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Part 1
= Environmental Materials =

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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 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. 1993 to Mar. 1994)

-continued from No, 106 of this publication-

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

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
October, 1993				
Sapporo, HOKKAIDOU	32	270.5	0.061 ± 0.018	0.024 ± 0.017
Aomori, AOMORI	32	80.0	0.010 ± 0.013	0.009 ± 0.010
Morioka, IWATE	32	69.5	0.005 ± 0.019	0.000 ± 0.011
Onagawa-machi, MIYAGI	32	120.5	0.0041 ± 0.0084	0.000 ± 0.010
Yamagata, YAMAGATA	32	77.8	0.011 ± 0.017	0.003 ± 0.016
Ookuma-machi, FUKUSHIMA	32	89.5	0.020 ± 0.016	0.008 ± 0.017
Mito, IBARAKI	32	136.0	0.003 ± 0.022	0.14 ± 0.023
Utsunomiya, TOCHIGI	32	66.8	0.000 ± 0.017	0.005 ± 0.012
Maebashi, GUNMA	32	76.0	0.0011 ± 0.0073	0.038 ± 0.015
Urawa, SAITAMA	32	153.3	0.010 ± 0.0070	0.000 ± 0.011
Ichihara, CHIBA	32	146.2	0.032 ± 0.019	0.014 ± 0.017
Shinjuku, TOKYO	32	164.2	0.0098 ± 0.0086	0.000 ± 0.015
Yokohama, KANAGAWA	32	154.1	0.030 ± 0.022	0.000 ± 0.014
Kosugi-machi, TOYAMA	32	131.1	0.026 ± 0.0088	0.000 ± 0.012
Fukui, FUKUI	32	144.6	0.039 ± 0.038	0.000 ± 0.075
Koufu, YAMANASHI	32	115.5	0.000 ± 0.011	0.017 ± 0.011
Gifu, GIFU	32	111.0	0.0000 ± 0.0097	0.000 ± 0.015
Shizuoka, SHIZUOKA	32	254.0	0.0098 ± 0.0084	0.025 ± 0.018
Nagoya, AICHI	32	99.3	0.0051 ± 0.0071	0.013 ± 0.017
Tsu, MIE	32	102.0	0.000 ± 0.018	0.041 ± 0.018
Ootsu, SHIGA	32	103.0	0.011 ± 0.012	0.019 ± 0.017
Kyoto, KYOTO	30	99.0	0.000 ± 0.011	0.006 ± 0.010
Kobe, HYOUGO	30	83.4	0.000 ± 0.019	0.000 ± 0.011
Nara, NARA	32	143.1	0.025 ± 0.010	0.000 ± 0.016
Wakayama, WAKAYAMA	21	14.0	0.047 ± 0.020	0.000 ± 0.014
Tottori, TOTTORI	32	63.4	0.050 ± 0.020	0.025 ± 0.016

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Matsue, SHIMANE	32	56.3	0.0067 ± 0.0047	0.011 ± 0.010
Hiroshima, HIROSHIMA	28	99.9	0.000 ± 0.016	0.005 ± 0.016
Ishii-machi, TOKUSHIMA	32	142.8	0.017 ± 0.0090	0.019 ± 0.016
Takamatsu, KAGAWA	32	71.5	0.019 ± 0.0081	0.000 ± 0.012
Matsuyama, EHIME	32	63.5	0.000 ± 0.019	0.000 ± 0.010
Dazaifu, FUKUOKA	32	97.4	0.014 ± 0.0068	0.000 ± 0.016
Saga, SAGA	32	67.6	0.0039 ± 0.0064	0.000 ± 0.017
Nagasaki, NAGASAKI	32	59.0	0.043 ± 0.016	0.009 ± 0.016
Kumamoto, KUMAMOTO	32	51.4	0.005 ± 0.018	0.000 ± 0.014
Ooita, OOITA	32	127.4	0.002 ± 0.018	0.0087 ± 0.0098
Miyazaki, MIYAZAKI	32	197.9	0.000 ± 0.021	0.000 ± 0.016
Yonagusuku-mura, Okinawa	33	128.5	0.006 ± 0.015	0.000 ± 0.013
November, 1993				
Sapporo, HOKKAIDOU	31	54.5	0.029 ± 0.016	0.029 ± 0.018
Aomori, AOMORI	30	58.0	0.037 ± 0.020	0.001 ± 0.011
Morioka, IWATE	31	77.9	0.006 ± 0.020	0.000 ± 0.011
Onagawa-machi, MIYAGI	32	117.5	0.025 ± 0.010	0.000 ± 0.011
Yamagata, YAMAGATA	31	66.2	0.000 ± 0.019	0.032 ± 0.013
Ookuma-machi, FUKUSHIMA	31	259.9	0.022 ± 0.017	0.009 ± 0.013
Mito, IBARAKI	31	100.5	0.003 ± 0.022	0.058 ± 0.018
Utsunomiya, TOCHIGI	31	107.7	0.018 ± 0.018	0.012 ± 0.011
Maebashi, GUNMA	32	99.5	0.019 ± 0.017	0.014 ± 0.016
Urawa, SAITAMA	31	80.3	0.0030 ± 0.0058	0.000 ± 0.012
Ichihara, CHIBA	31	198.4	0.006 ± 0.019	0.001 ± 0.016
Shinjuku, TOKYO	31	172.3	0.015 ± 0.012	0.008 ± 0.016
Yokohama, KANAGAWA	30	228.1	0.030 ± 0.018	0.021 ± 0.015
Kosugi-machi, TOYAMA	31	162.1	0.012 ± 0.0078	0.000 ± 0.011

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Fukui, FUKUI	36	201.4	0.000 ± 0.035	0.000 ± 0.081
Koufu, YAMANASHI	32	77.5	0.018 ± 0.013	0.031 ± 0.013
Gifu, GIFU	31	139.0	0.002 ± 0.011	0.000 ± 0.012
Shizuoka, SHIZUOKA	31	181.5	0.016 ± 0.0076	0.000 ± 0.016
Nagoya, AICHI	31	145.4	0.0067 ± 0.0078	0.013 ± 0.017
Tsu, MIE	30	228.5	0.015 ± 0.0086	0.000 ± 0.016
Ootsu, SHIGA	31	131.0	0.000 ± 0.024	0.006 ± 0.015
Kyoto, KYOTO	33	136.0	0.032 ± 0.015	0.011 ± 0.011
Kobe, HYOUGO	33	115.4	0.009 ± 0.026	0.000 ± 0.015
Nara, NARA	31	142.3	0.011 ± 0.0097	0.010 ± 0.018
Wakayama, WAKAYAMA	30	169.0	0.00 ± 0.10	0.041 ± 0.030
Tottori, TOTTORI	31	147.0	0.000 ± 0.027	0.000 ± 0.014
Matsue, SHIMANE	31	159.0	0.028 ± 0.013	0.0042 ± 0.0081
Hiroshima, HIROSHIMA	32	151.4	0.0092 ± 0.0064	0.014 ± 0.016
Ishii-machi, TOKUSHIMA	29	199.0	0.0073 ± 0.0088	0.000 ± 0.014
Takamatsu, KAGAWA	29	68.5	0.000 ± 0.018	0.000 ± 0.010
Matsuyama, EHIME	31	100.0	0.026 ± 0.0092	0.018 ± 0.016
Dazaifu, FUKUOKA	31	160.4	0.029 ± 0.0082	0.000 ± 0.017
Saga, SAGA	31	151.4	0.0087 ± 0.0070	0.002 ± 0.016
Nagasaki, NAGASAKI	31	130.5	0.0084 ± 0.0064	0.002 ± 0.010
Kumamoto, KUMAMOTO	31	73.5	0.032 ± 0.017	0.000 ± 0.014
Ooita, OOITA	31	212.0	0.0047 ± 0.0072	0.0000 ± 0.0094
Miyazaki, MIYAZAKI	31	332.4	0.49 ± 0.046	0.001 ± 0.016
Yonagusuku-mura, Okinawa	30	118.0	0.000 ± 0.014	0.000 ± 0.013
December, 1993				
Sapporo, HOKKAIDOU	28	55.0	0.0095 ± 0.0068	0.016 ± 0.014
Aomori, AOMORI	36	87.5	0.047 ± 0.021	0.005 ± 0.013

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Morioka, IWATE	35	36.7	0.000 ± 0.019	0.000 ± 0.012
Onagawa-machi, MIYAGI	35	32.0	0.0013 ± 0.0074	0.029 ± 0.013
Yamagata, YAMAGATA	35	64.5	0.006 ± 0.017	0.042 ± 0.014
Ookuma-machi, FUKUSHIMA	36	29.5	0.010 ± 0.017	0.025 ± 0.013
Mito, IBARAKI	36	68.5	0.005 ± 0.015	0.040 ± 0.017
Utsunomiya, TOCHIGI	35	30.8	0.0095 ± 0.0073	0.032 ± 0.013
Maebashi, GUNMA	35	16.0	0.0012 ± 0.0071	0.019 ± 0.014
Urawa, SAITAMA	36	46.2	0.011 ± 0.0057	0.0099 ± 0.0081
Ichihara, CHIBA	35	81.0	0.000 ± 0.023	0.013 ± 0.017
Shinjuku, TOKYO	35	62.1	0.031 ± 0.010	0.005 ± 0.014
Yokohama, KANAGAWA	29	75.9	0.035 ± 0.0093	0.008 ± 0.017
Kosugi-machi, TOYAMA	35	252.1	0.017 ± 0.0080	0.033 ± 0.013
Fukui, FUKUI	35	253.3	0.12 ± 0.098	0.041 ± 0.060
Koufu, YAMANASHI	34	43.0	0.008 ± 0.011	0.004 ± 0.017
Gifu, GIFU	35	79.0	0.022 ± 0.026	0.000 ± 0.013
Shizuoka, SHIZUOKA	36	129.5	0.034 ± 0.018	0.002 ± 0.011
Nagoya, AICHI	35	47.7	0.000 ± 0.017	0.010 ± 0.016
Tsu, MIE	36	37.0	0.000 ± 0.022	0.093 ± 0.020
Ootsu, SHIGA	37	49.7	0.000 ± 0.020	0.008 ± 0.017
Kyoto, KYOTO	28	38.0	0.025 ± 0.014	0.001 ± 0.012
Kobe, HYOUGO	29	46.8	0.033 ± 0.0088	0.000 ± 0.014
Nara, NARA	35	62.4	0.053 ± 0.022	0.011 ± 0.013
Wakayama, WAKAYAMA	35	53.0	0.000 ± 0.024	0.002 ± 0.012
Tottori, TOTTORI	36	223.7	0.040 ± 0.019	0.060 ± 0.019
Matsue, SHIMANE	32	172.5	0.020 ± 0.013	0.068 ± 0.012
Hiroshima, HIROSHIMA	35	49.5	0.025 ± 0.018	0.021 ± 0.016
Ishii-machi, TOKUSHIMA	38	34.0	0.0064 ± 0.0093	0.000 ± 0.014

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Takamatsu, KAGAWA	32	35.5	0.017 ± 0.025	0.009 ± 0.016
Matsuyama, EHIME	35	61.5	0.013 ± 0.0081	0.002 ± 0.016
Dazaifu, FUKUOKA	35	64.0	0.026 ± 0.022	0.025 ± 0.016
Saga, SAGA	35	47.1	0.018 ± 0.020	0.021 ± 0.019
Nagasaki, NAGASAKI	35	99.5	0.010 ± 0.0068	0.003 ± 0.010
Kumamoto, KUMAMOTO	35	91.7	0.00 ± 0.12	0.017 ± 0.016
Ooita, OOITA	35	35.6	0.012 ± 0.0080	0.002 ± 0.011
Miyazaki, MIYAZAKI	35	77.8	0.069 ± 0.019	0.014 ± 0.012
Yonagusuku-mura, Okinawa	37	17.0	0.022 ± 0.019	0.006 ± 0.012
January, 1994				
Sapporo, HOKKAIDOU	33	55.5	0.000 ± 0.017	0.010 ± 0.016
Aomori, AOMORI	28	77.5	0.022 ± 0.019	0.018 ± 0.012
Morioka, IWATE	28	40.6	0.000 ± 0.011	0.000 ± 0.011
Onagawa-machi, MIYAGI	28	22.5	0.012 ± 0.0080	0.017 ± 0.013
Yamagata, YAMAGATA	29	43.4	0.0011 ± 0.0064	0.006 ± 0.013
Ookuma-machi, FUKUSHIMA	28	20.0	0.020 ± 0.0074	0.030 ± 0.014
Mito, IBARAKI	28	35.0	0.000 ± 0.016	0.064 ± 0.018
Utsunomiya, TOCHIGI	29	31.9	0.008 ± 0.011	0.007 ± 0.010
Maebashi, GUNMA	28	25.5	0.038 ± 0.021	0.027 ± 0.017
Urawa, SAITAMA	28	46.8	0.034 ± 0.0081	0.049 ± 0.011
Ichihara, CHIBA	29	64.8	0.011 ± 0.025	0.006 ± 0.017
Shinjuku, TOKYO	29	56.8	0.019 ± 0.013	0.022 ± 0.014
Yokohama, KANAGAWA	35	53.7	0.023 ± 0.0079	0.086 ± 0.018
Kosugi-machi, TOYAMA	29	219.6	0.040 ± 0.0096	0.036 ± 0.017
Fukui, FUKUI	30	257.6	0.022 ± 0.036	0.13 ± 0.068
Koufu, YAMANASHI	29	24.0	0.031 ± 0.014	0.025 ± 0.016
Gifu, GIFU	29	20.0	0.016 ± 0.014	0.0042 ± 0.0094

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Shizuoka, SHIZUOKA	28	66.5	0.033 ± 0.018	0.026 ± 0.013
Nagoya, AICHI	29	25.9	0.031 ± 0.015	0.012 ± 0.015
Tsu, MIE	29	20.0	0.012 ± 0.0087	0.055 ± 0.020
Ootsu, SHIGA	27	41.8	0.073 ± 0.031	0.0000 ± 0.0098
Kyoto, KYOTO	36	43.5	0.021 ± 0.013	0.007 ± 0.013
Kobe, HYOUGO	35	37.0	0.027 ± 0.019	0.006 ± 0.013
Nara, NARA	29	64.5	0.008 ± 0.020	0.000 ± 0.011
Wakayama, WAKAYAMA	29	25.5	0.000 ± 0.026	0.011 ± 0.015
Tottori, TOTTORI	28	173.0	0.083 ± 0.021	0.020 ± 0.017
Matsue, SHIMANE	32	154.8	0.031 ± 0.0097	0.047 ± 0.011
Hiroshima, HIROSHIMA	27	36.9	0.018 ± 0.012	0.007 ± 0.012
Ishii-machi, TOKUSHIMA	28	24.5	0.028 ± 0.013	0.007 ± 0.013
Takamatsu, KAGAWA	34	14.0	0.0051 ± 0.0061	0.000 ± 0.013
Matsuyama, EHIME	29	30.5	0.000 ± 0.023	0.000 ± 0.013
Dazaifu, FUKUOKA	29	61.7	0.005 ± 0.020	0.011 ± 0.012
Saga, SAGA	29	41.8	0.035 ± 0.0091	0.019 ± 0.012
Nagasaki, NAGASAKI	30	51.5	0.017 ± 0.0071	0.0022 ± 0.0095
Kumamoto, KUMAMOTO	29	34.8	0.010 ± 0.019	0.000 ± 0.011
Ooita, OOITA	29	24.5	0.021 ± 0.0082	0.019 ± 0.011
Miyazaki, MIYAZAKI	29	53.1	0.010 ± 0.012	0.0000 ± 0.0094
Yonagusuku-mura, Okinawa Febraly,1994	27	96.0	0.000 ± 0.014	0.015 ± 0.014
Sapporo, HOKKAIDOU	28	131.0	0.000 ± 0.017	0.036 ± 0.017
Aomori, AOMORI	29	59.5	0.046 ± 0.021	0.047 ± 0.014
Morioka, IWATE	29	33.1	0.002 ± 0.016	0.000 ± 0.010
Onagawa-machi, MIYAGI	29	54.0	0.0032 ± 0.0074	0.046 ± 0.014
Yamagata, YAMAGATA	29	71.2	0.0074 ± 0.0080	0.037 ± 0.016

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Ookuma-machi, FUKUSHIMA	29	62.7	0.058 ± 0.020	0.16 ± 0.023
Mito, IBARAKI	29	69.5	0.016 ± 0.017	0.028 ± 0.017
Utsunomiya, TOCHIGI	29	49.1	0.012 ± 0.011	0.022 ± 0.012
Maebashi, GUNMA	29	37.5	0.020 ± 0.018	0.089 ± 0.018
Urawa, SAITAMA	29	66.4	0.017 ± 0.0063	0.044 ± 0.012
Ichihara, CHIBA	29	89.4	0.026 ± 0.021	0.027 ± 0.017
Shinjuku, TOKYO	29	90.0	0.016 ± 0.013	0.045 ± 0.015
Yokohama, KANAGAWA	29	85.9	0.019 ± 0.0089	0.069 ± 0.017
Kosugi-machi, TOYAMA	29	194.2	0.011 ± 0.019	0.043 ± 0.016
Fukui, FUKUI	28	136.4	0.000 ± 0.035	0.000 ± 0.077
Koufu, YAMANASHI	29	45.0	0.016 ± 0.013	0.040 ± 0.017
Gifu, GIFU	29	88.0	0.017 ± 0.040	0.021 ± 0.013
Shizuoka, SHIZUOKA	29	72.5	0.050 ± 0.021	0.071 ± 0.015
Nagoya, AICHI	29	81.7	0.016 ± 0.015	0.020 ± 0.020
Tsu, MIE	29	73.5	0.000 ± 0.046	0.20 ± 0.024
Ootsu, SHIGA	29	61.2	0.026 ± 0.011	0.009 ± 0.016
Kyoto, KYOTO	29	56.0	0.035 ± 0.015	0.000 ± 0.011
Kobe, HYOUGO	29	41.2	0.000 ± 0.019	0.023 ± 0.013
Nara, NARA	30	56.8	0.027 ± 0.021	0.001 ± 0.011
Wakayama, WAKAYAMA	23	40.0	0.000 ± 0.027	0.018 ± 0.016
Tottori, TOTTORI	29	125.0	0.047 ± 0.021	0.038 ± 0.018
Matsue, SHIMANE	29	177.7	0.039 ± 0.014	0.10 ± 0.015
Hiroshima, HIROSHIMA	29	98.2	0.024 ± 0.023	0.001 ± 0.012
Ishii-machi, TOKUSHIMA	30	59.0	0.018 ± 0.012	0.0000 ± 0.0077
Takamatsu, KAGAWA	29	40.5	0.0075 ± 0.0064	0.000 ± 0.012
Matsuyama, EHIME	29	88.0	0.004 ± 0.019	0.015 ± 0.018
Dazaifu, FUKUOKA	29	94.4	0.016 ± 0.020	0.065 ± 0.015

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Saga, SAGA	29	62.0	0.013 ± 0.013	0.023 ± 0.016
Nagasaki, NAGASAKI	28	113.0	0.042 ± 0.024	0.028 ± 0.013
Kumamoto, KUMAMOTO	29	69.8	0.018 ± 0.0083	0.000 ± 0.014
Ooita, OOITA	29	101.5	0.000 ± 0.011	0.010 ± 0.011
Miyazaki, MIYAZAKI	29	178.2	0.033 ± 0.014	0.033 ± 0.013
Yonagusuku-mura, Okinawa	29	120.0	0.000 ± 0.014	0.003 ± 0.013
March, 1994				
Sapporo, HOKKAIDOU	32	100.5	0.000 ± 0.012	0.015 ± 0.012
Aomori, AOMORI	32	47.0	0.086 ± 0.028	0.042 ± 0.013
Morioka, IWATE	32	53.8	0.000 ± 0.015	0.021 ± 0.012
Onagawa-machi, MIYAGI	32	113.5	0.025 ± 0.0091	0.032 ± 0.013
Yamagata, YAMAGATA	32	37.1	0.011 ± 0.014	0.047 ± 0.014
Ookuma-machi, FUKUSHIMA	32	122.3	0.053 ± 0.019	0.046 ± 0.017
Mito, IBARAKI	32	137.5	0.041 ± 0.018	0.027 ± 0.016
Utsunomiya, TOCHIGI	35	82.5	0.029 ± 0.022	0.046 ± 0.015
Maebashi, GUNMA	32	57.0	0.017 ± 0.019	0.16 ± 0.025
Urawa, SAITAMA	32	91.8	0.015 ± 0.0056	0.029 ± 0.011
Ichihara, CHIBA	32	188.2	0.020 ± 0.037	0.018 ± 0.016
Shinjuku, TOKYO	32	112.0	0.000 ± 0.011	0.023 ± 0.013
Yokohama, KANAGAWA	32	134.7	0.021 ± 0.013	0.050 ± 0.014
Kosugi-machi, TOYAMA	32	109.0	0.039 ± 0.020	0.035 ± 0.019
Fukui, FUKUI	32	106.4	0.045 ± 0.036	0.000 ± 0.057
Koufu, YAMANASHI	32	72.5	0.023 ± 0.019	0.022 ± 0.015
Gifu, GIFU	32	53.5	0.016 ± 0.0083	0.004 ± 0.012
Shizuoka, SHIZUOKA	32	153.5	0.032 ± 0.019	0.040 ± 0.014
Nagoya, AICHI	32	57.7	0.089 ± 0.028	0.028 ± 0.016
Tsu, MIE	32	46.0	0.064 ± 0.022	0.17 ± 0.024

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Ootsu, SHIGA	32	42.8	0.028 ± 0.019	0.018 ± 0.012
Kyoto, KYOTO	33	38.5	0.032 ± 0.014	0.011 ± 0.013
Kobe, HYOUGO	32	26.7	0.006 ± 0.019	0.035 ± 0.013
Nara, NARA	31	76.4	0.021 ± 0.021	0.000 ± 0.013
Wakayama, WAKAYAMA	31	89.5	0.038 ± 0.021	0.060 ± 0.019
Tottori, TOTTORI	32	115.3	0.056 ± 0.021	0.061 ± 0.018
Matsue, SHIMANE	32	112.9	0.028 ± 0.017	0.073 ± 0.014
Hiroshima, HIROSHIMA	33	88.1	0.014 ± 0.020	0.017 ± 0.016
Ishii-machi, TOKUSHIMA	30	39.5	0.015 ± 0.012	0.039 ± 0.013
Takamatsu, KAGAWA	32	21.5	0.000 ± 0.017	0.015 ± 0.015
Matsuyama, EHIME	32	61.5	0.038 ± 0.021	0.036 ± 0.016
Dazaifu, FUKUOKA	32	61.8	0.020 ± 0.014	0.029 ± 0.017
Saga, SAGA	32	53.0	0.031 ± 0.0083	0.037 ± 0.017
Nagasaki, NAGASAKI	32	71.0	0.036 ± 0.021	0.009 ± 0.013
Kumamoto, KUMAMOTO	32	45.3	0.015 ± 0.013	0.023 ± 0.012
Ooita, OOITA	32	55.1	0.059 ± 0.020	0.032 ± 0.015
Miyazaki, MIYAZAKI	32	102.7	0.014 ± 0.014	0.023 ± 0.013
Yonagusuku-mura, Okinawa	32	205.0	0.033 ± 0.021	0.025 ± 0.019

(1)-2 Strontuim-90 and Cesium-137 in Rain and Dry Fallout (for WHO program)
(from Oct. 1993 to Mar. 1994)

-continued from No, 106 of this publication-

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

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
October, 1993				
Akita, AKITA	32	151.8	0.013 ± 0.0079	0.042 ± 0.015
Chiba, CHIBA	32	137.1	0.000 ± 0.017	0.021 ± 0.0095
Niigata, NIIGATA	32	114.3	0.003 ± 0.012	0.003 ± 0.015
Kanazawa, ISHIKAWA	33	208.0	0.000 ± 0.018	0.035 ± 0.017
Osaka, OSAKA	32	177.3	0.013 ± 0.025	0.000 ± 0.012
Okayama, OKAYAMA	32	69.9	0.021 ± 0.0094	0.001 ± 0.016
Yamaguchi, YAMAGUCHI	32	133.5	0.007 ± 0.018	0.005 ± 0.014
Kochi, KOCHI	32	200.5	0.074 ± 0.022	0.009 ± 0.017
Kagoshima, KAGOSHIMA	30	55.5	0.000 ± 0.011	0.005 ± 0.016
November, 1993				
Akita, AKITA	31	270.9	0.000 ± 0.018	0.017 ± 0.016
Chiba, CHIBA	32	167.1	0.000 ± 0.021	0.0095 ± 0.0097
Niigata, NIIGATA	31	142.6	0.000 ± 0.011	0.012 ± 0.015
Kanazawa, ISHIKAWA	30	190.0	0.0000 ± 0.0077	0.016 ± 0.021
Nagano, NAGANO	31	61.3	0.009 ± 0.013	0.010 ± 0.011
Osaka, OSAKA	36	95.8	0.046 ± 0.028	0.016 ± 0.017
Okayama, OKAYAMA	31	99.0	0.017 ± 0.0096	0.000 ± 0.016
Yamaguchi, YAMAGUCHI	31	202.5	0.000 ± 0.017	0.000 ± 0.011
Kochi, KOCHI	31	361.5	0.062 ± 0.020	0.000 ± 0.012
Kagoshima, KAGOSHIMA	32	66.5	0.021 ± 0.012	0.015 ± 0.017
December, 1993				
Akita, AKITA	31	176.6	0.000 ± 0.022	0.030 ± 0.014
Chiba, CHIBA	35	72.3	0.006 ± 0.021	0.012 ± 0.0090
Niigata, NIIGATA	36	215.4	0.016 ± 0.016	0.045 ± 0.018
Kanazawa, ISHIKAWA	29	273.0	0.053 ± 0.045	0.056 ± 0.018
Nagano, NAGANO	35	43.4	0.010 ± 0.011	0.002 ± 0.011

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
Osaka, OSAKA	31	53.0	0.0000 ± 0.0095	0.021 ± 0.018
Okayama, OKAYAMA	36	45.2	0.028 ± 0.020	0.018 ± 0.013
Yamaguchi, YAMAGUCHI	35	51.5	0.0044 ± 0.0080	0.020 ± 0.016
Kochi, KOCHI	35	41.9	0.087 ± 0.026	0.032 ± 0.017
Kagoshima, KAGOSHIMA	30	102.5	0.081 ± 0.012	0.000 ± 0.017
January, 1994				
Akita, AKITA	33	152.0	0.025 ± 0.020	0.006 ± 0.014
Chiba, CHIBA	29	51.3	0.036 ± 0.025	0.0036 ± 0.0089
Niigata, NIIGATA	28	188.4	0.010 ± 0.012	0.011 ± 0.016
Kanazawa, ISHIKAWA	36	324.0	0.0064 ± 0.0080	0.043 ± 0.016
Nagano, NAGANO	29	27.3	0.000 ± 0.018	0.000 ± 0.015
Osaka, OSAKA	28	47.2	0.065 ± 0.021	0.010 ± 0.019
Okayama, OKAYAMA	28	20.5	0.049 ± 0.022	0.063 ± 0.016
Yamaguchi, YAMAGUCHI	29	78.0	0.013 ± 0.0080	0.009 ± 0.015
Kochi, KOCHI	29	80.2	0.079 ± 0.012	0.005 ± 0.013
Kagoshima, KAGOSHIMA	35	88.5	0.062 ± 0.011	0.000 ± 0.017
Febraly, 1994				
Akita, AKITA	29	93.1	0.002 ± 0.020	0.038 ± 0.017
Chiba, CHIBA	29	79.1	0.037 ± 0.016	0.050 ± 0.015
Niigata, NIIGATA	29	69.7	0.005 ± 0.012	0.14 ± 0.023
Kanazawa, ISHIKAWA	29	175.0	0.023 ± 0.0084	0.050 ± 0.016
Nagano, NAGANO	29	41.2	0.000 ± 0.019	0.012 ± 0.012
Osaka, OSAKA	29	48.1	0.051 ± 0.024	0.007 ± 0.012
Okayama, OKAYAMA	29	67.7	0.032 ± 0.020	0.039 ± 0.014
Yamaguchi, YAMAGUCHI	29	88.0	0.012 ± 0.023	0.077 ± 0.016
Kochi, KOCHI	29	87.8	0.063 ± 0.011	0.038 ± 0.018
Kagoshima, KAGOSHIMA	29	110.0	0.096 ± 0.012	0.062 ± 0.020

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km²)	^{137}Cs (MBq/km²)
March, 1994				
Akita, AKITA	32	81.7	0.021 ± 0.0078	0.044 ± 0.014
Chiba, CHIBA	32	156.1	0.000 ± 0.013	0.017 ± 0.014
Niigata, NIIGATA	32	68.2	0.040 ± 0.022	0.055 ± 0.016
Kanazawa, ISHIKAWA	31	121.5	0.005 ± 0.012	0.027 ± 0.015
Nagano, NAGANO	32	27.4	0.024 ± 0.020	0.005 ± 0.012
Osaka, OSAKA	31	38.2	0.009 ± 0.022	0.009 ± 0.012
Okayama, OKAYAMA	32	43.3	0.037 ± 0.020	0.014 ± 0.012
Yamaguchi, YAMAGUCHI	32	81.0	0.018 ± 0.011	0.024 ± 0.013
Kochi, KOCHI	32	167.1	0.091 ± 0.018	0.042 ± 0.013
Kagoshima, KAGOSHIMA	32	101.0	0.057 ± 0.0099	0.047 ± 0.017

(2) Strontium-90 and Cesium-137 in Airborne Dust
(from Oct. 1993 to Mar. 1994)

-continued from No. 106 of this publication-

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, 1993				
Morioka, IWATE	10~12	8,939.0	0.00039 ± 0.00048	0.00099 ± 0.00045
Akita, AKITA	10~12	10,800.0	0.00075 ± 0.00038	0.00000 ± 0.00053
Yamagata, YAMAGATA	10~12	12,960.0	0.00046 ± 0.00056	0.00022 ± 0.00028
Ookuma-machi, FUKUSHIMA	10~12	9,773.0	0.00000 ± 0.00087	0.00032 ± 0.00052
Mito, IBARAKI	10~12	9,322.8	0.00063 ± 0.00043	0.00087 ± 0.00043
Utsunomiya, TOCHIGI	10~12	14,047.0	0.00029 ± 0.00027	0.00025 ± 0.00028
Maebashi, GUNMA	10~12	14,913.0	0.00000 ± 0.00055	0.00000 ± 0.00030
Ichihara, CHIBA	10~12	12,960.0	0.0014 ± 0.00089	0.00009 ± 0.00034
Yokohama, KANAGAWA	10~12	10,464.0	0.0012 ± 0.00093	0.00000 ± 0.00048
Niigata, NIIGATA	10~12	10,519.0	0.0015 ± 0.00095	0.00033 ± 0.00037
Kosugi-machi, TOYAMA	10~12	19,410.0	0.00000 ± 0.00043	0.00002 ± 0.00019
Fukui, FUKUI	10~12	9,818.0	0.00044 ± 0.00039	0.00000 ± 0.00051
Koufu, YAMANASHI	10~12	16,267.0	0.00072 ± 0.00058	0.00000 ± 0.00026
Nagano, NAGANO	10~12	11,941.0	0.0013 ± 0.00079	0.00000 ± 0.00032
Gifu, GIFU	10~12	11,730.0	0.00000 ± 0.00031	0.00054 ± 0.00033
Hamaoka-machi, SHIZUOKA	10~12	10,757.0	0.00069 ± 0.00058	0.0010 ± 0.00061
Nagoya, AICHI	10~12	9,799.0	0.00000 ± 0.00092	0.00000 ± 0.00053
Tsu, MIE	10~12	14,080.0	0.0012 ± 0.00067	0.00000 ± 0.00026
Ootsu, SHIGA	10~12	11,550.0	0.0018 ± 0.00087	0.00007 ± 0.00031
Kyoto, KYOTO	10~12	10,150.0	0.0003 ± 0.0010	0.00000 ± 0.00032
Osaka, OSAKA	10~12	15,461.0	0.00051 ± 0.00026	0.00041 ± 0.00037
Kobe, HYOUGO	10~12	9,928.0	0.00053 ± 0.00041	0.00014 ± 0.00054
Nara, NARA	10~12	13,039.9	0.00052 ± 0.00031	0.00000 ± 0.00041
Wakayama, WAKAYAMA	10~12	10,257.0	0.00058 ± 0.00058	0.00034 ± 0.00036

Location	Sampling period	Absorption volume (m^2)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
Tottori, TOTTORI	10～12	14,221.0	0.00000 ± 0.00059	0.00000 ± 0.00025
Okayama, OKAYAMA	10～12	13,421.0	0.00000 ± 0.00025	0.00014 ± 0.00026
Hiroshima, HIROSHIMA	10～12	10,190.0	0.00042 ± 0.00037	0.00000 ± 0.00044
Yamaguchi, YAMAGUCHI	10～12	19,005.0	0.00000 ± 0.00019	0.00016 ± 0.00021
Tokushima, TOKUSHIMA	10～12	11,280.0	0.00065 ± 0.00039	0.00000 ± 0.00051
Takamatsu, KAGAWA	10～12	15,309.0	0.00027 ± 0.00043	0.00043 ± 0.00027
Saga, SAGA	10～12	12,012.1	0.00033 ± 0.00034	0.00000 ± 0.00039
Nagasaki, NAGASAKI	10～12	10,174.0	0.00000 ± 0.00061	0.00019 ± 0.00038
Kumamoto, KUMAMOTO	10～12	9,985.0	0.00028 ± 0.00038	0.00019 ± 0.00034
Ooita, OOITA	10～12	10,354.0	0.00000 ± 0.00083	0.00000 ± 0.00054
Miyazaki, MIYAZAKI	10～12	14,209.0	0.00077 ± 0.00030	0.00000 ± 0.00022
January~March, 1994				
Morioka, IWATE	1～ 3	10,103.0	0.00075 ± 0.00038	0.00024 ± 0.00040
Akita, AKITA	1～ 3	10,920.0	0.00095 ± 0.00089	0.00032 ± 0.00050
Yamagata, YAMAGATA	1～ 3	12,960.0	0.00089 ± 0.00050	0.00034 ± 0.00032
Ookuma-machi, FUKUSHIMA	1～ 3	11,410.0	0.0011 ± 0.00085	0.00000 ± 0.00034
Mito, IBARAKI	1～ 3	8,882.7	0.00010 ± 0.00038	0.00000 ± 0.00041
Utsunomiya, TOCHIGI	1～ 3	14,096.0	0.00011 ± 0.00047	0.00077 ± 0.00037
Maebashi, GUNMA	1～ 3	14,096.0	0.00021 ± 0.00046	0.00000 ± 0.00026
Ichihara, CHIBA	1～ 3	12,960.0	0.00081 ± 0.00081	0.00036 ± 0.00033
Yokohama, KANAGAWA	1～ 3	11,127.0	0.00096 ± 0.00062	0.00031 ± 0.00048
Niigata, NIIGATA	1～ 3	10,632.0	0.00000 ± 0.00085	0.00008 ± 0.00042
Kosugi-machi, TOYAMA	1～ 3	18,553.0	0.00000 ± 0.00062	0.00019 ± 0.00022
Fukui, FUKUI	1～ 3	9,976.0	0.00046 ± 0.00071	0.00000 ± 0.00042
Koufu, YAMANASHI	1～ 3	17,826.0	0.00021 ± 0.00020	0.00006 ± 0.00021

Location	Sampling period	Absorption volume (m^2)	^{90}Sr (mBq/m^3)		^{137}Cs (mBq/m^3)	
Nagano, NAGANO	1～ 3	11,712.0	0.00062	± 0.00051	0.00047	± 0.00035
Gifu, GIFU	1～ 3	12,057.0	0.00000	± 0.00047	0.00000	± 0.00032
Hamaoka-machi, SHIZUOKA	1～ 3	11,065.0	0.00041	± 0.00052	0.00004	± 0.00053
Nagoya, AICHI	1～ 3	10,677.7	0.00000	± 0.00029	0.00071	± 0.00041
Tsu, MIE	1～ 3	14,108.0	0.00033	± 0.00042	0.00032	± 0.00030
Ootsu, SHIGA	1～ 3	11,154.0	0.00000	± 0.00044	0.00056	± 0.00038
Kyoto, KYOTO	1～ 3	10,089.0	0.00000	± 0.00095	0.00068	± 0.00044
Osaka, OSAKA	1～ 3	15,511.0	0.00000	± 0.00039	0.00000	± 0.00027
Kobe, HYOUGO	1～ 3	10,006.0	0.00062	± 0.00062	0.00000	± 0.00053
Nara, NARA	1～ 3	13,243.3	0.00036	± 0.00045	0.00000	± 0.00042
Wakayama, WAKAYAMA	1～ 3	17,119.8	0.00052	± 0.00044	0.00035	± 0.00025
Tottori, TOTTORI	1～ 3	13,603.0	0.00034	± 0.00029	0.00035	± 0.00030
Okayama, OKAYAMA	1～ 3	11,534.0	0.00043	± 0.00034	0.00027	± 0.00031
Hiroshima, HIROSHIMA	1～ 3	10,351.0	0.00046	± 0.00062	0.00066	± 0.00045
Yamaguchi, YAMAGUCHI	1～ 3	19,114.0	0.00033	± 0.00035	0.00021	± 0.00023
Tokushima, TOKUSHIMA	1～ 3	11,280.0	0.00000	± 0.00040	0.00030	± 0.00049
Takamatsu, KAGAWA	1～ 3	15,430.0	0.00000	± 0.00043	0.00003	± 0.00025
Saga, SAGA	1～ 3	12,042.9	0.00069	± 0.00034	0.00045	± 0.00031
Nagasaki, NAGASAKI	1～ 3	10,114.0	0.00021	± 0.00070	0.00000	± 0.00038
Kumamoto, KUMAMOTO	1～ 3	10,888.0	0.00000	± 0.00059	0.00000	± 0.00043
Ooita, OOITA	1～ 3	10,193.0	0.00078	± 0.00092	0.00013	± 0.00053
Miyazaki, MIYAZAKI	1～ 3	12,829.0	0.0010	± 0.00078	0.00075	± 0.00045

(3) Strontium-90 and cesium-137 in Service Water
(from Oct. 1993 to Mar. 1994)

-continued from No. 106 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, 1993					
Urawa, SAITAMA	7.6	0.000	± 0.035	0.030	± 0.053
Katsushika, TOKYO	7.1	1.2	± 0.20	0.21	± 0.095
Tsukui-machi, KANAGAWA	6.2	0.32	± 0.056	0.033	± 0.054
Nagano, NAGANO	6.9	0.79	± 0.14	0.000	± 0.043
Inuyama, AICHI	6.8	2.1	± 0.19	0.23	± 0.064
Moriguchi, OSAKA	7.4	2.8	± 0.12	0.13	± 0.055
Fukuoka, FUKUOKA	7.3	2.2	± 0.12	0.037	± 0.058
January, 1994					
Sapporo, HOKKAIDOU	6.9	2.0	± 0.11	0.037	± 0.053
Kisarazu, CHIBA	7.7	1.7	± 0.11	0.000	± 0.076
Kyoto, KYOTO	7.53	3.2	± 0.22	0.022	± 0.082
(Tap Water)					
October, 1993					
Sendai, MIYAGI	—	1.7	± 0.19	0.000	± 0.097
November, 1993					
Yamagata, YAMAGATA	7.2	2.3	± 0.14	0.000	± 0.052
Niigata, NIIGATA	7.38	2.7	± 0.13	0.23	± 0.13
December, 1993					
Wakkanai, HOKKAIDOU	6.7	1.4	± 0.10	0.090	± 0.057
Aomori, AOMORI	7.3	1.2	± 0.15	0.25	± 0.096
Morioka, IWATE	6.94	1.3	± 0.09	0.038	± 0.055
Akita, AKITA	6.15	2.8	± 0.14	0.11	± 0.062
Fukushima, FUKUSHIMA	7.24	2.3	± 0.21	0.011	± 0.049
Mito, IBARAKI	7.0	1.1	± 0.14	0.000	± 0.047

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
Utsunomiya, TOCHIGI	7.6	0.38	± 0.056	0.017	± 0.063
Maebashi, GUNMA	6.8	1.8	± 0.12	0.14	± 0.067
Urawa, SAITAMA	6.9	1.4	± 0.10	0.12	± 0.061
Ichihara, CHIBA	7.43	1.8	± 0.13	0.15	± 0.12
Katsushika, TOKYO	6.9	1.5	± 0.19	0.13	± 0.092
Yokohama, KANAGAWA	7.0	0.51	± 0.12	0.035	± 0.053
Kosugi-machi, TOYAMA	7.1	1.8	± 0.11	0.000	± 0.040
Kanazawa, ISHIKAWA	6.31	2.1	± 0.13	0.23	± 0.074
Fukui, FUKUI	6.17	0.84	± 0.083	0.000	± 0.052
Gifu, GIFU	6.84	0.78	± 0.088	0.000	± 0.044
Nagoya, AICHI	6.7	1.8	± 0.20	0.044	± 0.056
Tsu, MIE	7.0	2.7	± 0.13	0.038	± 0.059
Ootsu, SHIGA	6.8	4.0	± 0.34	0.000	± 0.070
Osaka, OSAKA	7.3	2.8	± 0.15	0.000	± 0.050
Kobe, HYOUGO	7.39	1.8	± 0.11	0.099	± 0.054
Nara, NARA	7.1	2.6	± 0.15	0.086	± 0.065
Matsue, SHIMANE	—	2.6	± 0.19	0.085	± 0.073
Okayama, OKAYAMA	7.0	2.2	± 0.18	0.000	± 0.051
Ube, YAMAGUCHI	6.6	2.3	± 0.18	0.006	± 0.050
Takamatsu, KAGAWA	7.2	2.6	± 0.13	0.048	± 0.052
Matsuyama, EHIME	7.6	1.4	± 0.15	0.040	± 0.058
Kochi, KOCHI	7.8	1.5	± 0.11	0.028	± 0.055
Fukuoka, FUKUOKA	7.0	1.9	± 0.11	0.048	± 0.061
Saga, SAGA	7.59	1.7	± 0.12	0.000	± 0.051
Nagasaki, NAGASAKI	8.0	1.7	± 0.16	0.096	± 0.054
Kumamoto, KUMAMOTO	7.12	0.098	± 0.045	0.000	± 0.042

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
Miyazaki, MIYAZAKI	6.95	1.0	± 0.09	0.026	± 0.055
Kagoshima, KAGOSHIMA	7.0	0.96	± 0.13	0.21	± 0.085
Naha, Okinawa	7.45	5.6	± 0.20	0.000	± 0.088
January, 1994					
Kyoto, KYOTO	7.94	3.5	± 0.14	0.022	± 0.072
Hiroshima, HIROSHIMA	6.85	1.7	± 0.20	0.000	± 0.048
Tokushima, TOKUSHIMA	7.0	1.6	± 0.18	0.000	± 0.051
Ooita, OOITA	7.1	0.69	± 0.11	0.18	± 0.077
Febraly, 1994					
Tottori, TOTTORI	7.1	1.9	± 0.20	0.011	± 0.067
March, 1994					
Shinguu, WAKAYAMA	6.8	1.4	± 0.19	0.000	± 0.087

(4) Strontium-90 and cesium-137 in Freshwater
(from Nov. 1993 to Dec. 1993)

-continued from No. 106 of this publication-

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

Location	pH	^{90}Sr (mBq/ ℓ)		^{137}Cs (mBq/ ℓ)	
(FreshWater)					
November, 1993					
Niigata, NIIGATA	7.42	4.0	± 0.16	0.28	± 0.10
December, 1993					
Suwa, NAGANO	7.01	0.51	± 0.12	0.005	± 0.060
Uji, KYOTO	7.07	0.068	± 0.036	0.000	± 0.068
Shobara, HIROSHIMA	6.90	1.2	± 0.09	0.000	± 0.055

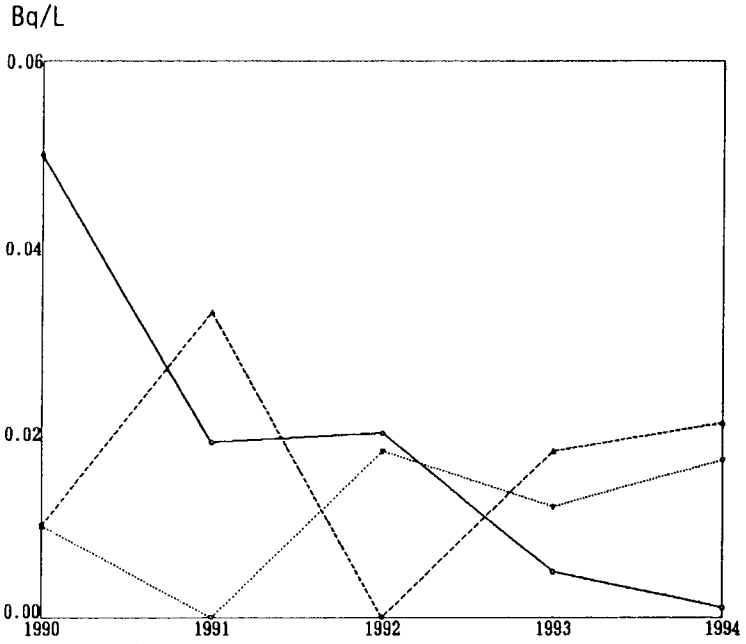
(5) Strontium-90 and Cesium-137 in Soil
(Oct. 1993)
-continued from No, 106 of this publication-

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, 1993					
Hagi, YAMAGUCHI	0～ 5	0.76 ± 0.074	48 ± 4.7	4.4 ± 0.22	270 ± 14
〃	5～20	0.47 ± 0.064	87 ± 12	4.9 ± 0.23	910 ± 43

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

<Strontium-90>



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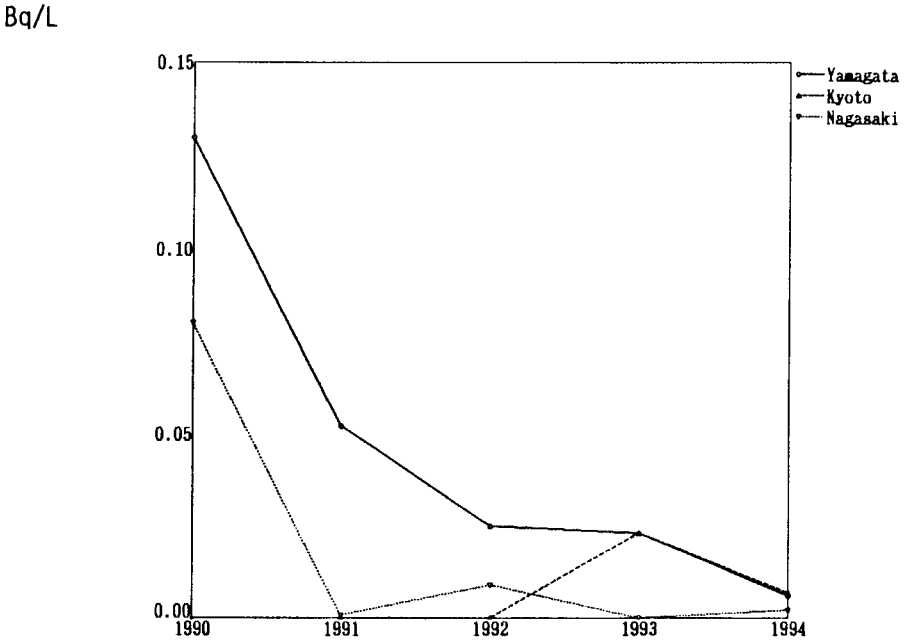
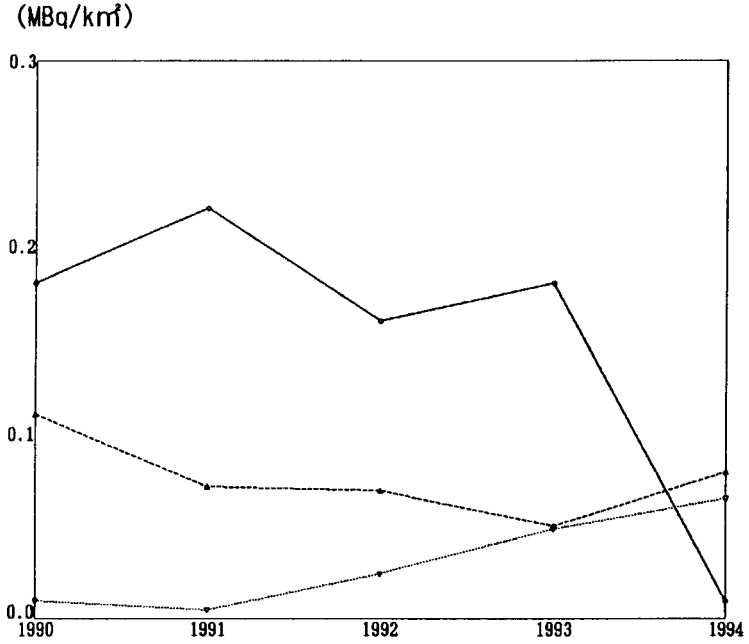


Fig. 1—1

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

<Strontium-90>



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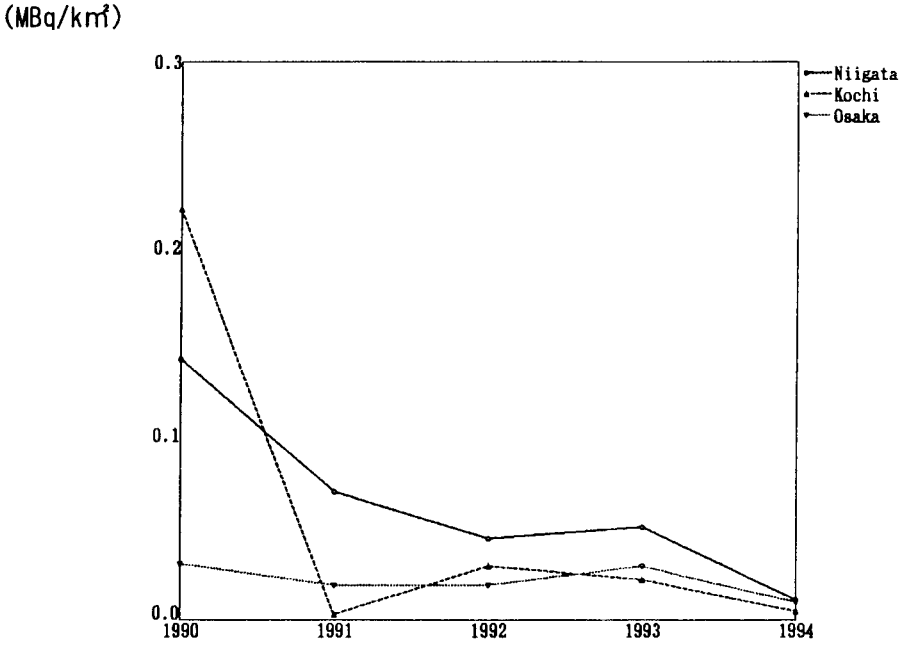
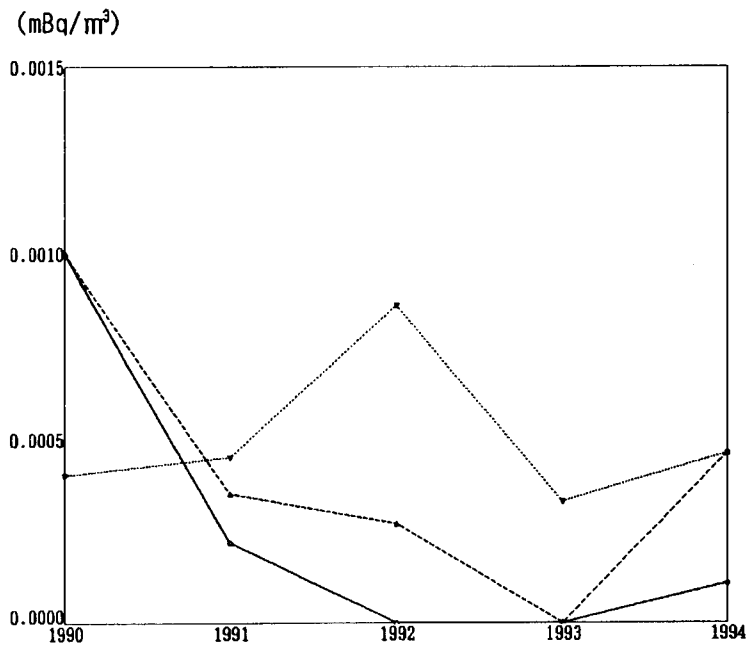


Fig. 1—2

* * Airborne Dust * *

<Strontium-90>



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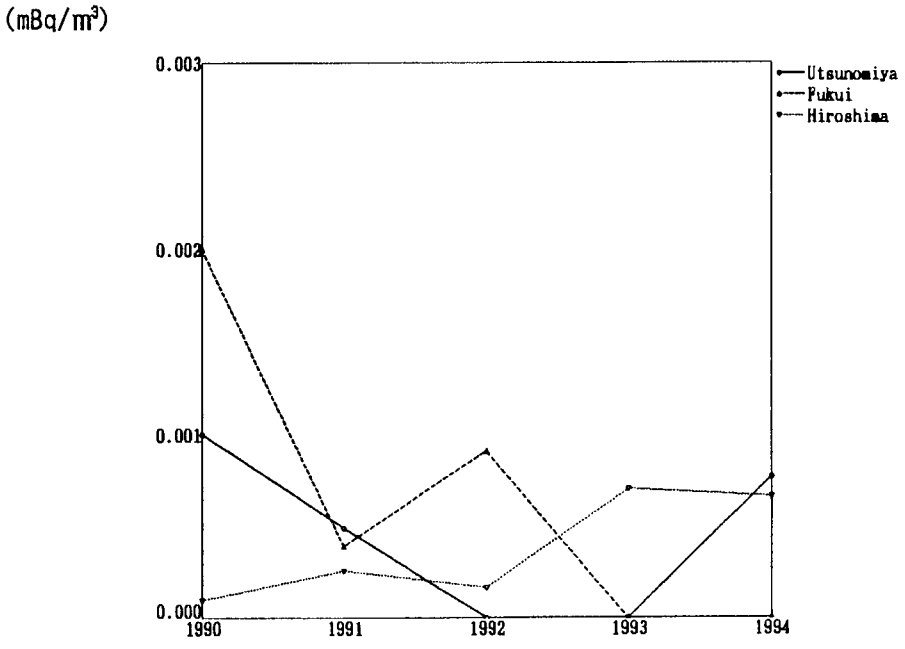
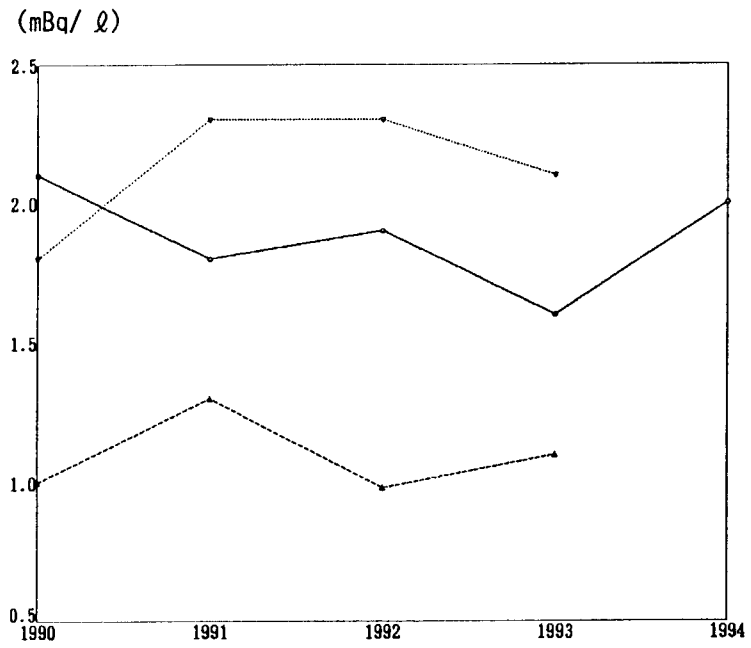


Fig. 2

* * Service Water (Source Water) * *

<Strontium-90>



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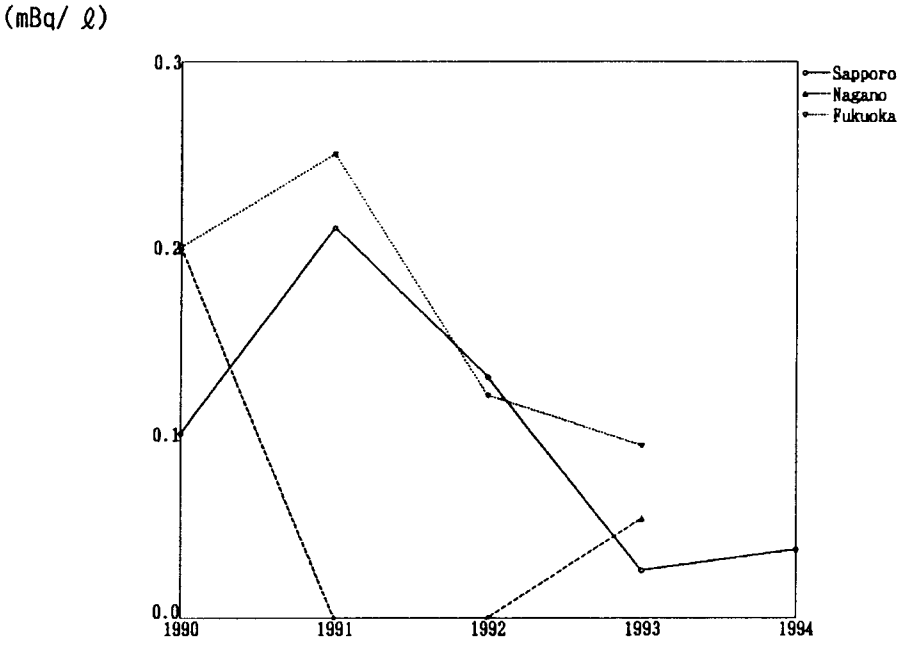
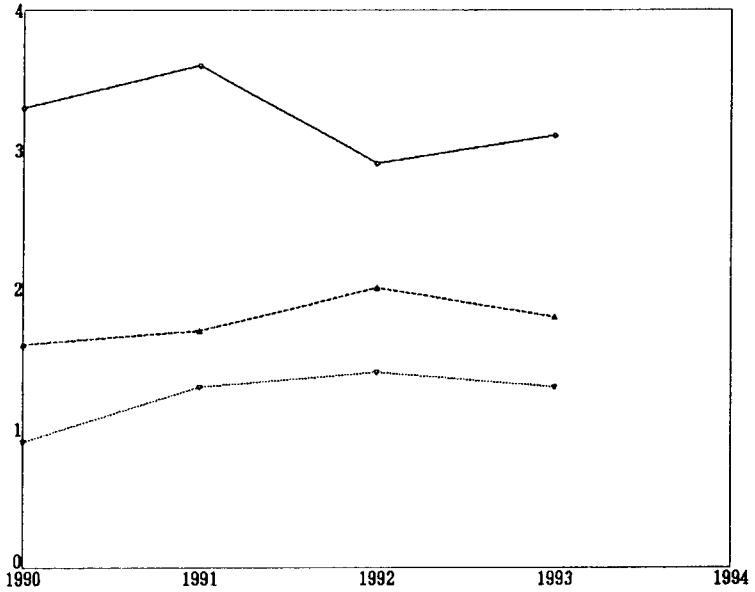


Fig. 3—1

＊ ＊ Service Water (Tap Water) ＊ ＊

<Strontium-90>

(mBq/ ℓ)



<Cesium-137>

(mBq/ ℓ)

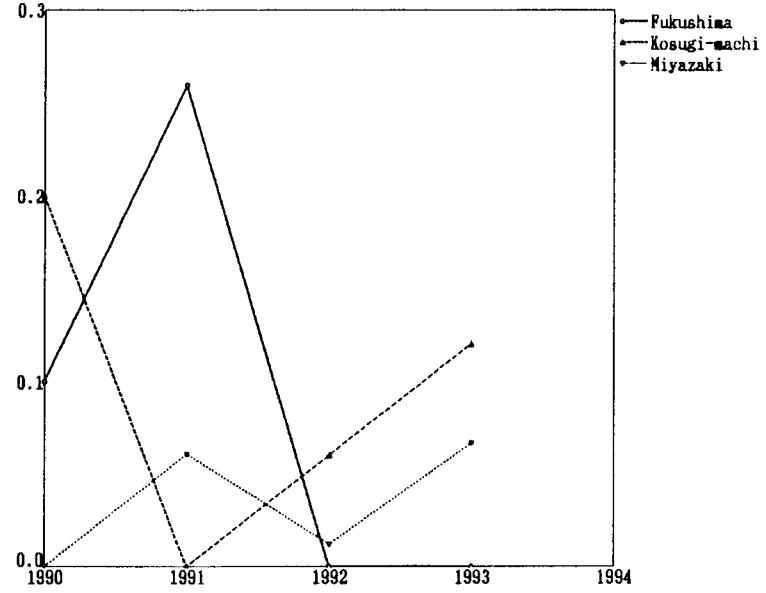
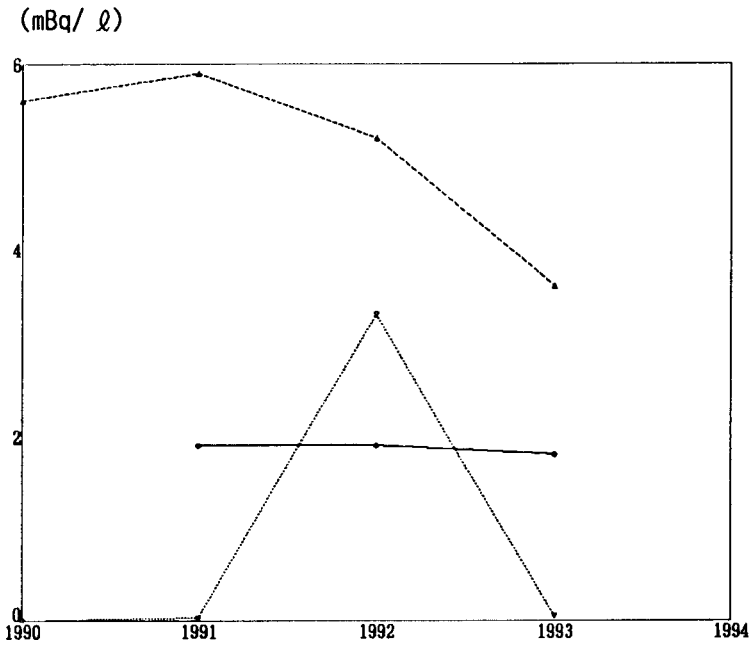


Fig. 3—2

* * Fresh Water * *

<Strontium-90>



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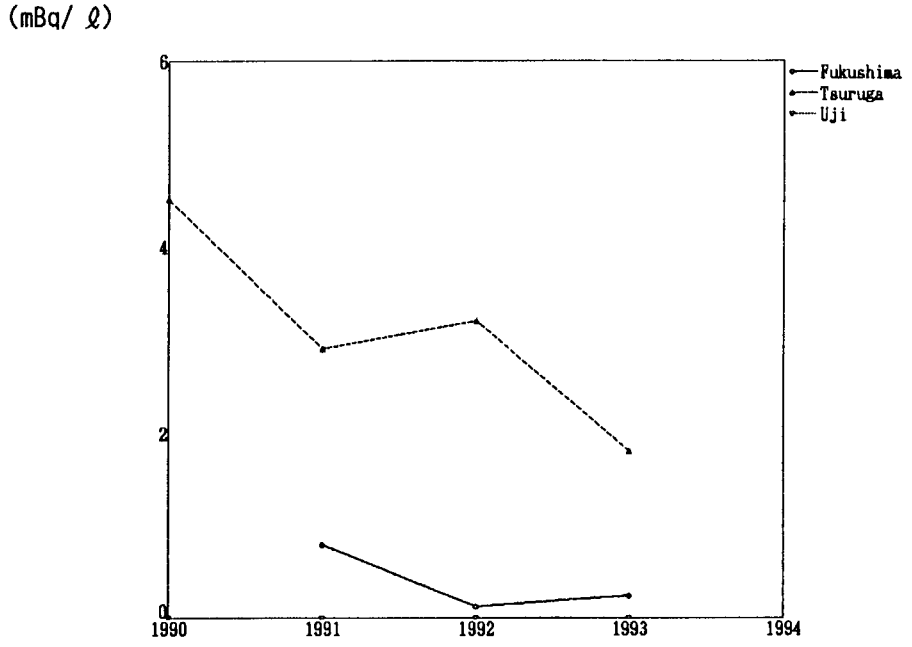
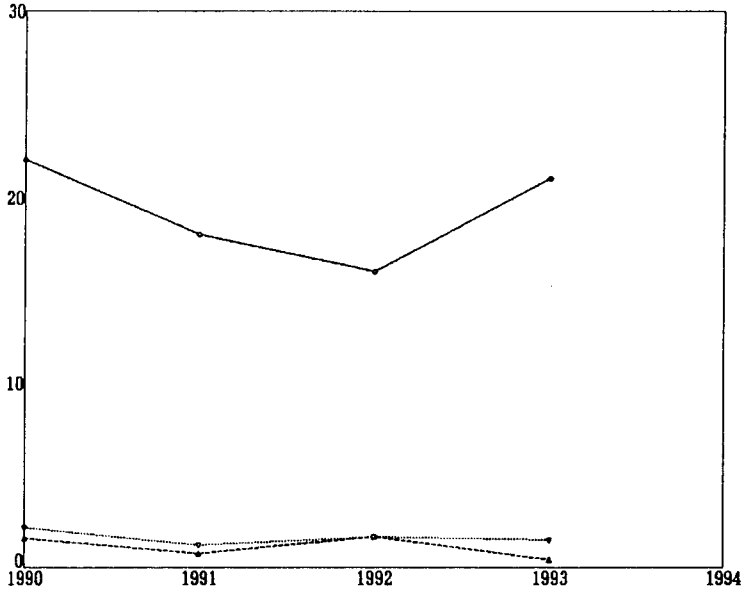


Fig. 4

＊ ＊ Soil ＊ ＊

<Strontium-90>

(Bq/kg)(dried So



<Cesium-137>

(Bq/kg)(dried So

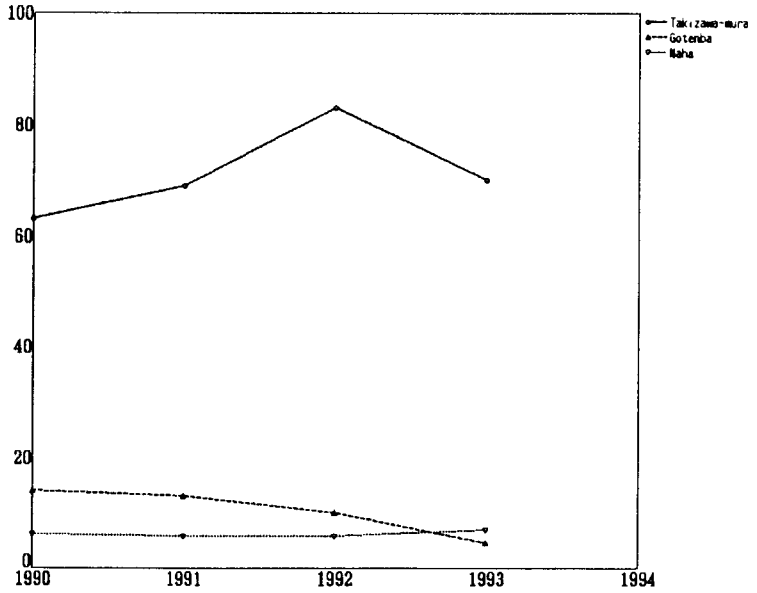


Fig. 5

* * 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: 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