072	0.007 ± 0.015
Ooita, OOITA	31	21.5	0.012 ± 0.0078	0.012 ± 0.013
Miyazaki, MIYAZAKI	31	130.7	0.027 ± 0.017	0.022 ± 0.012
Yonagusuku-mura, Okinawa	31	68.5	0.0024 ± 0.0069	0.000 ± 0.011
December, 1994				
Sapporo, HOKKAIDOU	28	33.5	0.0067 ± 0.0068	0.016 ± 0.011
Aomori, AOMORI	35	131.5	0.004 ± 0.014	0.002 ± 0.016
Morioka, IWATE	35	47.6	0.0032 ± 0.0077	0.010 ± 0.014

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Onagawa-machi, MIYAGI	36	33.0	0.016 ± 0.017	0.0000 ± 0.0094
Yamagata, YAMAGATA	35	114.8	0.0000 ± 0.0072	0.043 ± 0.019
Ookuma-machi, FUKUSHIMA	36	13.9	0.021 ± 0.0089	0.088 ± 0.021
Mito, IBARAKI	36	51.5	0.010 ± 0.0068	0.013 ± 0.012
Utsunomiya, TOCHIGI	35	26.3	0.017 ± 0.0069	0.017 ± 0.015
Maebashi, GUNMA	36	17.5	0.029 ± 0.013	0.032 ± 0.018
Urawa, SAITAMA	35	19.6	0.000 ± 0.014	0.066 ± 0.015
Ichihara, CHIBA	35	33.6	0.047 ± 0.017	0.023 ± 0.017
Shinjuku, TOKYO	35	28.9	0.027 ± 0.017	0.010 ± 0.014
Yokohama, KANAGAWA	28	28.9	0.037 ± 0.0083	0.052 ± 0.017
Kosugi-machi, TOYAMA	35	275.4	0.017 ± 0.015	0.027 ± 0.013
Fukui, FUKUI	30	237.9	0.003 ± 0.038	0.000 ± 0.076
Koufu, YAMANASHI	35	19.5	0.010 ± 0.0081	0.000 ± 0.016
Gifu, GIFU	35	45.5	0.020 ± 0.015	0.000 ± 0.014
Shizuoka, SHIZUOKA	36	31.5	0.018 ± 0.019	0.013 ± 0.016
Nagoya, AICHI	37	20.2	0.000 ± 0.011	0.006 ± 0.012
Tsu, MIE	35	21.0	0.015 ± 0.0081	0.000 ± 0.012
Ootsu, SHIGA	33	27.0	0.022 ± 0.019	0.006 ± 0.013
Kyoto, KYOTO	29	17.0	0.021 ± 0.010	0.013 ± 0.018
Kobe, HYOUGO	29	13.4	0.030 ± 0.013	0.028 ± 0.012
Nara, NARA	36	33.7	0.016 ± 0.013	0.005 ± 0.013
Wakayama, WAKAYAMA	37	69.5	0.023 ± 0.023	0.013 ± 0.012
Tottori, TOTTORI	36	236.8	0.073 ± 0.022	0.000 ± 0.013
Matsue, SHIMANE	37	146.0	0.024 ± 0.017	0.028 ± 0.0094
Hiroshima, HIROSHIMA	35	37.4	0.015 ± 0.013	0.0000 ± 0.0096
Ishii-machi, TOKUSHIMA	36	36.0	0.022 ± 0.023	0.023 ± 0.014
Matsuyama, EHIME	31	38.5	0.0043 ± 0.0089	0.000 ± 0.010

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Matsuyama, EHIME	35	29.0	0.041 ± 0.019	0.000 ± 0.011
Dazaifu, FUKUOKA	35	65.6	0.0080 ± 0.0086	0.012 ± 0.012
Saga, SAGA	35	88.9	0.028 ± 0.014	0.014 ± 0.014
Nagasaki, NAGASAKI	35	65.5	0.020 ± 0.011	0.016 ± 0.013
Kumamoto, KUMAMOTO	35	118.7	0.020 ± 0.0086	0.025 ± 0.016
Ooita, OOITA	35	66.6	0.015 ± 0.0086	0.000 ± 0.012
Miyazaki, MIYAZAKI	35	65.6	0.0080 ± 0.0076	0.023 ± 0.016
Yonagusuku-mura, Okinawa	37	80.5	0.0000 ± 0.0080	0.004 ± 0.019
January, 1995				
Sapporo, HOKKAIDOU	36	88.0	0.002 ± 0.018	0.023 ± 0.013
Aomori, AOMORI	29	165.0	0.007 ± 0.015	0.000 ± 0.014
Morioka, IWATE	29	43.8	0.018 ± 0.022	0.025 ± 0.018
Onagawa-machi, MIYAGI	28	19.0	0.004 ± 0.020	0.031 ± 0.018
Yamagata, YAMAGATA	29	77.2	0.0000 ± 0.0074	0.017 ± 0.017
Ookuma-machi, FUKUSHIMA	28	31.1	0.057 ± 0.021	0.096 ± 0.019
Mito, IBARAKI	28	21.0	0.000 ± 0.019	0.000 ± 0.015
Utsunomiya, TOCHIGI	29	26.8	0.001 ± 0.017	0.025 ± 0.013
Maebashi, GUNMA	28	10.5	0.000 ± 0.011	0.043 ± 0.018
Urawa, SAITAMA	29	32.5	0.007 ± 0.013	0.019 ± 0.012
Ichihara, CHIBA	29	42.8	0.032 ± 0.017	0.022 ± 0.017
Shinjuku, TOKYO	29	27.9	0.036 ± 0.0096	0.001 ± 0.017
Yokohama, KANAGAWA	35	44.2	0.021 ± 0.0079	0.003 ± 0.013
Kosugi-machi, TOYAMA	29	341.4	0.0000 ± 0.0097	0.013 ± 0.012
Fukui, FUKUI	29	471.7	0.044 ± 0.036	0.000 ± 0.081
Koufu, YAMANASHI	29	39.5	0.0096 ± 0.0086	0.016 ± 0.017
Gifu, GIFU	29	73.0	0.039 ± 0.017	0.0000 ± 0.0093
Shizuoka, SHIZUOKA	28	77.5	0.000 ± 0.018	0.023 ± 0.016

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Nagoya, AICHI	29	56.1	0.024 ± 0.014	0.002 ± 0.011
Tsu, MIE	29	37.5	0.0045 ± 0.0066	0.013 ± 0.011
Ootsu, SHIGA	31	61.2	0.0000 ± 0.0062	0.010 ± 0.013
Kobe, HYOUGO	37	46.1	0.019 ± 0.0082	0.066 ± 0.015
Nara, NARA	28	86.1	0.0000 ± 0.0094	0.0000 ± 0.0099
Wakayama, WAKAYAMA	28	12.0	0.000 ± 0.021	0.002 ± 0.012
Tottori, TOTTORI	28	207.5	0.070 ± 0.026	0.043 ± 0.032
Matsue, SHIMANE	27	137.0	0.000 ± 0.011	0.050 ± 0.011
Hiroshima, HIROSHIMA	28	8.4	0.022 ± 0.015	0.003 ± 0.011
Ishii-machi, TOKUSHIMA	28	22.5	0.005 ± 0.015	0.000 ± 0.018
Matsuyama, EHIME	33	28.5	0.011 ± 0.013	0.007 ± 0.013
Matsuyama, EHIME	29	47.5	0.006 ± 0.012	0.015 ± 0.015
Dazaifu, FUKUOKA	29	34.9	0.006 ± 0.017	0.0000 ± 0.0087
Saga, SAGA	29	19.6	0.011 ± 0.012	0.027 ± 0.018
Nagasaki, NAGASAKI	29	37.0	0.01 ± 0.013	0.007 ± 0.011
Kumamoto, KUMAMOTO	29	15.9	0.011 ± 0.015	0.010 ± 0.013
Ooita, OOITA	29	8.0	0.007 ± 0.018	0.005 ± 0.012
Miyazaki, MIYAZAKI	29	50.5	0.012 ± 0.0074	0.027 ± 0.017
Yonagusuku-mura, Okinawa	27	39.5	0.0077 ± 0.0092	0.026 ± 0.020
Febraly, 1995				
Sapporo, HOKKAIDOU	29	31.0	0.000 ± 0.012	0.005 ± 0.010
Aomori, AOMORI	28	31.5	0.000 ± 0.013	0.036 ± 0.017
Morioka, IWATE	29	5.3	0.037 ± 0.025	0.021 ± 0.017
Onagawa-machi, MIYAGI	29	24.5	0.000 ± 0.018	0.021 ± 0.016
Yamagata, YAMAGATA	29	35.3	0.016 ± 0.019	0.002 ± 0.012
Ookuma-machi, FUKUSHIMA	29	11.4	0.000 ± 0.017	0.023 ± 0.014
Mito, IBARAKI	30	32.5	0.000 ± 0.019	0.000 ± 0.015

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Utsunomiya, TOCHIGI	29	6.8	0.003 ± 0.018	0.098 ± 0.019
Maebashi, GUNMA	28	2.5	0.002 ± 0.011	0.060 ± 0.019
Urawa, SAITAMA	29	50.7	0.006 ± 0.012	0.047 ± 0.014
Ichihara, CHIBA	29	27.6	0.007 ± 0.013	0.043 ± 0.018
Shinjuku, TOKYO	29	56.5	0.017 ± 0.010	0.025 ± 0.017
Yokohama, KANAGAWA	29	37.4	0.057 ± 0.023	0.051 ± 0.015
Kosugi-machi, TOYAMA	29	101.8	0.000 ± 0.020	0.000 ± 0.011
Fukui, FUKUI	30	211.7	0.000 ± 0.029	0.000 ± 0.048
Koufu, YAMANASHI	29	9.5	0.0081 ± 0.0083	0.000 ± 0.017
Gifu, GIFU	29	39.5	0.032 ± 0.018	0.007 ± 0.012
Shizuoka, SHIZUOKA	29	31.0	0.0000 ± 0.0078	0.028 ± 0.016
Nagoya, AICHI	29	19.1	0.030 ± 0.018	0.019 ± 0.013
Tsu, MIE	29	23.0	0.011 ± 0.013	0.014 ± 0.011
Ootsu, SHIGA	29	22.8	0.000 ± 0.013	0.022 ± 0.012
Kyoto, KYOTO	30	23.5	0.016 ± 0.0072	0.011 ± 0.016
Kobe, HYOUGO	27	20.1	0.0077 ± 0.0089	0.027 ± 0.014
Nara, NARA	29	20.3	0.035 ± 0.013	0.028 ± 0.012
Wakayama, WAKAYAMA	28	24.5	0.025 ± 0.023	0.018 ± 0.012
Tottori, TOTTORI	29	156.3	0.054 ± 0.017	0.019 ± 0.017
Matsue, SHIMANE	29	123.9	0.027 ± 0.014	0.022 ± 0.012
Hiroshima, HIROSHIMA	30	32.6	0.041 ± 0.016	0.003 ± 0.011
Ishii-machi, TOKUSHIMA	29	5.5	0.030 ± 0.020	0.017 ± 0.017
Matsuyama, EHIME	29	9.0	0.007 ± 0.013	0.004 ± 0.012
Matsuyama, EHIME	29	20.0	0.001 ± 0.012	0.000 ± 0.015
Dazaifu, FUKUOKA	29	33.3	0.002 ± 0.017	0.028 ± 0.013
Saga, SAGA	29	34.8	0.017 ± 0.013	0.018 ± 0.017
Nagasaki, NAGASAKI	29	38.5	0.0083 ± 0.0089	0.017 ± 0.012

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Kumamoto, KUMAMOTO	29	30.8	0.0051 ± 0.0086	0.007 ± 0.012
Ooita, OOITA	29	20.7	0.011 ± 0.018	0.003 ± 0.012
Miyazaki, MIYAZAKI	29	59.2	0.022 ± 0.0076	0.000 ± 0.015
Yonagusuku-mura, Okinawa	30	63.0	0.0072 ± 0.0087	0.031 ± 0.020
March, 1995				
Sapporo, HOKKAIDOU	31	32.5	0.035 ± 0.017	0.072 ± 0.020
Aomori, AOMORI	35	86.5	0.038 ± 0.018	0.022 ± 0.018
Morioka, IWATE	34	68.6	0.081 ± 0.022	0.038 ± 0.020
Onagawa-machi, MIYAGI	34	155.0	0.035 ± 0.022	0.021 ± 0.018
Yamagata, YAMAGATA	34	93.4	0.000 ± 0.014	0.044 ± 0.019
Ookuma-machi, FUKUSHIMA	34	172.1	0.053 ± 0.011	0.14 ± 0.021
Mito, IBARAKI	33	118.5	0.039 ± 0.014	0.020 ± 0.018
Utsunomiya, TOCHIGI	32	172.1	0.031 ± 0.021	0.021 ± 0.013
Maebashi, GUNMA	32	101.5	0.035 ± 0.015	0.042 ± 0.019
Urawa, SAITAMA	34	158.1	0.035 ± 0.012	0.054 ± 0.014
Ichihara, CHIBA	34	167.4	0.051 ± 0.016	0.015 ± 0.012
Shinjuku, TOKYO	34	188.4	0.000 ± 0.023	0.037 ± 0.013
Yokohama, KANAGAWA	32	204.1	0.056 ± 0.016	0.084 ± 0.018
Kosugi-machi, TOYAMA	31	118.3	0.000 ± 0.027	0.076 ± 0.018
Fukui, FUKUI	33	183.5	0.13 ± 0.050	0.044 ± 0.063
Koufu, YAMANASHI	34	91.5	0.030 ± 0.0098	0.029 ± 0.019
Gifu, GIFU	34	158.0	0.049 ± 0.011	0.010 ± 0.011
Shizuoka, SHIZUOKA	34	205.0	0.068 ± 0.012	0.045 ± 0.018
Nagoya, AICHI	34	130.8	0.077 ± 0.018	0.061 ± 0.020
Tsu, MIE	34	141.0	0.026 ± 0.0096	0.011 ± 0.017
Ootsu, SHIGA	34	96.6	0.050 ± 0.013	0.023 ± 0.017
Kyoto, KYOTO	31	60.5	0.036 ± 0.0091	0.032 ± 0.018

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Kobe, HYOUGO	32	55.7	0.051 ± 0.0097	0.056 ± 0.019
Nara, NARA	34	94.4	0.064 ± 0.024	0.069 ± 0.016
Wakayama, WAKAYAMA	31	48.0	0.057 ± 0.026	0.028 ± 0.013
Tottori, TOTTORI	34	125.5	0.041 ± 0.016	0.052 ± 0.020
Matsue, SHIMANE	34	101.3	0.082 ± 0.016	0.096 ± 0.016
Hiroshima, HIROSHIMA	31	66.0	0.12 ± 0.032	0.12 ± 0.030
Ishii-machi, TOKUSHIMA	31	33.0	0.043 ± 0.010	0.027 ± 0.017
Matsuyama, EHIME	31	25.0	0.009 ± 0.021	0.018 ± 0.017
Matsuyama, EHIME	34	49.0	0.002 ± 0.016	0.006 ± 0.018
Dazaifu, FUKUOKA	34	108.2	0.043 ± 0.016	0.059 ± 0.018
Saga, SAGA	34	83.8	0.043 ± 0.0095	0.062 ± 0.020
Nagasaki, NAGASAKI	34	86.5	0.017 ± 0.0082	0.011 ± 0.013
Kumamoto, KUMAMOTO	24	50.9	0.014 ± 0.0081	0.025 ± 0.012
Ooita, OOITA	34	109.9	0.000 ± 0.018	0.032 ± 0.018
Miyazaki, MIYAZAKI	34	184.2	0.047 ± 0.0092	0.018 ± 0.016
Yonagusuku-mura, Okinawa	31	310.0	0.017 ± 0.0092	0.028 ± 0.017

(1)-2 Strontuim-90 and Cesium-137 in Rain and Dry Fallout (for WHO program)
(from Oct. 1994 to Mar. 1995)

-continued from No, 110 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)
October, 1994				
Akita, AKITA	30	120.3	0.000 ± 0.018	0.009 ± 0.011
Chiba, CHIBA	33	53.3	0.011 ± 0.0075	0.0046 ± 0.0087
Niigata, NIIGATA	30	121.4	0.013 ± 0.012	0.019 ± 0.012
Kanazawa, ISHIKAWA	33	145.5	0.039 ± 0.0086	0.011 ± 0.015
Nagano, NAGANO	30	53.5	0.030 ± 0.0078	0.029 ± 0.015
Osaka, OSAKA	30	33.8	0.025 ± 0.010	0.021 ± 0.017
Okayama, OKAYAMA	30	58.1	0.000 ± 0.011	0.016 ± 0.012
Yamaguchi, YAMAGUCHI	30	33.5	0.011 ± 0.0067	0.000 ± 0.015
Kochi, KOCHI	30	87.8	0.082 ± 0.018	0.000 ± 0.015
Kagoshima, KAGOSHIMA	32	33.0	0.041 ± 0.0099	0.024 ± 0.014
November, 1994				
Akita, AKITA	31	113.8	0.014 ± 0.0066	0.026 ± 0.013
Chiba, CHIBA	31	73.0	0.013 ± 0.0077	0.013 ± 0.0096
Niigata, NIIGATA	31	177.0	0.008 ± 0.012	0.007 ± 0.013
Kanazawa, ISHIKAWA	28	146.5	0.31 ± 0.020	0.040 ± 0.017
Nagano, NAGANO	31	18.9	0.0000 ± 0.0086	0.000 ± 0.013
Osaka, OSAKA	35	27.3	0.030 ± 0.0095	0.000 ± 0.016
Okayama, OKAYAMA	31	28.6	0.008 ± 0.012	0.000 ± 0.010
Yamaguchi, YAMAGUCHI	31	47.5	0.027 ± 0.019	0.038 ± 0.013
Kochi, KOCHI	31	205.8	0.061 ± 0.010	0.010 ± 0.011
Kagoshima, KAGOSHIMA	30	28.5	0.042 ± 0.0088	0.015 ± 0.013
December, 1994				
Akita, AKITA	31	142.7	0.0065 ± 0.0093	0.013 ± 0.011
Chiba, CHIBA	36	46.6	0.024 ± 0.0085	0.018 ± 0.011
Niigata, NIIGATA	35	163.4	0.005 ± 0.011	0.007 ± 0.012
Kanazawa, ISHIKAWA	31	226.5	0.014 ± 0.0087	0.027 ± 0.017

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Nagano, NAGANO	35	35.3	0.0000 ± 0.0099	0.000 ± 0.018
Osaka, OSAKA	32	75.2	0.010 ± 0.011	0.028 ± 0.017
Okayama, OKAYAMA	36	44.3	0.018 ± 0.013	0.000 ± 0.011
Yamaguchi, YAMAGUCHI	35	57.5	0.0064 ± 0.0077	0.023 ± 0.016
Kochi, KOCHI	35	93.6	0.038 ± 0.011	0.011 ± 0.011
Kagoshima, KAGOSHIMA	30	80.5	0.046 ± 0.0097	0.020 ± 0.018
January, 1995				
Akita, AKITA	33	156.4	0.0000 ± 0.0069	0.009 ± 0.017
Chiba, CHIBA	28	13.5	0.002 ± 0.020	0.019 ± 0.011
Niigata, NIIGATA	29	199.6	0.008 ± 0.012	0.013 ± 0.013
Kanazawa, ISHIKAWA	35	420.5	0.0099 ± 0.0089	0.058 ± 0.020
Nagano, NAGANO	29	63.9	0.017 ± 0.012	0.007 ± 0.011
Osaka, OSAKA	28	14.1	0.000 ± 0.010	0.000 ± 0.012
Okayama, OKAYAMA	28	9.0	0.0000 ± 0.0094	0.001 ± 0.017
Yamaguchi, YAMAGUCHI	29	28.5	0.006 ± 0.013	0.000 ± 0.011
Kochi, KOCHI	31	10.1	0.074 ± 0.015	0.005 ± 0.024
Kagoshima, KAGOSHIMA	36	54.0	0.082 ± 0.011	0.011 ± 0.019
Febraly, 1995				
Akita, AKITA	29	79.2	0.0006 ± 0.0079	0.056 ± 0.018
Chiba, CHIBA	30	60.3	0.000 ± 0.020	0.033 ± 0.012
Niigata, NIIGATA	29	52.4	0.011 ± 0.0074	0.008 ± 0.012
Kanazawa, ISHIKAWA	29	142.5	0.008 ± 0.010	0.015 ± 0.011
Nagano, NAGANO	29	38.9	0.000 ± 0.011	0.0000 ± 0.0096
Osaka, OSAKA	29	27.3	0.043 ± 0.027	0.021 ± 0.016
Okayama, OKAYAMA	29	12.2	0.021 ± 0.014	0.006 ± 0.017
Yamaguchi, YAMAGUCHI	29	47.5	0.012 ± 0.014	0.008 ± 0.011
Kochi, KOCHI	27	34.5	0.058 ± 0.022	0.000 ± 0.012

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Kagoshima, KAGOSHIMA	29	59.0	0.051 ± 0.0098	0.011 ± 0.018
March, 1995				
Akita, AKITA	34	131.6	0.015 ± 0.016	0.045 ± 0.018
Chiba, CHIBA	33	119.9	0.034 ± 0.024	0.023 ± 0.011
Niigata, NIIGATA	34	114.8	0.049 ± 0.021	0.085 ± 0.022
Kanazawa, ISHIKAWA	36	227.0	0.072 ± 0.037	0.054 ± 0.020
Nagano, NAGANO	34	40.4	0.025 ± 0.024	0.051 ± 0.020
Osaka, OSAKA	31	76.0	0.030 ± 0.020	0.000 ± 0.012
Okayama, OKAYAMA	34	39.5	0.042 ± 0.016	0.027 ± 0.018
Yamaguchi, YAMAGUCHI	34	147.0	0.000 ± 0.021	0.048 ± 0.015
Kochi, KOCHI	34	144.5	0.11 ± 0.021	0.011 ± 0.018
Kagoshima, KAGOSHIMA	31	136.5	0.051 ± 0.010	0.072 ± 0.021

(2) Strontium-90 and Cesium-137 in Airborne Dust
(from Oct. 1994 to Mar. 1995)

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

Location	Sampling period	Absorption volume (m^2)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
October~December, 1994				
Morioka, IWATE	10~12	10,961.0	0.00000 ± 0.00026	0.00000 ± 0.00032
Akita, AKITA	10~12	10,890.0	0.00028 ± 0.00081	0.00067 ± 0.00039
Yamagata, YAMAGATA	10~12	12,960.0	0.00000 ± 0.00029	0.00018 ± 0.00027
Ookuma-machi, FUKUSHIMA	10~12	10,187.4	0.00034 ± 0.00036	0.00004 ± 0.00041
Mito, IBARAKI	10~12	8,577.6	0.0000 ± 0.0010	0.00000 ± 0.00040
Utsunomiya, TOCHIGI	10~12	14,369.0	0.00029 ± 0.00063	0.00029 ± 0.00029
Maebashi, GUNMA	10~12	13,013.0	0.00004 ± 0.00025	0.00060 ± 0.00033
Ichihara, CHIBA	10~12	12,960.0	0.00000 ± 0.00043	0.00000 ± 0.00039
Yokohama, KANAGAWA	10~12	10,381.0	0.00029 ± 0.00036	0.00000 ± 0.00034
Niigata, NIIGATA	10~12	10,336.0	0.0017 ± 0.0010	0.00042 ± 0.00058
Kosugi-machi, TOYAMA	10~12	19,186.0	0.00028 ± 0.00018	0.00020 ± 0.00019
Fukui, FUKUI	10~12	13,047.8	0.00058 ± 0.00033	0.00030 ± 0.00030
Koufu, YAMANASHI	10~12	12,136.0	0.0012 ± 0.00072	0.00043 ± 0.00037
Nagano, NAGANO	10~12	12,172.0	0.00056 ± 0.00030	0.00032 ± 0.00034
Gifu, GIFU	10~12	11,667.0	0.0010 ± 0.00081	0.00056 ± 0.00033
Hamaoka-machi, SHIZUOKA	10~12	10,436.0	0.00059 ± 0.00033	0.0011 ± 0.00044
Nagoya, AICHI	10~12	10,100.0	0.00000 ± 0.00059	0.00000 ± 0.00052
Tsu, MIE	10~12	14,126.0	0.00041 ± 0.00026	0.00008 ± 0.00027
Ootsu, SHIGA	10~12	11,154.0	0.00035 ± 0.00029	0.00052 ± 0.00033
Kyoto, KYOTO	10~12	10,183.0	0.00022 ± 0.00041	0.00032 ± 0.00041
Osaka, OSAKA	10~12	15,976.0	0.0012 ± 0.00057	0.00000 ± 0.00022
Kobe, HYOUGO	10~12	10,423.0	0.00062 ± 0.00038	0.00000 ± 0.00033
Nara, NARA	10~12	11,106.9	0.00049 ± 0.00081	0.00028 ± 0.00037
Wakayama, WAKAYAMA	10~12	11,988.0	0.00000 ± 0.00028	0.00000 ± 0.00033

Location	Sampling period	Absorption volume (m^3)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
Tottori, TOTTORI	10～12	14,141.0	0.00017 ± 0.00023	0.00011 ± 0.00025
Okayama, OKAYAMA	10～12	11,887.0	0.00020 ± 0.00027	0.0001 ± 0.00026
Hiroshima, HIROSHIMA	10～12	10,078.0	0.00082 ± 0.00097	0.00000 ± 0.00038
Yamaguchi, YAMAGUCHI	10～12	18,333.0	0.00000 ± 0.00044	0.00026 ± 0.00022
Tokushima, TOKUSHIMA	10～12	10,080.0	0.00033 ± 0.00036	0.00044 ± 0.00035
Takamatsu, KAGAWA	10～12	15,542.0	0.00011 ± 0.00025	0.00018 ± 0.00024
Saga, SAGA	10～12	10,294.7	0.00000 ± 0.00075	0.00092 ± 0.00043
Nagasaki, NAGASAKI	10～12	10,307.0	0.00023 ± 0.00034	0.00037 ± 0.00038
Kumamoto, KUMAMOTO	10～12	10,728.0	0.0018 ± 0.00093	0.00015 ± 0.00040
Ooita, OOITA	10～12	10,519.0	0.00006 ± 0.00032	0.00000 ± 0.00030
Miyazaki, MIYAZAKI	10～12	12,822.0	0.00026 ± 0.00025	0.00003 ± 0.00031
January~March, 1995				
Morioka, IWATE	1～ 3	10,629.0	0.00043 ± 0.00034	0.00062 ± 0.00040
Akita, AKITA	1～ 3	10,800.0	0.00012 ± 0.00054	0.00045 ± 0.00045
Yamagata, YAMAGATA	1～ 3	12,960.0	0.00052 ± 0.00045	0.00034 ± 0.00039
Ookuma-machi, FUKUSHIMA	1～ 3	10,287.1	0.00025 ± 0.00050	0.00038 ± 0.00054
Mito, IBARAKI	1～ 3	8,561.5	0.00019 ± 0.00039	0.00000 ± 0.00042
Utsunomiya, TOCHIGI	1～ 3	15,137.0	0.00027 ± 0.00036	0.00019 ± 0.00039
Maebashi, GUNMA	1～ 3	13,463.0	0.00008 ± 0.00026	0.00000 ± 0.00029
Ichihara, CHIBA	1～ 3	12,960.0	0.00024 ± 0.00053	0.00000 ± 0.00035
Yokohama, KANAGAWA	1～ 3	10,370.0	0.0010 ± 0.00096	0.00035 ± 0.00054
Niigata, NIIGATA	1～ 3	10,340.0	0.00028 ± 0.00053	0.00061 ± 0.00043
Kosugi-machi, TOYAMA	1～ 3	19,421.0	0.00090 ± 0.00056	0.00000 ± 0.00019
Fukui, FUKUI	1～ 3	13,191.1	0.00011 ± 0.00041	0.00000 ± 0.00040
Koufu, YAMANASHI	1～ 3	15,019.0	0.00038 ± 0.00026	0.00036 ± 0.00029

Location	Sampling period	Absorption volume (m^2)	^{90}Sr (mBq/m^3)		^{137}Cs (mBq/m^3)	
Nagano, NAGANO	1～ 3	12,366.0	0.00044	± 0.00052	0.00095	± 0.00044
Gifu, GIFU	1～ 3	12,169.0	0.00012	± 0.00044	0.00010	± 0.00046
Hamaoka-machi, SHIZUOKA	1～ 3	10,177.0	0.00094	± 0.00039	0.00052	± 0.00039
Nagoya, AICHI	1～ 3	10,445.9	0.00086	± 0.00046	0.00030	± 0.00037
Tsu, MIE	1～ 3	14,177.0	0.00000	± 0.00044	0.00032	± 0.00041
Ootsu, SHIGA	1～ 3	10,560.0	0.00000	± 0.00087	0.00000	± 0.00031
Kyoto, KYOTO	1～ 3	10,380.0	0.00051	± 0.00042	0.00052	± 0.00038
Osaka, OSAKA	1～ 3	15,937.0	0.00000	± 0.00036	0.00061	± 0.00036
Kobe, HYOUGO	1～ 3	10,552.0	0.00029	± 0.00044	0.00015	± 0.00039
Nara, NARA	1～ 3	10,577.9	0.00025	± 0.00031	0.00037	± 0.00044
Wakayama, WAKAYAMA	1～ 3	10,368.0	0.00000	± 0.00033	0.00043	± 0.00043
Tottori, TOTTORI	1～ 3	13,544.0	0.00000	± 0.00063	0.00000	± 0.00028
Okayama, OKAYAMA	1～ 3	13,320.0	0.00004	± 0.00070	0.00023	± 0.00028
Hiroshima, HIROSHIMA	1～ 3	10,606.0	0.00000	± 0.00085	0.00011	± 0.00036
Yamaguchi, YAMAGUCHI	1～ 3	18,395.0	0.00000	± 0.00053	0.00032	± 0.00024
Tokushima, TOKUSHIMA	1～ 3	10,080.0	0.0003	± 0.0010	0.00004	± 0.00036
Takamatsu, KAGAWA	1～ 3	16,419.0	0.00013	± 0.00041	0.00037	± 0.00032
Saga, SAGA	1～ 3	9,836.9	0.00063	± 0.00037	0.00000	± 0.00043
Nagasaki, NAGASAKI	1～ 3	10,306.0	0.00037	± 0.00073	0.00046	± 0.00048
Kumamoto, KUMAMOTO	1～ 3	10,169.0	0.00006	± 0.00099	0.00008	± 0.00040
Ooita, OOITA	1～ 3	10,308.0	0.00014	± 0.00032	0.00031	± 0.00036
Miyazaki, MIYAZAKI	1～ 3	13,479.0	0.00044	± 0.00028	0.00000	± 0.00029

(3) Strontium-90 and cesium-137 in Service Water
(from Oct. 1994 to Mar. 1995)

-continued from No, 110 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, 1994					
Urawa, SAITAMA	7.8	0.000	± 0.042	0.019	± 0.084
Kisarazu, CHIBA	7.60	1.3	± 0.09	0.29	± 0.093
Katsushika, TOKYO	7.3	1.5	± 0.18	0.20	± 0.095
Tsukui-machi, KANAGAWA	7.8	0.50	± 0.067	0.000	± 0.050
Nagano, NAGANO	7.00	1.1	± 0.09	0.11	± 0.068
Inuyama, AICHI	7.0	2.2	± 0.14	0.32	± 0.094
Moriguchi, OSAKA	7.2	4.0	± 0.24	0.29	± 0.078
Fukuoka, FUKUOKA	7.8	2.0	± 0.12	0.14	± 0.073
January, 1995					
Kyoto, KYOTO	7.48	3.1	± 0.21	0.38	± 0.10
Febraly, 1995					
Sapporo, HOKKAIDOU	6.9	1.8	± 0.11	0.22	± 0.093
(Tap Water)					
October, 1994					
Sendai, MIYAGI	—	1.7	± 0.11	0.076	± 0.057
November, 1994					
Shinguu, WAKAYAMA	5.8	1.6	± 0.10	0.092	± 0.055
December, 1994					
Wakkanai, HOKKAIDOU	6.7	1.5	± 0.13	0.041	± 0.057
Aomori, AOMORI	7.3	1.3	± 0.14	0.46	± 0.10
Morioka, IWATE	7.1	1.3	± 0.18	0.20	± 0.072
Akita, AKITA	6.37	3.4	± 0.19	0.16	± 0.059
Yamagata, YAMAGATA	6.9	1.9	± 0.12	0.067	± 0.054
Fukushima, FUKUSHIMA	7.1	1.9	± 0.10	0.071	± 0.082

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
Mito, IBARAKI	7.6	1.2	± 0.10	0.000	± 0.059
Utsunomiya, TOCHIGI	7.2	0.58	± 0.068	0.090	± 0.058
Maebashi, GUNMA	7.3	1.3	± 0.09	0.093	± 0.070
Urawa, SAITAMA	7.0	1.4	± 0.11	0.066	± 0.056
Ichihara, CHIBA	7	1.8	± 0.10	0.000	± 0.070
Katsushika, TOKYO	6.9	1.5	± 0.19	0.27	± 0.10
Yokohama, KANAGAWA	6.9	0.57	± 0.066	0.000	± 0.048
Kosugi-machi, TOYAMA	6.7	2.7	± 0.12	0.098	± 0.079
Kanazawa, ISHIKAWA	7.26	3.4	± 0.20	0.058	± 0.063
Fukui, FUKUI	6.51	1.1	± 0.13	0.10	± 0.053
Nagano, NAGANO	7.19	0.62	± 0.071	0.072	± 0.060
Gifu, GIFU	7.20	1.5	± 0.35	0.000	± 0.043
Shizuoka, SHIZUOKA	7.5	0.74	± 0.067	0.070	± 0.081
Nagoya, AICHI	6.8	2.5	± 0.13	0.29	± 0.096
Tsu, MIE	7.2	2.6	± 0.13	0.000	± 0.050
Ootsu, SHIGA	6.5	3.4	± 0.25	0.084	± 0.065
Osaka, OSAKA	7.2	3.3	± 0.18	0.027	± 0.052
Kobe, HYOUGO	7.60	1.1	± 0.13	0.000	± 0.060
Nara, NARA	6.4	3.0	± 0.23	0.011	± 0.055
Matsue, SHIMANE	—	4.3	± 0.23	0.072	± 0.082
Okayama, OKAYAMA	6.6	2.5	± 0.12	0.046	± 0.077
Takamatsu, KAGAWA	7.9	2.7	± 0.13	0.000	± 0.053
Matsuyama, EHIME	7.8	1.8	± 0.10	0.018	± 0.076
Kochi, KOCHI	6.7	1.7	± 0.10	0.066	± 0.059
Fukuoka, FUKUOKA	7.6	3.0	± 0.14	0.000	± 0.054
Saga, SAGA	7.46	1.4	± 0.16	0.075	± 0.077

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
Nagasaki, NAGASAKI	7.5	2.5	± 0.18	0.082	± 0.053
Kumamoto, KUMAMOTO	7.28	0.12	± 0.043	0.17	± 0.069
Ooita, OOITA	7.3	0.83	± 0.13	0.27	± 0.071
Miyazaki, MIYAZAKI	7.02	1.0	± 0.09	0.026	± 0.049
Kagoshima, KAGOSHIMA	7.6	0.48	± 0.061	0.16	± 0.066
Naha, Okinawa	7.39	3.4	± 0.22	0.11	± 0.092
January, 1995					
Kyoto, KYOTO	7.42	3.5	± 0.22	0.12	± 0.080
Tokushima, TOKUSHIMA	6.9	1.7	± 0.11	0.062	± 0.083
Febraly, 1995					
Niigata, NIIGATA	7.62	2.5	± 0.12	0.042	± 0.085
Tottori, TOTTORI	7.0	2.0	± 0.18	0.094	± 0.078
Hiroshima, HIROSHIMA	6.85	1.7	± 0.10	0.057	± 0.080

(4) Strontium-90 and cesium-137 in Freshwater
(from Oct. 1994 to Mar. 1995)

-continued from No. 110 of this publication-

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

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
(FreshWater)					
October, 1994					
Fukushima, FUKUSHIMA	7.5	1.6	± 0.10	0.13	± 0.066
November, 1994					
Niigata, NIIGATA	7.06	3.4	± 0.22	0.24	± 0.11
December, 1994					
Uji, KYOTO	7.41	0.000	± 0.083	0.053	± 0.078
Shobara, HIROSHIMA	6.75	1.4	± 0.09	0.011	± 0.069
January, 1995					
Suwa, NAGANO	7.25	0.91	± 0.083	0.25	± 0.089

(5) Strontium-90 and Cesium-137 in Soil
(from Oct. 1994 to Mar. 1995)
-continued from No. 110 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/km²)	^{137}Cs (Bq/kg) (dried Soil)	^{137}Cs (MBq/km²)
October, 1994					
Iwatesan-machi, IWATE	0～ 5	3.0 ± 0.14	100 ± 5	7.3 ± 0.30	250 ± 10
	5～20	1.8 ± 0.11	290 ± 18	1.5 ± 0.14	250 ± 23

(6) Strontium-90 and Cesium-137 in Sea Water
(from Oct. 1994 to Mar. 1995)
-continued from No. 110 of this publication-

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

Location	Sample volume analyzed (ℓ)	Cl (ℓ)	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
October, 1994				
Katsuren-machi, Okinawa	40.0	—	2.3 ± 0.19	3.3 ± 0.35

(7) Strontium-90 and Cesium-137 in Sea Sediments
(from Oct. 1994 to Mar. 1995)
-continued from No. 110 of this publication-

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)
October, 1994			
Katsuren-machi, Okinawa	17.7	0.13 ± 0.073	0.40 ± 0.091

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

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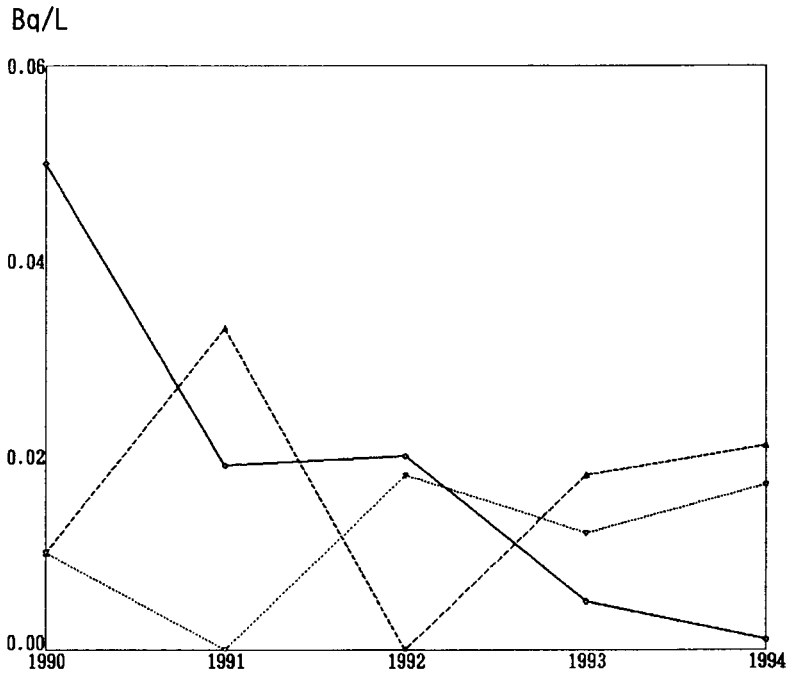

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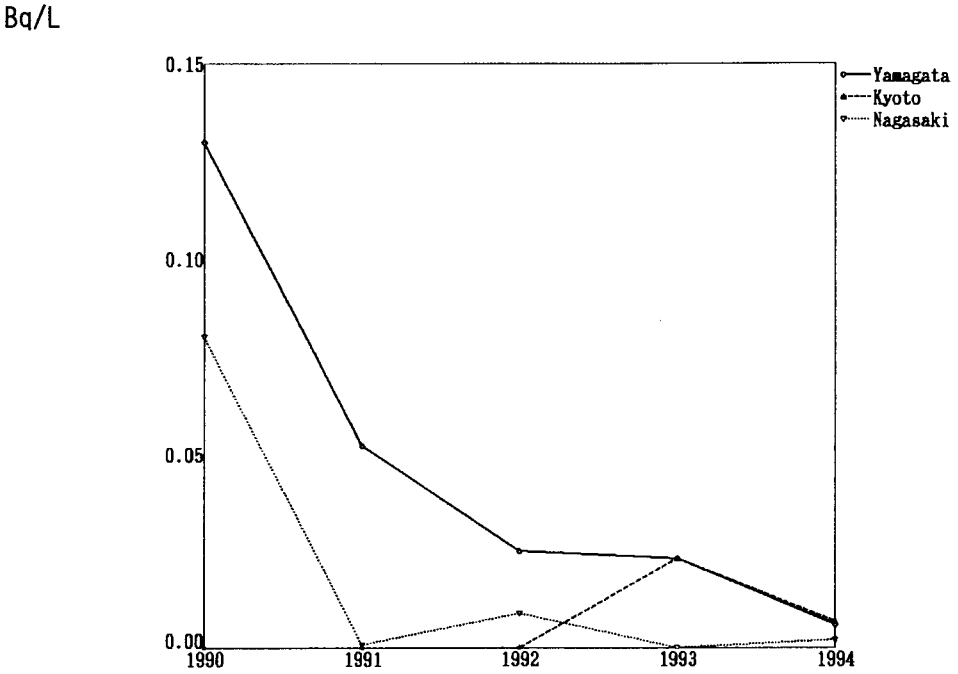

Fig. 1—1

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

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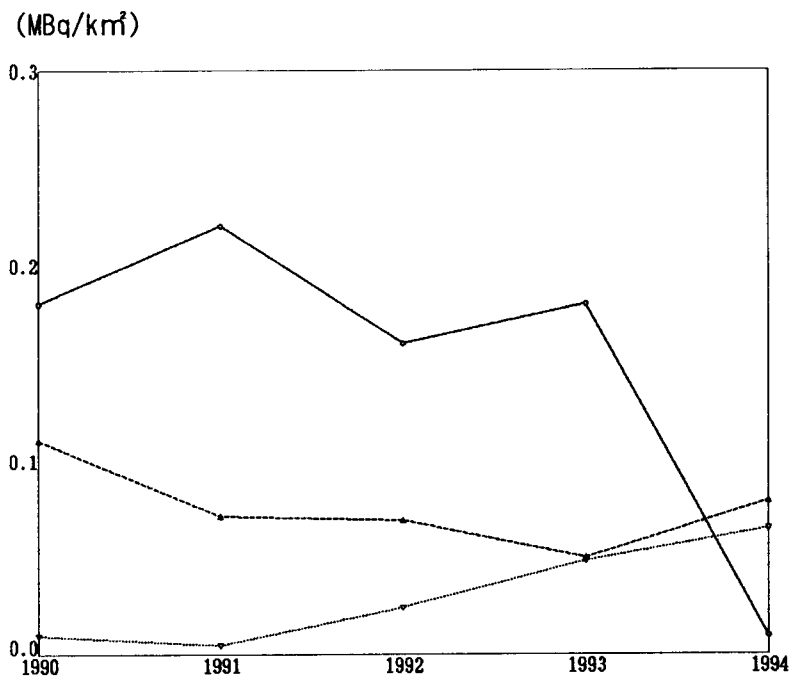

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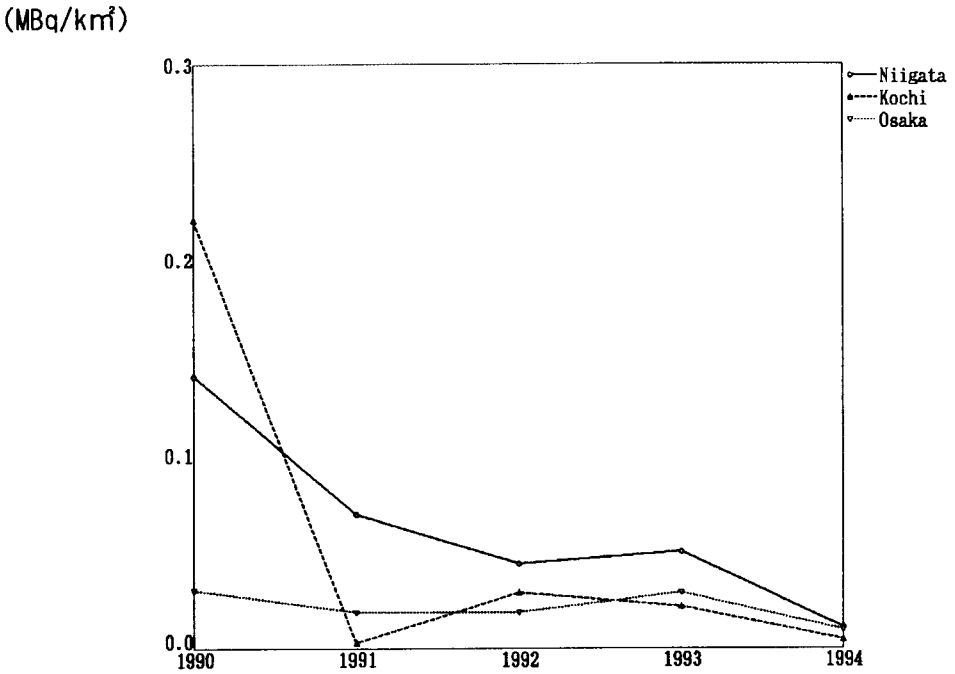

Fig. 1—2

* * Airborne Dust * *

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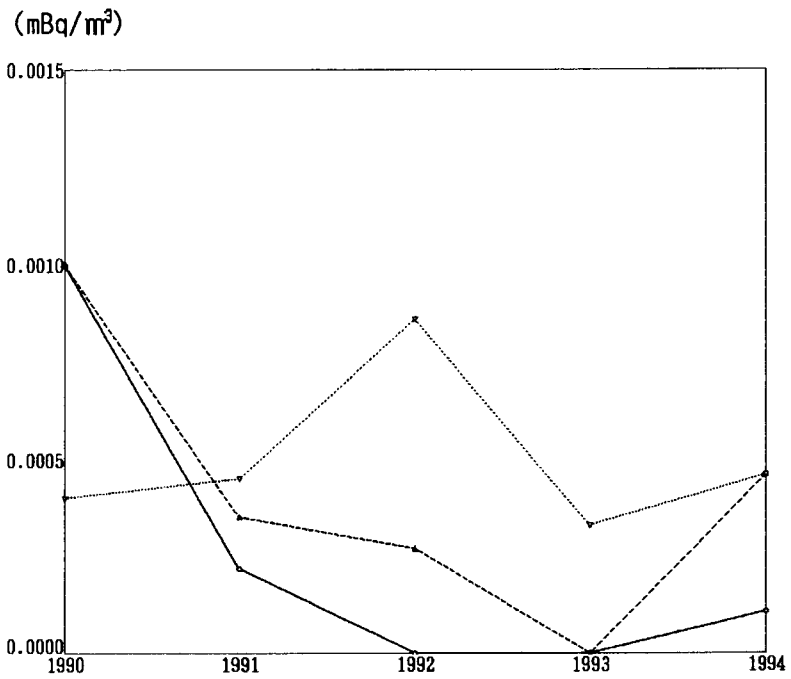

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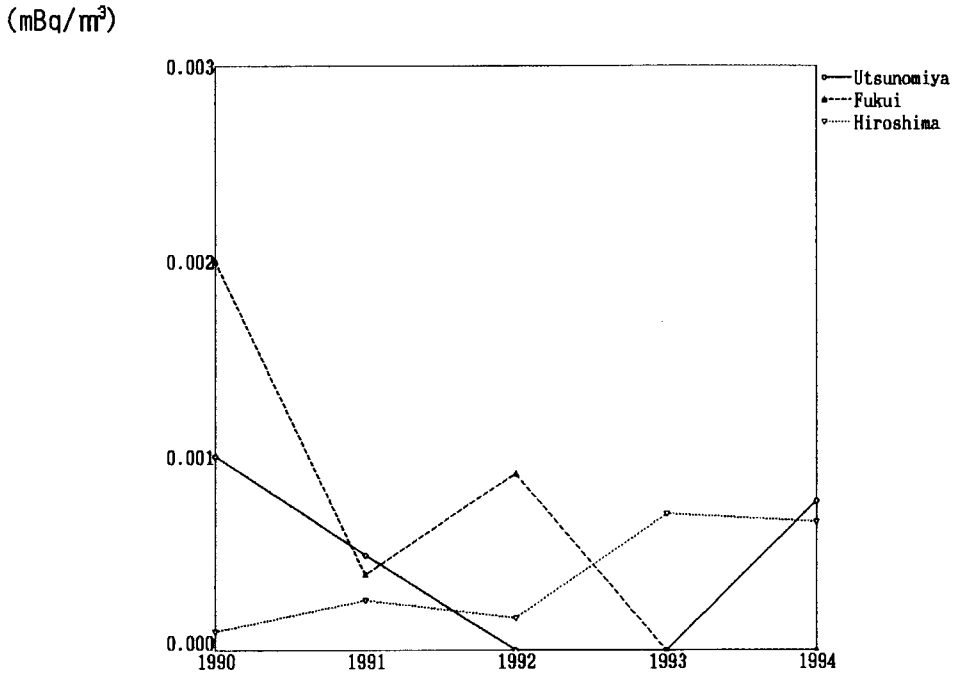
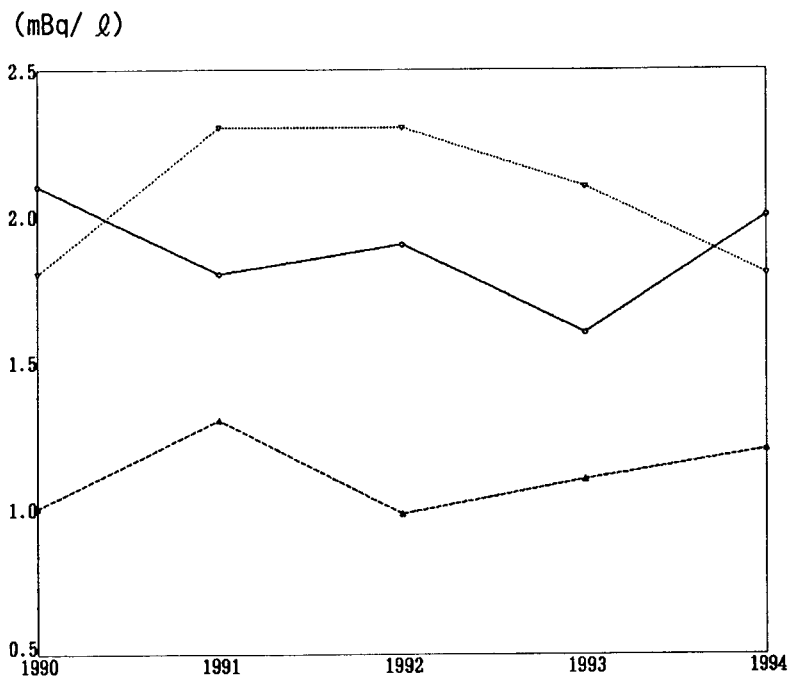


Fig. 2

＊ ＊ Service Water (Source Water) ＊ ＊

<Strontium-90>



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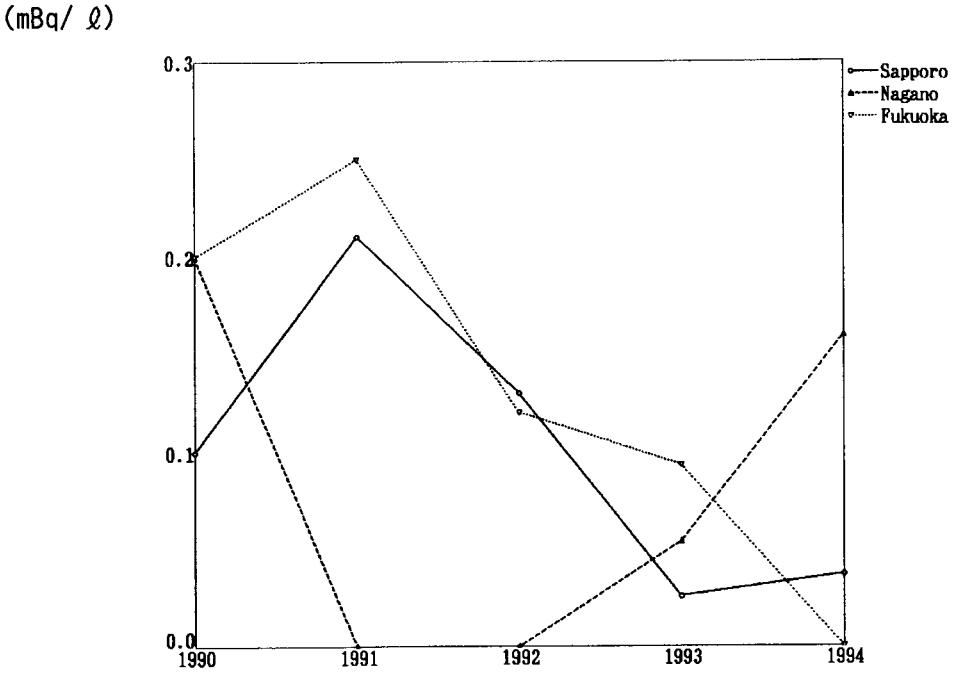

Fig. 3—1

＊ ＊ Service Water (Tap Water) ＊ ＊

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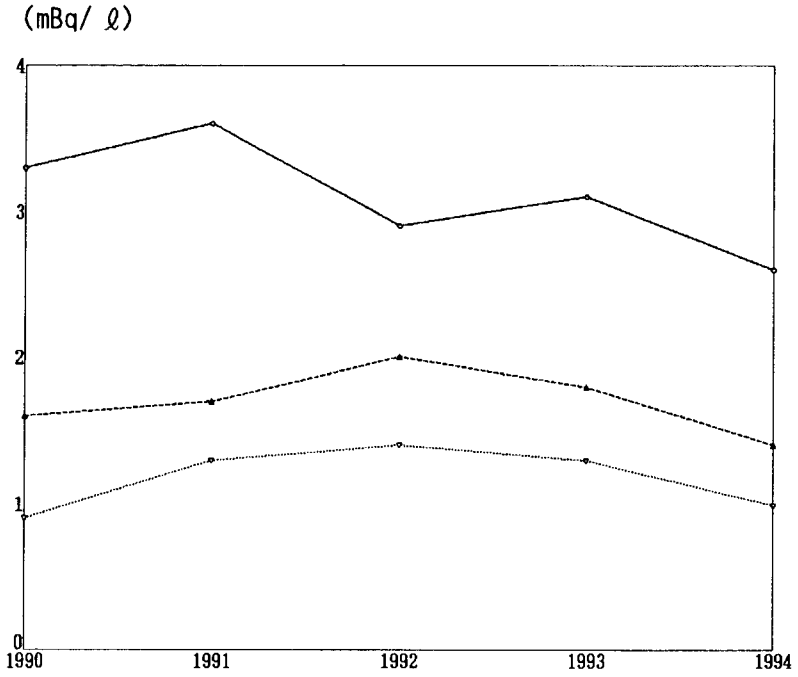

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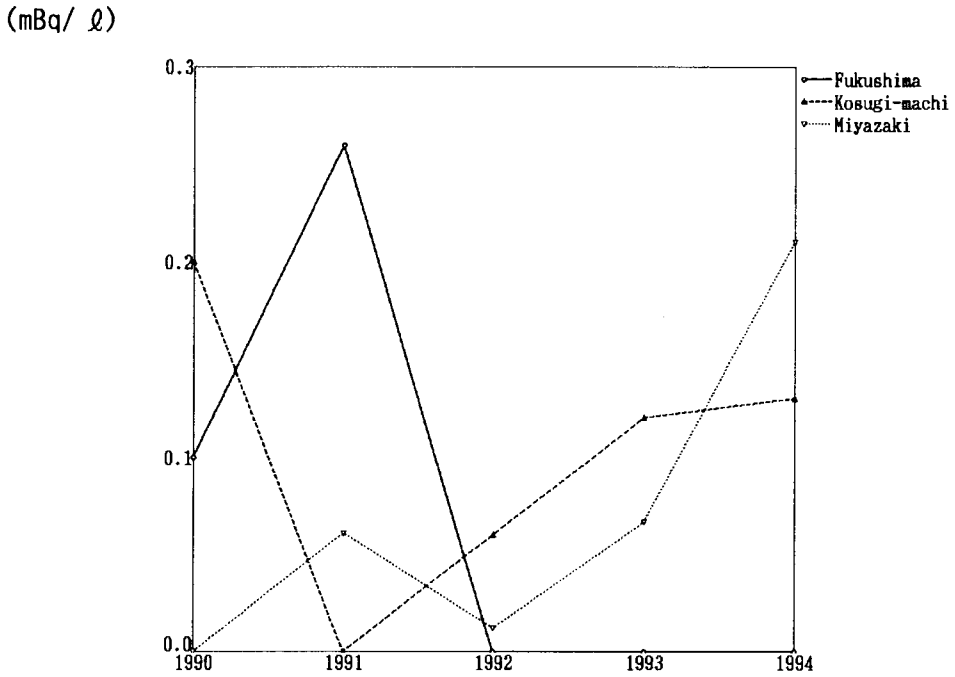
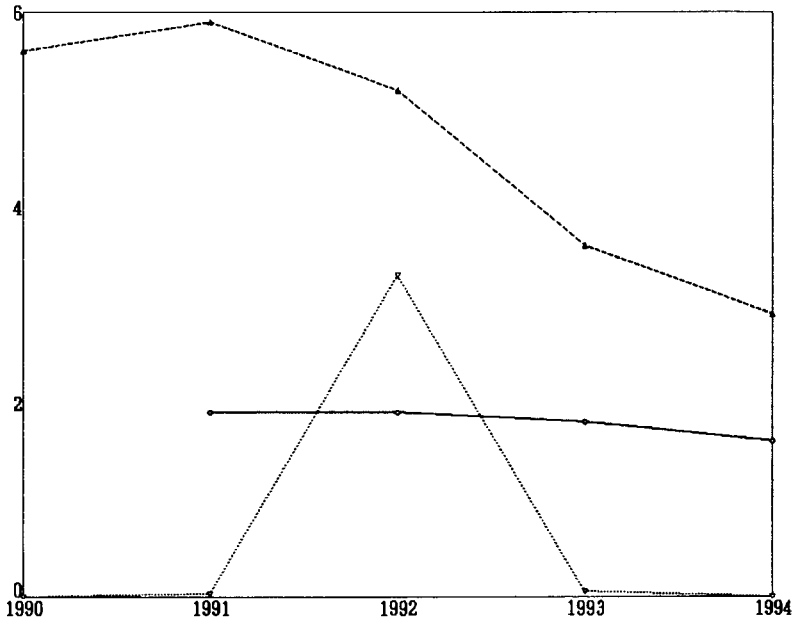


Fig. 3—2

* * Fresh Water * *

<Strontium-90>

(mBq/ ℓ)



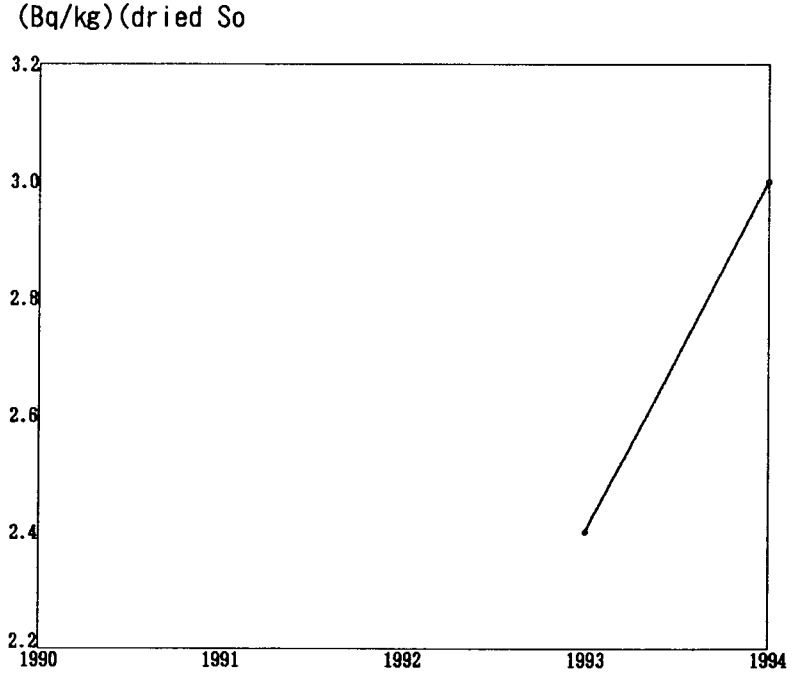
<Cesium-137>

(mBq/ ℓ)

Fig. 4

＊ ＊ Soil ＊ ＊

<Strontium-90>



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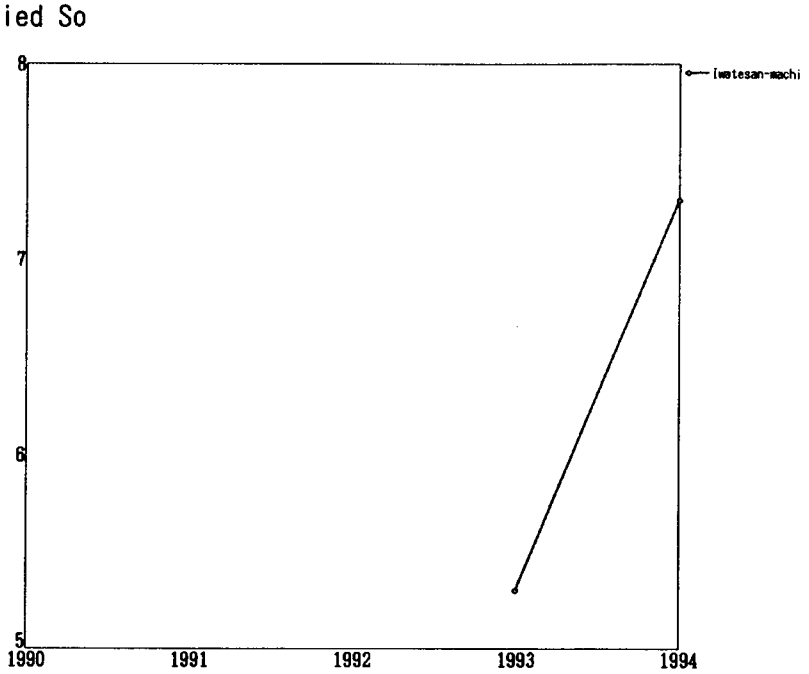
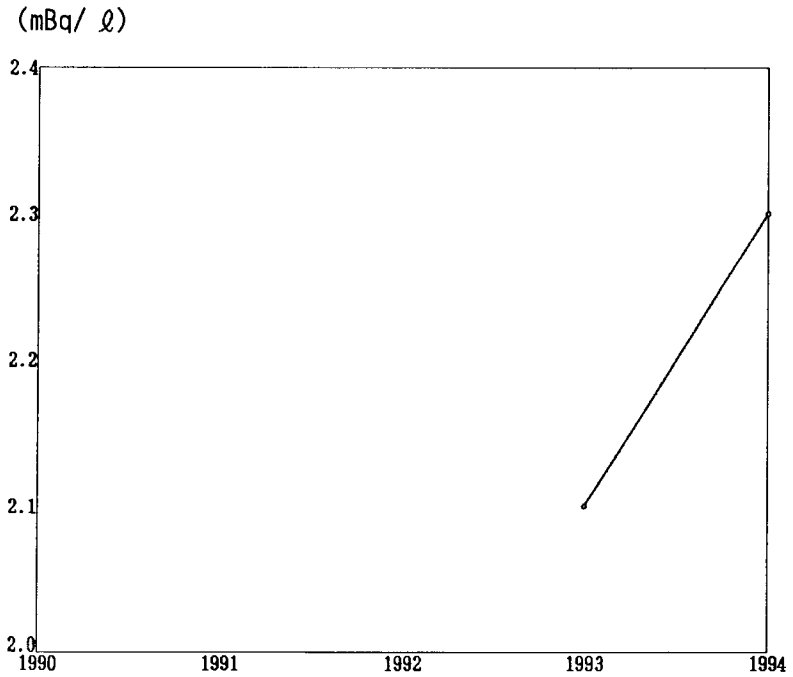


Fig. 5

* * Sea Water * *

<Strontium-90>



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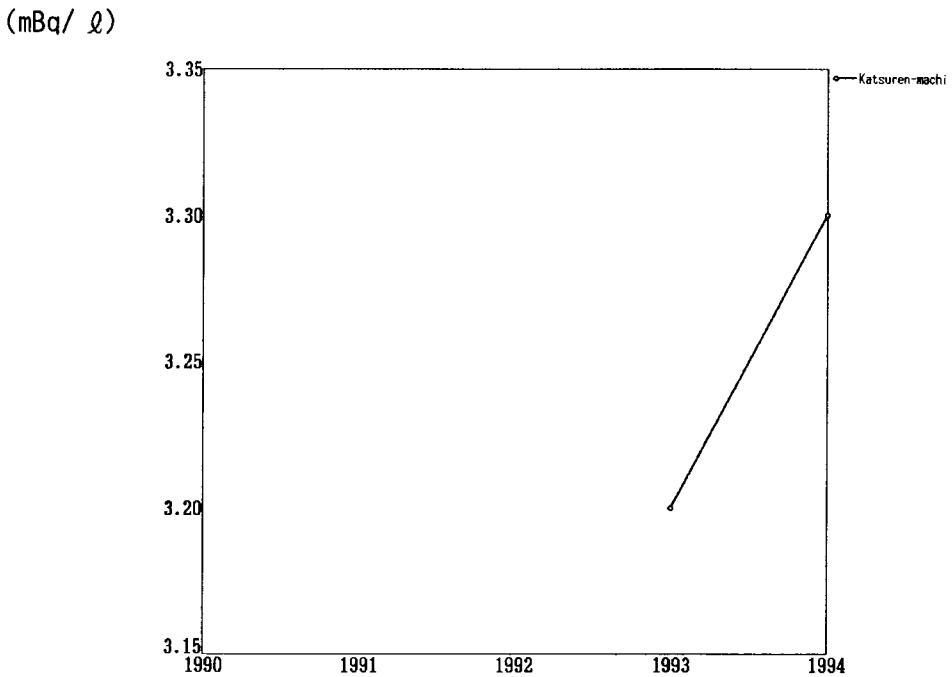
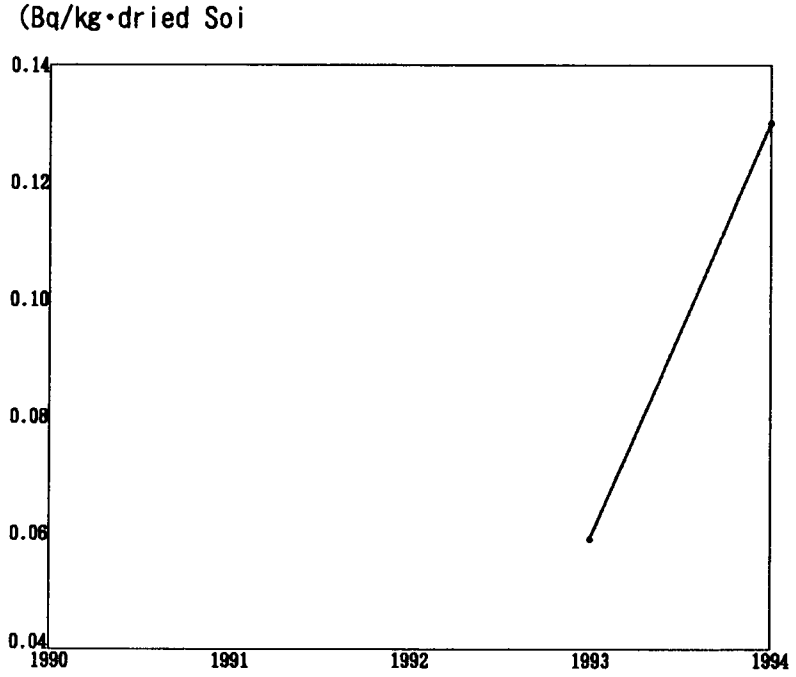


Fig. 6

* * Sea Sediments * *

<Strontium-90>



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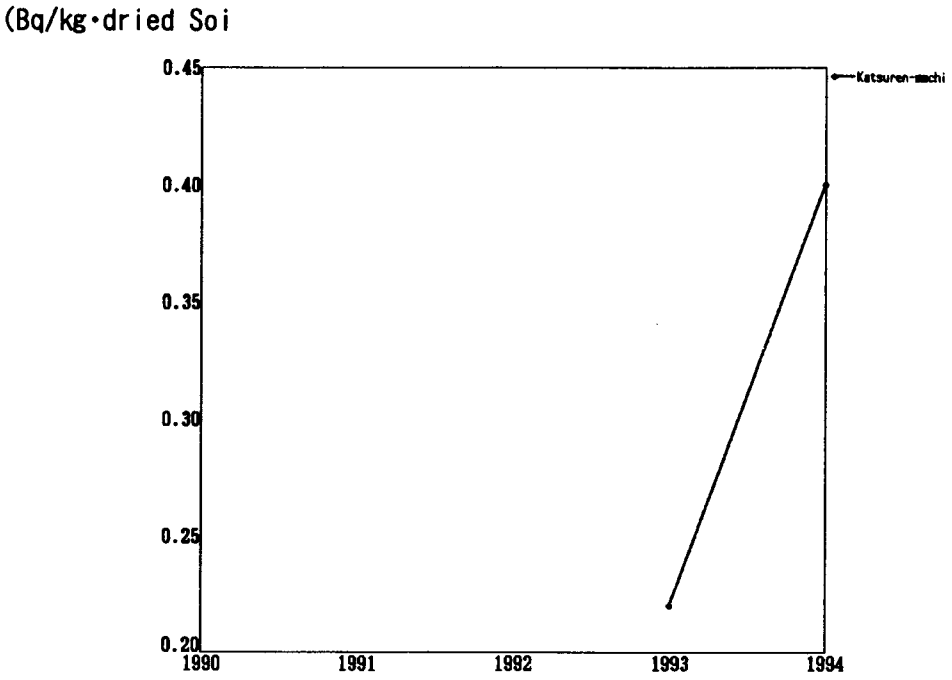

Fig. 7

* * Sampling Locations in Japan * * (36)

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: Maebashi
15: Nagano
16: Yokohama
17: Toyama
18: Kouhu
19: Kanazawa
20: Shizuoka
21: Gifu
22: Fukui
23: Nagoya
24: Tsu
25: Ootsu
26: Kyoto
27: Nara
28: Osaka
29: Tottori
30: Kobe
31: Wakayama
32: Okayama
33: Matsue
34: Tokushima
35: Takamatsu
36: Hiroshima
37: Kochi
38: Matsuyama
39: Yamaguchi
40: Ooita
41: Fukuoka
42: Saga
43: Kumamoto
44: Miyazaki
45: Nagasaki
46: Kagoshima
47: Naha