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RADIOACTIVITY SURVEY DATA in Japan

Part 1
= Environmental Materials =

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National Institute of Radiological Sciences
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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 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 threemonths 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 andcesium carriers were added to the filtered water sample. The subsequent process was the same as that describedin the section (1). Freshwater was treated inthe 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 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 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 1ℓ 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 stainless 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 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 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 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 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 p
ersons		
(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 0.25 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 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 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 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 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 molybdophosphate added.

After filtered off and washed with hydrochlotric acid the precipitate was dissolved in 2.5 N 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 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 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 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 Jun. 1990 to Mar. 1991)

-continued from NO. 94 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)
June, 1990				
Kosugi-machi, TOYAMA	32	167.9	0.56 ±0.026	0.095±0.020
August, 1990				
Koufu, YAMANASHI	32	123.5	0.0076±0.0087	0.021±0.016
Tsu, MIE	32	74.0	0.002 ±0.017	0.13 ±0.025
Tottori, TOTTORI	33	58.5	0.29 ±0.026	0.14 ±0.025
September, 1990				
Aomori, AOMORI	32	227.5	0.016 ±0.014	0.023±0.017
Mito, IBARAKI	31	210.5	0.0083±0.0072	0.008±0.017
Kosugi-machi, TOYAMA	31	232.9	0.35 ±0.022	0.24 ±0.025
Koufu, YAMANASHI	31	314.0	0.0012±0.0080	0.040±0.016
Ooita, OOITA	31	291.9	0.000 ±0.016	0.019±0.017
Miyazaki, MIYAZAKI	31	634.8	0.006 ±0.012	0.054±0.019
October, 1990				
Sapporo, HOKKAIDO	32	91.5	0.0000±0.0073	0.034±0.019
Aomori, AOMORI	31	71.0	0.039 ±0.015	0.000±0.016
Onagawa-machi, MIYAGI	32	195.0	0.032 ±0.031	0.004±0.015
Maebashi, GUNMA	10	36.3	0.017 ±0.0070	0.021±0.021
Kosugi-machi, TOYAMA	32	223.1	0.023 ±0.0077	0.040±0.015
Koufu, YAMANASHI	32	126.0	0.011 ±0.0089	0.007±0.014
Tsu, MIE	32	158.0	0.020 ±0.016	0.040±0.015
Kyoto, KYOTO	33	133.2	0.030 ±0.019	0.031±0.017
Tottori, TOTTORI	32	232.0	0.062 ±0.020	0.013±0.016
Matsue, SHIMANE	32	201.2	0.024 ±0.0053	0.15 ±0.018
Ishii-machi, TOKUSHIMA	32	278.0	0.020 ±0.010	0.000±0.014
Takamatsu, KAGAWA	32	158.0	0.018 ±0.016	0.027±0.014
Ooita, OOITA	32	305.8	0.023 ±0.018	0.010±0.017
Miyazaki, MIYAZAKI	32	746.0	0.000 ±0.011	0.018±0.015
November, 1990				
Sapporo, HOKKAIDO	31	70.0	0.015 ±0.015	0.32 ±0.033
Aomori, AOMORI	31	164.0	0.066 ±0.017	0.026±0.018

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Onagawa-machi, MIYAGI	33	150.5	0.097 ±0.012	0.010±0.018
Ookuma-machi, FUKUSHIMA	32	130.4	0.040 ±0.015	0.22 ±0.027
Shinjuku, KOKYO	31	264.7	0.002 ±0.018	0.000±0.017
Maebashi, GUNMA	31	189.4	0.023 ±0.0075	0.080±0.024
Kosugi-machi, TOYAMA	31	204.7	0.035 ±0.0086	0.072±0.018
Koufu, YAMANASHI	31	102.5	0.019 ±0.014	0.013±0.014
Gifu, GIFU	31	284.0	0.000 ±0.017	0.004±0.021
Nagoya, AICHI	33	197.2	0.014 ±0.018	0.022±0.033
Tsu, MIE	31	294.5	0.019 ±0.018	0.036±0.017
Ootsu, SHIGA	31	139.0	0.000 ±0.016	0.000±0.020
Kyoto, KYOTO	29	118.7	0.037 ±0.019	0.011±0.016
Tottori, TOTTORI	31	271.5	0.092 ±0.023	0.045±0.018
Matsue, SHIMANE	31	162.5	0.021 ±0.0052	0.033±0.012
Hiroshima, HIROSHIMA	32	90.8	0.036 ±0.016	0.014±0.014
Matsuyama, EHIME	31	96.0	0.030 ±0.018	0.000±0.016
Ishii-machi, TOKUSHIMA	31	335.5	0.0099±0.0067	0.000±0.013
Takamatsu, KAGAWA	31	138.0	0.017 ±0.017	0.008±0.013
Ooita, OOITA	31	69.5	0.030 ±0.019	0.011±0.016
Miyazaki, MIYAZAKI	31	132.9	0.000 ±0.019	0.038±0.018
December, 1990				
Sapporo, HOKKAIDO	28	70.0	0.039 ±0.017	0.044±0.018
Aomori, AOMORI	36	94.0	0.078 ±0.018	0.055±0.019
Onagawa-machi, MIYAGI	36	20.5	0.027 ±0.0091	0.034±0.018
Morioka, IWATE	35	68.1	0.020 ±0.017	0.025±0.016
Ookuma-machi, FUKUSHIMA	26	145.8	0.021 ±0.0077	0.087±0.018
Mito, IBARAKI	36	29.5	0.027 ±0.0077	0.032±0.015
Shinjuku, TOKYO	35	41.2	0.000 ±0.020	0.000±0.015
Yokohama, KANAGAWA	29	140.4	0.060 ±0.019	0.054±0.023
Maebashi, GUNMA	35	7.7	0.013 ±0.0077	0.057±0.020
Utsunomiya, TOCHIGI	36	37.5	0.025 ±0.0079	0.032±0.014
Kosugi-machi, TOYAMA	35	227.3	0.17 ±0.015	0.030±0.017
Fukui, FUKUI	33	222.1	0.11 ±0.10	0.11 ±0.094
Koufu, YAMANASHI	35	10.0	0.017 ±0.015	0.006±0.014
Shizuoka, SHIZUOKA	36	29.5	0.013 ±0.0064	0.010±0.016
Gifu, GIFU	35	47.5	0.006 ±0.020	0.009±0.021
Nagoya, AICHI	33	29.2	0.014 ±0.016	0.035±0.021
Tsu, MIE	35	29.5	0.023 ±0.018	0.22 ±0.027
Ootsu, SHIGA	35	85.2	0.008 ±0.020	0.038±0.018
Kyoto, KYOTO	36	62.5	0.017 ±0.019	0.008±0.017

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Kobe, HYOGO	29	20.0	0.011 ±0.014	0.039±0.015
Nara, NARA	36	38.3	0.002 ±0.018	0.15 ±0.025
Tottori, TOTTORI	38	154.3	0.038 ±0.028	0.10 ±0.021
Matsue, SHIMANE	28	73.7	0.067 ±0.0089	0.076±0.021
Hiroshima, HIROSHIMA	36	22.1	0.090 ±0.019	0.021±0.015
Matsuyama, EHIME	35	43.5	0.000 ±0.017	0.013±0.017
Ishii-machi, TOKUSHIMA	36	21.0	0.015 ±0.0071	0.042±0.023
Takamatsu, KAGAWA	33	78.5	0.023 ±0.0079	0.048±0.022
Dazaifu, FUKUOKA	35	43.8	0.022 ±0.016	0.007±0.013
Saga, SAGA	33	31.4	0.032 ±0.013	0.000±0.016
Nagasaki, NAGASAKI	35	58.5	0.012 ±0.011	0.000±0.015
Kumamoto, KUMAMOTO	35	55.5	0.021 ±0.018	0.013±0.015
Ooita, OOITA	35	26.3	0.029 ±0.018	0.010±0.016
Miyazaki, MIYAZAKI	35	10.4	0.001 ±0.017	0.044±0.020
Yonagusuku-mura, OKINAWA	39	62.5	0.010 ±0.016	0.024±0.023
January, 1991				
Sapporo, HOKKAIDO	36	187.5	0.033 ±0.017	0.044±0.018
Aomori, AOMORI	31	101.5	0.015 ±0.0071	0.017±0.015
Onagawa-machi, MIYAGI	26	5.0	0.010 ±0.015	0.000±0.015
Morioka, IWATE	29	30.2	0.027 ±0.0084	0.033±0.016
Yamagata, YAMAGATA	29	39.7	0.019 ±0.0066	0.052±0.016
Ookuma-machi, FUKUSHIMA	38	17.4	0.030 ±0.016	0.16 ±0.025
Mito, IBARAKI	28	40.5	0.025 ±0.0075	0.008±0.020
Shinjuku, TOKYO	29	50.3	0.0087±0.0088	0.000±0.015
Yokohama, KANAGAWA	35	62.1	0.047 ±0.020	0.064±0.020
Maebashi, GUNMA	29	25.0	0.017 ±0.017	0.033±0.020
Utsunomiya, TOCHIGI	28	32.1	0.012 ±0.0094	0.022±0.018
Kosugi-machi, TOYAMA	29	245.9	0.008 ±0.016	0.041±0.019
Fukui, FUKUI	29	346.4	0.081 ±0.039	0.15 ±0.079
Koufu, YAMANASHI	29	34.5	0.000 ±0.015	0.065±0.020
Shizuoka, SHIZUOKA	26	67.0	0.013 ±0.0065	0.009±0.015
Gifu, GIFU	29	68.5	0.023 ±0.019	0.022±0.018
Nogoya, AICHI	29	46.3	0.013 ±0.017	0.008±0.016
Tsu, MIE	29	37.0	0.0000±0.0073	0.052±0.019
Ootsu, SHIGA	29	39.0	0.0051±0.0076	0.042±0.027
Kyoto, KYOTO	28	34.7	0.033 ±0.022	0.000±0.020
Kobe, HYOGO	35	42.2	0.011 ±0.017	0.000±0.017
Nara, NARA	28	57.2	0.009 ±0.018	0.050±0.018
Wakayama, WAKAYAMA	45	39.0	0.022 ±0.010	0.011±0.018

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Tottori, TOTTORI	26	185.0	0.011 ±0.018	0.073±0.019
Matsue, SHIMANE	36	97.2	0.026 ±0.011	0.073±0.015
Hiroshima, HIROSHIMA	27	44.3	0.020 ±0.019	0.000±0.016
Matsuyama, EHIME	29	14.5	0.0000±0.0059	0.001±0.015
Ishii-machi, TOKUSHIMA	28	15.0	0.012 ±0.022	0.025±0.020
Takamatsu, KAGAWA	31	26.5	0.0012±0.0063	0.025±0.021
Dazaifu, FUKUOKA	29	57.8	0.021 ±0.0085	0.030±0.022
Saga, SAGA	29	9.7	0.000 ±0.016	0.000±0.016
Nagasaki, NAGASAKI	29	38.5	0.0000±0.0079	0.001±0.015
Kumamoto, KUMAMOTO	29	35.3	0.027 ±0.0077	0.014±0.021
Ooita, OOITA	29	18.3	0.028 ±0.0083	0.024±0.015
Miyazaki, MIYAZAKI	29	77.7	0.019 ±0.018	0.000±0.018
Yonagusuku-mura, OKINAWA	26	85.0	0.006 ±0.018	0.028±0.017
February, 1991				
Sapporo, HOKKAIDO	29	69.0	0.018 ±0.016	0.026±0.017
Aomori, AOMORI	27	113.0	0.025 ±0.0080	0.049±0.018
Onagawa-machi, MIYAGI	29	99.0	0.029 ±0.0080	0.009±0.017
Morioka, IWATE	29	58.8	0.034 ±0.017	0.022±0.019
Yamagata, YAMAGATA	29	83.5	0.016 ±0.0086	0.012±0.017
Ookuma-machi, FUKUSHIMA	29	139.6	0.020 ±0.016	0.094±0.021
Mito, IBARAKI	29	69.0	0.027 ±0.0082	0.075±0.020
Shinjuku, TOKYO	29	80.3	0.0092±0.0088	0.036±0.018
Yokohama, KANAGAWA	29	78.4	0.094 ±0.022	0.16 ±0.025
Maebashi, GUNMA	29	32.4	0.026 ±0.016	0.17 ±0.025
Utsunomiya, TOCHIGI	29	73.8	0.020 ±0.0079	0.056±0.019
Kosugi-machi, TOYAMA	29	212.0	0.030 ±0.018	0.066±0.022
Fukui, FUKUI	29	229.2	0.063 ±0.038	0.028±0.073
Koufu, YAMANASHI	29	45.5	0.035 ±0.018	0.042±0.020
Shizuoka, SHIZUOKA	29	69.5	0.034 ±0.0084	0.15 ±0.025
Gifu, GIFU	29	110.0	0.015 ±0.0099	0.014±0.017
Nagoya, AICHI	29	72.8	0.036 ±0.019	0.013±0.017
Tsu, MIE	29	87.0	0.022 ±0.0088	0.14 ±0.024
Ootsu, SHIGA	29	78.2	0.041 ±0.0095	0.049±0.019
Kyoto, KYOTO	30	75.8	0.004 ±0.020	0.000±0.020
Kobe, HYOGO	29	41.5	0.0012±0.0082	0.058±0.019
Nara, NARA	29	95.5	0.000 ±0.018	0.12 ±0.023
Wakayama, WAKAYAMA	22	20.1	0.022 ±0.028	0.031±0.020
Tottori, TOTTORI	29	140.2	0.023 ±0.021	0.15 ±0.025
Matsue, SHIMANE	29	134.0	0.040 ±0.0075	0.12 ±0.018

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Hiroshima, HIROSHIMA	29	82.4	0.029 ± 0.0084	0.046 ± 0.019
Matsuyama, EHIME	29	147.0	0.029 ± 0.017	0.091 ± 0.023
Ishii-machi, TOKUSHIMA	29	41.5	0.031 ± 0.0086	0.019 ± 0.017
Takamatsu, KAGAWA	29	30.5	0.038 ± 0.0085	0.035 ± 0.018
Dazaifu, FUKUOKA	29	131.6	0.014 ± 0.0076	0.099 ± 0.021
Saga, SAGA	29	133.5	0.026 ± 0.018	0.060 ± 0.020
Nagasaki, NAGASAKI	29	94.5	0.047 ± 0.012	0.021 ± 0.017
Kumamoto, KUMAMOTO	29	86.5	0.032 ± 0.0086	0.049 ± 0.017
Ooita, OOITA	29	95.1	0.016 ± 0.0076	0.070 ± 0.019
Miyazaki, MIYAZAKI	29	124.8	0.021 ± 0.019	0.070 ± 0.022
Yonagusuku-mura, OKINAWA	28	88.5	0.018 ± 0.0077	0.066 ± 0.019
March, 1991				
Sapporo, HOKKAIDO	32	23.0	0.026 ± 0.0082	0.040 ± 0.017
Aomori, AOMORI	29	29.0	0.038 ± 0.0086	0.033 ± 0.017
Onagawa-machi, MIYAGI	32	41.0	0.026 ± 0.017	0.031 ± 0.019
Morioka, IWATE	32	46.9	0.022 ± 0.017	0.11 ± 0.022
Yamagata, YAMAGATA	32	50.9	0.0091 ± 0.0073	0.11 ± 0.022
Ookuma-machi, FUKUSHIMA	32	111.9	0.018 ± 0.017	0.066 ± 0.022
Mito, IBARAKI	32	114.0	0.057 ± 0.019	0.069 ± 0.020
Shinjuku, TOKYO	32	158.0	0.018 ± 0.018	0.007 ± 0.019
Yokohama, KANAGAWA	31	157.3	0.077 ± 0.011	0.13 ± 0.023
Maebashi, GUNMA	32	108.0	0.032 ± 0.017	0.14 ± 0.025
Utsunomiya, TOCHIGI	32	152.3	0.011 ± 0.0079	0.025 ± 0.019
Kosugi-machi, TOYAMA	32	201.1	0.047 ± 0.017	0.062 ± 0.019
Fukui, FUKUI	32	178.5	0.35 ± 0.11	0.064 ± 0.084
Koufu, YAMANASHI	32	150.0	0.004 ± 0.024	0.000 ± 0.016
Shizuoka, SHIZUOKA	33	271.0	0.031 ± 0.0079	0.051 ± 0.019
Gifu, GIFU	32	199.5	0.050 ± 0.018	0.043 ± 0.016
Nagoya, AICHI	32	191.1	0.062 ± 0.021	0.049 ± 0.018
Tsu, MIE	32	246.0	0.029 ± 0.017	0.057 ± 0.021
Ootsu, SHIGA	32	237.7	0.052 ± 0.025	0.052 ± 0.019
Kyoto, KYOTO	33	193.2	0.006 ± 0.020	0.011 ± 0.018
Kobe, HYOGO	31	107.8	0.028 ± 0.0081	0.062 ± 0.020
Nara, NARA	32	183.1	0.005 ± 0.021	0.033 ± 0.018
Wakayama, WAKAYAMA	21	93.4	0.055 ± 0.015	0.006 ± 0.023
Tottori, TOTTORI	32	243.8	0.039 ± 0.0090	0.061 ± 0.020
Matsue, SHIMANE	32	146.7	0.040 ± 0.015	0.036 ± 0.013
Hiroshima, HIROSHIMA	31	154.3	0.027 ± 0.0077	0.017 ± 0.016

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Matsuyama, EHIME	32	83.5	0.023 ± 0.017	0.037 ± 0.018
Ishii-machi, TOKUSHIMA	32	119.0	0.024 ± 0.0084	0.045 ± 0.017
Takamatsu, KAGAWA	32	121.5	0.033 ± 0.020	0.014 ± 0.020
Dazaifu, FUKUOKA	32	191.6	0.0035 ± 0.0075	0.000 ± 0.015
Saga, SAGA	32	181.9	0.024 ± 0.0078	0.039 ± 0.017
Nagasaki, NAGASAKI	32	180.0	0.030 ± 0.013	0.056 ± 0.022
Kumamoto, KUMAMOTO	32	190.7	0.027 ± 0.0091	0.079 ± 0.019
Ooita, OOITA	32	191.7	0.017 ± 0.020	0.054 ± 0.022
Miyazaki, MIYAZAKI	32	376.5	0.024 ± 0.028	0.058 ± 0.024
Yonagusuku-mura, OKINAWA	33	140.5	0.034 ± 0.018	0.007 ± 0.016

(1)-2 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for WHO program)
(from Oct. 1990 to Mar. 1991)

-continued from NO. 94 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, 1990				
Chiba, CHIBA	32	161.4	0.0037±0.0070	0.024±0.012
Ichihara, CHIBA	32	151.0	0.011 ±0.0085	0.000±0.015
Kagoshima, KAGOSHIMA	31	152.5	0.029 ±0.019	0.027±0.019
November, 1990				
Chiba, CHIBA	33	271.5	0.017 ±0.0079	0.022±0.013
Ichihara, CHIBA	31	282.5	0.015 ±0.0096	0.000±0.018
Niigata, NIIGATA	31	155.6	0.095 ±0.021	0.042±0.019
Kanazawa, ISHIKAWA	35	281.5	0.057 ±0.011	0.033±0.017
Yamaguchi, YAMAGUCHI	33	68.0	0.028 ±0.017	0.018±0.022
Kagoshima, KAGOSHIMA	32	75.5	0.080 ±0.023	0.033±0.019
December, 1990				
Akita, AKITA	31	219.0	0.024 ±0.013	0.022±0.015
Chiba, CHIBA	36	35.5	0.021 ±0.0083	0.037±0.014
Ichihara, CHIBA	35	49.2	0.0000±0.0076	0.013±0.017
Niigata, NIIGATA	35	142.8	0.19 ±0.015	0.061±0.017
Kanazawa, ISHIKAWA	33	233.5	0.000 ±0.017	0.075±0.024
Nagano, NAGANO	35	78.5	0.012 ±0.018	0.007±0.021
Okayama, OKAYAMA	38	20.9	0.036 ±0.022	0.028±0.018
Yamaguchi, YAMAGUCHI	33	51.5	0.019 ±0.0077	0.043±0.016
Kochi, KOCHI	38	54.4	0.047 ±0.020	0.018±0.015
Kagoshima, KAGOSHIMA	28	27.5	0.095 ±0.011	0.044±0.016
January, 1991				
Akita, AKITA	33	134.2	0.000 ±0.017	0.057±0.023
Chiba, CHIBA	26	46.3	0.0028±0.0072	0.028±0.013
Ichihara, CHIBA	29	55.7	0.0031±0.0085	0.006±0.015
Niigata, NIIGATA	29	86.3	0.22 ±0.027	0.069±0.021
Kanazawa, ISHIKAWA	29	313.5	0.0066±0.0096	0.051±0.018
Nagano, NAGANO	29	55.6	0.0077±0.0070	0.005±0.015
Osaka, OSAKA	27	58.3	0.005 ±0.019	0.019±0.017
Okayama, OKAYAMA	26	24.5	0.027 ±0.0071	0.032±0.015
Yamaguchi, YAMAGUCHI	29	54.0	0.020 ±0.0075	0.027±0.015

Location	Duration (days)	Precipitation (mm)	^{90}Sr (MBq/km^2)	^{137}Cs (MBq/km^2)
Kochi, KOCHI	26	33.0	0.071 ±0.012	0.003±0.022
Kagoshima, KAGOSHIMA	35	53.5	0.13 ±0.014	0.063±0.021
February, 1991				
Akita, AKITA	29	157.8	0.012 ±0.017	0.034±0.018
Chiba, CHIBA	29	58.4	0.023 ±0.0087	0.083±0.016
Ichihara, CHIBA	29	63.5	0.021 ±0.0092	0.14 ±0.024
Kanazawa, ISHIKAWA	28	237.5	0.0042±0.0075	0.063±0.020
Nagano, NAGANO	29	60.7	0.0056±0.0069	0.022±0.017
Osaka, OSAKA	30	92.1	0.016 ±0.019	0.066±0.019
Okayama, OKAYAMA	29	54.6	0.031 ±0.020	0.018±0.017
Yamaguchi, YAMAGUCHI	29	121.5	0.029 ±0.0085	0.081±0.021
Kochi, KOCHI	29	107.7	0.10 ±0.012	0.059±0.019
Kagoshima, KAGOSHIMA	30	109.5	0.14 ±0.023	0.13 ±0.025
March, 1991				
Akita, AKITA	32	61.2	0.026 ±0.016	0.060±0.019
Chiba, CHIBA	32	160.0	0.019 ±0.0087	0.038±0.016
Ichihara, CHIBA	32	161.7	0.023 ±0.010	0.008±0.017
Niigata, NIIGATA	32	47.0	0.26 ±0.027	0.045±0.019
Kanazawa, ISHIKAWA	33	241.5	0.069 ±0.019	0.052±0.019
Nagano, NAGANO	32	67.7	0.047 ±0.022	0.033±0.020
Osaka, OSAKA	29	123.2	0.000 ±0.017	0.031±0.016
Okayama, OKAYAMA	32	131.5	0.048 ±0.0092	0.028±0.016
Yamaguchi, YAMAGUCHI	32	233.5	0.054 ±0.010	0.045±0.019
Kochi, KOCHI	33	241.1	0.12 ±0.024	0.049±0.020
Kagoshima, KAGOSHIMA	29	215.0	0.053 ±0.023	0.025±0.017

(2) Strontium-90 and Cesium-137 in Airborne Dust
(from Jul. 1990 to Mar. 1991)

-continued from NO. 94 of this publication-

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

Location	Sampling period	Absorption volume (m3)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
July～October, 1990				
Mito, IBARAKI	7～10	9,664.1	0.00013±0.00039	0.00009±0.00056
Nagano, NAGANO	7～10	17,497.0	0.00024±0.00019	0.00049±0.00046
October～December, 1990				
Morioka, IWATE	10～12	10,134.0	0.00056±0.00038	0.0013 ±0.00083
Mito, IBARAKI	10～12	9,376.6	0.00068±0.00036	0.00000±0.00076
Ichihara, CHIBA	10～12	10,368.0	0.00035±0.00036	0.0012 ±0.00057
Maebashi, GUNMA	10～12	13,555.0	0.00000±0.00063	0.00000±0.00066
Niigata, NIIGATA	10～12	11,391.0	0.00051±0.00035	0.00000±0.00063
Nagano, NAGANO	10～12	18,128.5	0.00047±0.00020	0.00000±0.00048
Tsu, MIE	10～12	14,953.0	0.00078±0.00026	0.00083±0.00056
Ootsu, SHIGA	10～12	10,973.0	0.00053±0.00036	0.0018 ±0.00074
Kyoto, KYOTO	10～12	7,760.0	0.0014 ±0.00050	0.00050±0.00077
Tottori, TOTTORI	10～12	12,907.0	0.00043±0.00030	0.00000±0.00042
Yamaguchi, YAMAGUCHI	10～12	18,707.0	0.00020±0.00020	0.00071±0.00040
Tokushima, TOKUSHIMA	10～12	10,080.0	0.00095±0.00037	0.00085±0.00083
Nagasaki, NAGASAKI	10～12	10,326.0	0.00010±0.00082	0.0011 ±0.00082
Ooita, OOITA	10～12	10,086.0	0.00000±0.00033	0.00000±0.00062
November～December, 1990				
Gifu, GIFU	11～12	10,916.0	0.00068±0.00032	0.0016 ±0.00082
January～March, 1991				
Morioka, IWATE	1～3	10,428.0	0.00055±0.00036	0.00030±0.00081
Yamagata, YAMAGATA	1～3	12,960.0	0.00041±0.00071	0.0021 ±0.00072
Ookuma-machi, FUKUSHIMA	1～3	7,305.0	0.0017 ±0.00050	0.0013 ±0.00079
Mito, IBARAKI	1～3	7,629.0	0.0000 ±0.0011	0.0025 ±0.0012
Ichihara, CHIBA	1～3	14,976.0	0.00058±0.00062	0.00003±0.00038
Yokohama, KANAGAWA	1～3	12,183.0	0.00059±0.00028	0.00000±0.00060
Maebashi, GUNMA	1～3	13,899.0	0.00092±0.00069	0.00023±0.00065
Utsunomiya, TOCHIGI	1～3	13,822.0	0.00022±0.00060	0.00049±0.00060
Niigata, NIIGATA	1～3	13,135.0	0.00078±0.00066	0.00062±0.00071
Kosugi-machi, TOYAMA	1～3	18,433.0	0.00000±0.00043	0.00000±0.00050
Fukui, FUKUI	1～3	16,131.0	0.00035±0.00020	0.00039±0.00052
Nagano, NAGANO	1～3	19,167.8	0.00053±0.00020	0.00000±0.00040

Location	Sampling period	Absorption volume (m3)	^{90}Sr (mBq/m^3)	^{137}Cs (mBq/m^3)
Koufu, YAMANASHI	1～3	14,316.0	0.00044±0.00062	0.0014 ±0.00068
Hamaoka-machi, SHIZUOKA	1～3	11,337.0	0.00028±0.00076	0.0017 ±0.00082
Gifu, GIFU	1～3	10,027.2	0.00077±0.00037	0.00000±0.00083
Nagoya, AICHI	1～3	10,756.0	0.0011 ±0.00035	0.00028±0.00056
Tsu, MIE	1～3	14,660.0	0.00014±0.00058	0.00000±0.00051
Ootsu, SHIGA	1～3	12,107.0	0.00054±0.00029	0.00000±0.00047
Kyoto, KYOTO	1～3	8,382.0	0.0010 ±0.00042	0.00021±0.00071
Osaka, OSAKA	1～3	15,342.0	0.00028±0.00057	0.00090±0.00059
Kobe, HYOGO	1～3	10,185.0	0.00014±0.00077	0.0016 ±0.00085
Nara, NARA	1～3	10,171.0	0.00062±0.00037	0.00000±0.00055
Wakayama, WAKAYAMA	1～3	15,364.0	0.00048±0.00058	0.00012±0.00050
Tottori, TOTTORI	1～3	12,927.0	0.00065±0.00031	0.00054±0.00048
Hiroshima, HIROSHIMA	1～3	12,035.0	0.00045±0.00030	0.00026±0.00070
Yamaguchi, YAMAGUCHI	1～3	20,967.0	0.00034±0.00043	0.00002±0.00042
Tokushima, TOKUSHIMA	1～3	11,940.0	0.00042±0.00076	0.00000±0.00073
Takamatsu, KAGAWA	1～3	15,490.0	0.00018±0.00022	0.00047±0.00053
Saga, SAGA	1～3	10,855.1	0.00032±0.00075	0.00073±0.00075
Nagasaki, NAGASAKI	1～3	12,100.0	0.00090±0.00080	0.00036±0.00066
Kumamoto, KUMAMOTO	1～3	18,364.0	0.00042±0.00021	0.00017±0.00045
Ooita, OOITA	1～3	11,159.0	0.00040±0.00032	0.00000±0.00066
Miyazaki, MIYAZAKI	1～3	14,240.0	0.00000±0.00060	0.00012±0.00040

(3) Strontium-90 and Cesium-137 in Service Water
(from Dec. 1990 to Feb. 1991)

-continued from NO. 94 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, 1990			
Kisarazu, CHIBA	7.6	2.5 ±0.12	0.038±0.091
Katsushika, TOKYO	7.3	1.9 ±0.13	0.13 ±0.08
January, 1991			
Sapporo, HOKKAIDO	6.9	1.8 ±0.11	0.21 ±0.097
Kyoto, KYOTO	6.7	3.5 ±0.15	0.27 ±0.10
(Tap Water)			
December, 1990			
Wakkanai, HOKKAIDO	6.8	1.7 ±0.11	-
Aomori, AOMORI	7.8	0.93 ±0.082	0.36 ±0.099
Ichihara, CHIBA	7.6	2.6 ±0.13	0.000±0.079
Katsushika, TOKYO	7.3	1.9 ±0.14	0.12 ±0.09
Tsu, MIE	7.0	2.7 ±0.13	0.039±0.081
Tottori, TOTTORI	7.4	1.5 ±0.10	0.000±0.087
Matsuyama, EHIME	7.7	1.8 ±0.11	0.15 ±0.10
Takamatsu, KAGAWA	7.6	2.8 ±0.14	0.034±0.094
Kagoshima, KAGOSHIMA	7.2	0.49 ±0.087	0.085±0.092
January, 1991			
Kyoto, KYOTO	7.0	4.7 ±0.30	0.000±0.077
Shinguu, WAKAYAMA	7.0	2.2 ±0.13	0.000±0.086
February, 1991			
Tokushima, TOKUSHIMA	6.1	1.7 ±0.11	0.000±0.070

(4) Strontium-90 and Cesium-137 in Freshwater
(from Jul. 1990 to Dec. 1990)

-continued from NO. 94 of this publication-

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

Location	pH	^{90}Sr (mBq/ℓ)	^{137}Cs (mBq/ℓ)
(Freshwater)			
July, 1990			
Barato-lake, HOKKAIDO	8.6	3.7 ±0.16	1.2 ±0.15
December, 1990			
Uji, KYOTO	6.4	0.000±0.034	0.000±0.084

(5) Strontium-90 and Cesium-137 in Soil
(from Jun. 1990 to Mar. 1991)

-continued from NO. 94 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)
June, 1990					
Katsushika, TOKYO	0～5	0.053± 0.091	3.6± 6.1	1.4 ± 0.16	95 ± 11
〃	5～20	0.39 ± 0.12	74 ±23	1.8 ± 0.17	340 ± 33
July, 1990					
Aomori, AOMORI	0～5	1.1 ± 0.08	40 ± 3.1	5.1 ± 0.25	200 ± 10
〃	5～20	0.53 ± 0.065	49 ± 6.0	0.21± 0.066	19 ± 6.1
Imaichi, TOCHIGI	0～5	15 ± 0.4	280 ± 7	45 ± 0.7	830 ± 13
〃	5～20	7.9 ± 0.29	150 ± 6	15 ± 0.4	290 ± 8
Kanazawa, ISHIKAWA	0～5	18 ± 0.4	510 ±12	48 ± 0.7	1400 ± 20
〃	5～20	11 ± 0.3	1600 ±50	30 ± 0.6	4400 ± 80
Nagano, NAGANO	0～5	3.6 ± 0.21	85 ± 5.0	42 ± 0.7	980 ± 17
〃	5～20	3.0 ± 0.19	120 ± 8	3.5 ± 0.22	140 ± 9
Tsu, MIE	0～5	0.48 ± 0.13	40 ±11	2.3 ± 0.19	190 ± 16
〃	5～20	0.42 ± 0.12	87 ±26	0.48± 0.11	100 ± 22
Yasu-machi, SHIGA	0～5	1.1 ± 0.09	73 ± 5.6	1.9 ± 0.18	120 ± 11
〃	5～20	1.0 ± 0.08	170 ±14	0.16± 0.087	27 ± 15
Miyazu, KYOTO	0～5	2.0 ± 0.11	68 ± 3.7	36 ± 0.7	1200 ± 20
〃	5～20	0.78 ± 0.076	180 ±18	7.1 ± 0.31	1600 ± 70
Kasai, HYOGO	0～5	2.1 ± 0.17	93 ± 7.7	34 ± 0.6	1500 ± 30
〃	5～20	1.0 ± 0.15	96 ±14	5.1 ± 0.27	490 ± 26
Kashihara, NARA	0～5	1.6 ± 0.16	100 ±10	6.2 ± 0.29	410 ± 19
〃	5～20	1.6 ± 0.16	180 ±18	6.3 ± 0.29	720 ± 34
Shinguu, WAKAYAMA	0～5	0.13 ± 0.10	4.1± 3.2	3.1 ± 0.21	100 ± 7
〃	5～20	0.11 ± 0.098	7.5± 6.5	1.2 ± 0.14	81 ± 9.4
Kokufu-machi, TOTTORI	0～5	0.26 ± 0.057	19 ± 4.1	2.2 ± 0.16	160 ± 12
〃	5～20	0.75 ± 0.081	110 ±12	2.5 ± 0.18	380 ± 28
Oota, SHIMANE	0～5	22 ± 0.4	530 ± 9	32 ± 0.6	750 ± 14
〃	5～20	6.8 ± 0.22	530 ±17	17 ± 0.5	1300 ± 40

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)
Hiroshima, HIROSHIMA	0～5	0.61 ± 0.10	30 ± 5.1	3.0 ± 0.20	150 ± 10
〃	5～20	2.1 ± 0.17	400 ± 32	11 ± 0.4	2100 ± 70
Matsuyama, EHIME	0～5	3.8 ± 0.22	47 ± 2.7	45 ± 0.8	550 ± 9
〃	5～20	0.99 ± 0.13	68 ± 9.0	41 ± 0.7	2800 ± 50
Sakaide, KAGAWA	0～5	2.9 ± 0.19	120 ± 7	11 ± 0.4	450 ± 15
〃	5～20	2.2 ± 0.17	210 ± 16	1.3 ± 0.15	120 ± 14
Fukuoka, FUKUOKA	0～5	6.9 ± 0.29	450 ± 19	11 ± 0.4	720 ± 24
〃	5～20	5.0 ± 0.25	800 ± 40	4.1 ± 0.25	650 ± 39
Obama-machi, NAGASAKI	0～5	9.2 ± 0.26	94 ± 2.6	120 ± 1	1200 ± 10
〃	5～20	6.3 ± 0.19	320 ± 9	54 ± 0.8	2700 ± 40
Nishihara-mura, KUMAMOTO	0～5	7.3 ± 0.21	160 ± 5	82 ± 1.0	1800 ± 20
〃	5～20	8.9 ± 0.23	570 ± 15	15 ± 0.4	990 ± 28
Sadowara-machi, MIYAZAKI	0～5	1.5 ± 0.10	100 ± 7	12 ± 0.4	790 ± 27
〃	5～20	1.6 ± 0.10	310 ± 20	12 ± 0.4	2300 ± 80
Naha, OKINAWA	0～5	2.2 ± 0.17	170 ± 14	6.1 ± 0.30	480 ± 24
〃	5～20	2.1 ± 0.17	410 ± 33	3.7 ± 0.24	740 ± 48
August, 1990					
Sapporo, HOKKAODO	0～5	12 ± 0.3	440 ± 10	40 ± 0.7	1500 ± 30
〃	5～20	8.6 ± 0.22	1300 ± 30	9.2 ± 0.35	1400 ± 50
Iwadeyama-machi, MIYAGI	0～5	2.8 ± 0.14	77 ± 3.7	7.3 ± 0.32	200 ± 9
〃	5～20	1.8 ± 0.11	310 ± 18	2.8 ± 0.20	470 ± 34
Takisawa-mura, IWATE	0～5	22 ± 0.5	690 ± 15	63 ± 0.8	2000 ± 30
〃	5～20	9.3 ± 0.31	750 ± 25	5.1 ± 0.26	410 ± 21
Yokohama, KANAGAWA	0～5	9.9 ± 0.35	240 ± 8	52 ± 0.8	1300 ± 20
〃	5～20	12 ± 0.4	1200 ± 40	22 ± 0.5	2100 ± 50
Takane-machi, YAMANASHI	0～5	8.1 ± 0.30	460 ± 17	35 ± 0.6	2000 ± 40
〃	5～20	9.6 ± 0.34	1200 ± 40	33 ± 0.6	4200 ± 80
Kochi, KOCHI	0～5	8.9 ± 0.32	450 ± 16	40 ± 0.7	2000 ± 40
〃	5～20	5.6 ± 0.26	810 ± 38	9.5 ± 0.36	1400 ± 50
Kaimon-machi, KAGOSHIMA	0～5	0.59 ± 0.063	20 ± 2.1	1.4 ± 0.15	48 ± 5.2
〃	5～20	0.24 ± 0.048	24 ± 4.7	0.34 ± 0.099	34 ± 9.8

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)
September, 1990					
Kawabe-machi, AKITA	0～5	5.9 ± 0.19	200 ± 7	41 ± 0.7	1400 ± 30
〃	5～20	4.3 ± 0.16	580 ± 22	16 ± 0.5	2100 ± 60
Asahi-machi, OKAYAMA	0～5	0.12 ± 0.094	4.7 ± 3.9	0.41 ± 0.11	17 ± 4.6
〃	5～20	0.20 ± 0.11	28 ± 15	0.51 ± 0.11	71 ± 16
Kujuu,machi, OOITA	0～5	3.8 ± 0.15	50 ± 2.0	110 ± 1	1400 ± 20
〃	5～20	3.8 ± 0.16	110 ± 5	17 ± 0.5	510 ± 14
October, 1990					
Maebashi, GUNMA	0～5	0.78 ± 0.074	40 ± 3.8	3.4 ± 0.21	170 ± 11
〃	5～20	1.6 ± 0.10	220 ± 14	2.4 ± 0.18	330 ± 25
Gifu, GIFU	0～5	0.98 ± 0.13	39 ± 5.0	14 ± 0.4	540 ± 16
〃	5～20	1.3 ± 0.14	300 ± 32	9.7 ± 0.36	2200 ± 80
March, 1991					
Ichihara, CHIBA	0～5	0.13 ± 0.046	4.8 ± 1.7	1.6 ± 0.15	60 ± 5.5
〃	5～20	0.23 ± 0.052	31 ± 7.1	1.5 ± 0.14	200 ± 19

(6) Strontium-90 and Cesium-137 in Sea Water
(from Jul. 1990 to Jan. 1991)

-continued from NO. 94 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, 1990 Yoichi-bay, HOKKAIDO	40.0	18.84	2.9 ±0.34	5.0 ±0.42
January, 1991 Ichihara, CHIBA	40.0	18.31	1.9 ±0.31	3.4 ±0.39

(7) Strontium-90 and Cesium-137 in Sea Sediments
(from May. 1990 to Jan. 1991)

-continued from NO. 94 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)
May, 1990			
Mutsu, AOMORI	13.5	0.00 ±0.12	0.27 ±0.084
July, 1990			
Yoichi-bay, HOKKAIDO	13.0	0.000±0.057	0.55 ±0.11
Tokai-mura, IBARAKI	7.0	0.000±0.088	0.52 ±0.10
Niigata-Port, NIIGATA	19.0	0.00 ±0.11	2.0 ±0.16
Ise-bay, AICHI	21.5	0.13 ±0.11	5.3 ±0.25
Moji-Port, FUKUOKA	8.0	0.16 ±0.093	2.8 ±0.19
Kaseda, KAGOSHIMA	14.0	0.000±0.049	0.38 ±0.11
August, 1990			
Mutsu-bay, AOMORI	12.0	0.73 ±0.15	8.3 ±0.31
Matsukawaura, FUKUSHIMA	5.0	0.000±0.096	0.68 ±0.11
Odawa-bay, KANAGAWA	7.5	0.088±0.091	3.3 ±0.20
Osaka-Port, OSAKA	11.1	0.13 ±0.11	6.3 ±0.27
Yamaguchi-bay, YAMAGUCHI	10.0	0.07 ±0.11	4.1 ±0.22
October, 1990			
Kinnakagusuku-bay, OKINAWA	13.3	0.17 ±0.067	0.47 ±0.11
January, 1991			
Ichihara, CHIBA	16.0	0.27 ±0.11	4.5 ±0.23

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

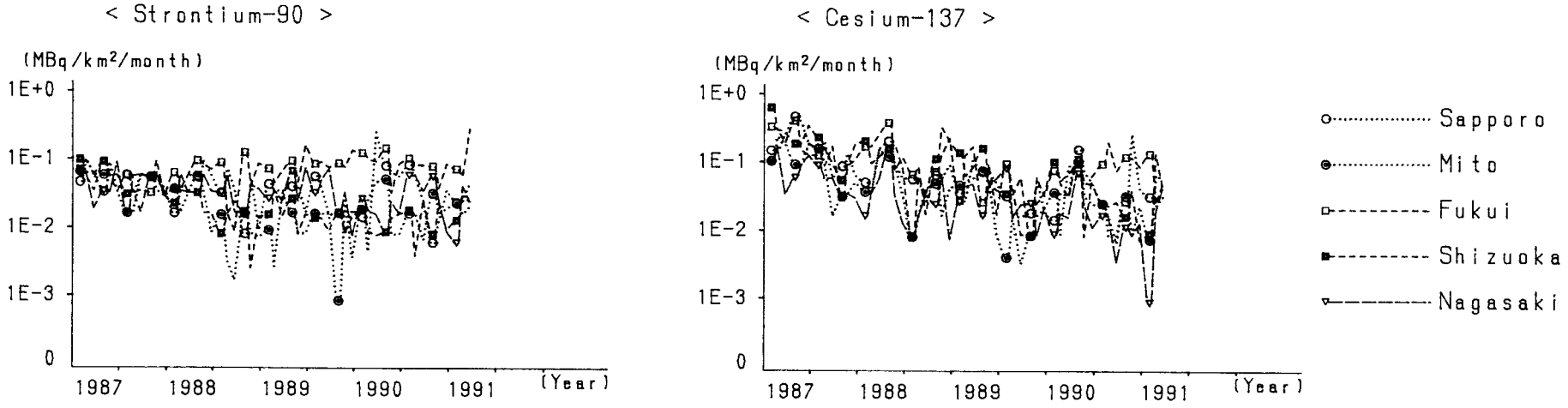


Fig. 1-1

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

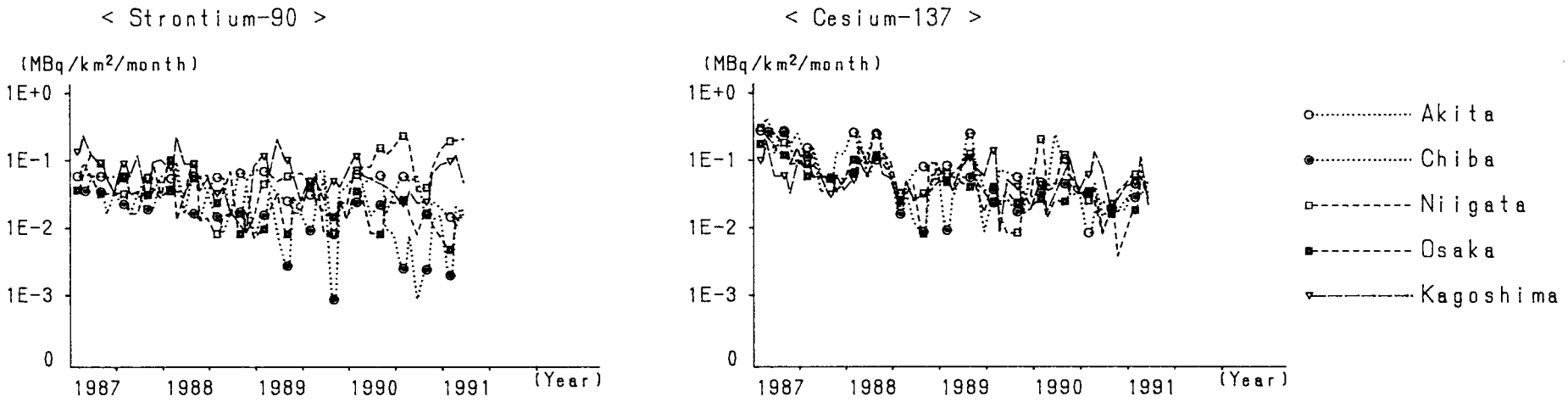


Fig. 1-2

* * * Airborne Dust * * *

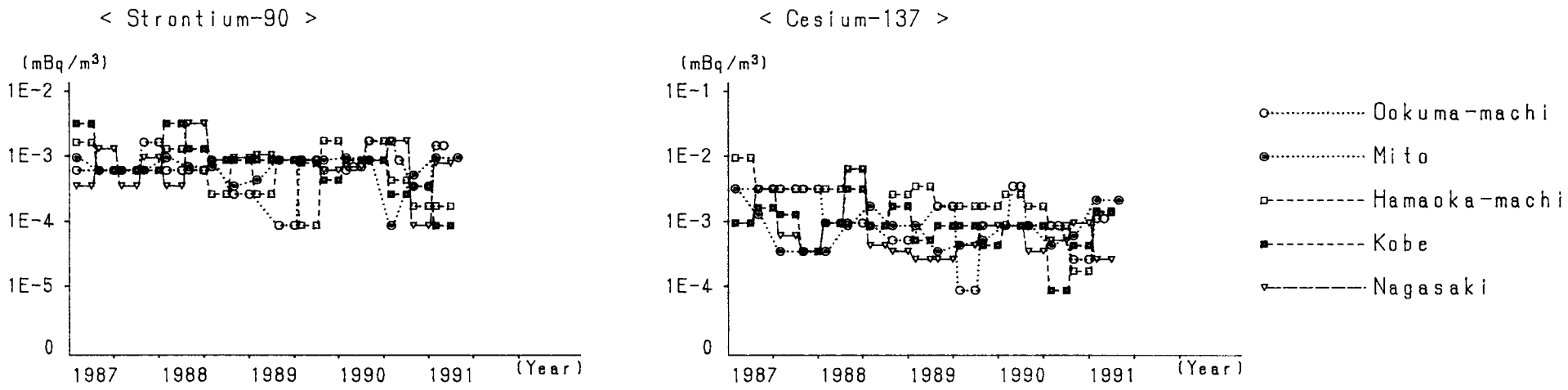


Fig. 2

＊＊＊　Tap water　＊＊＊

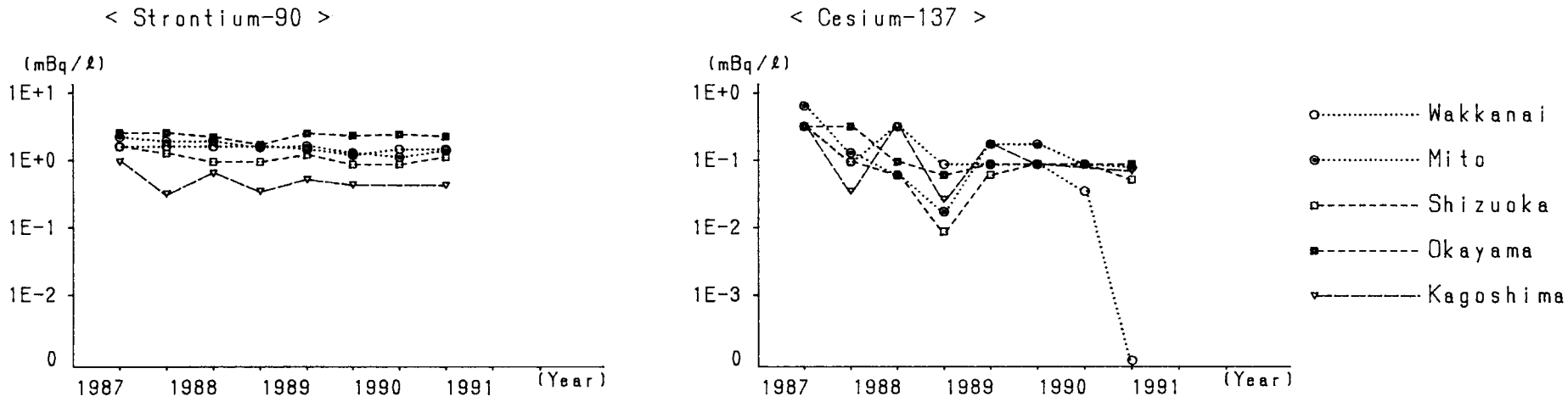


Fig.3

* * * Freshwater * * *

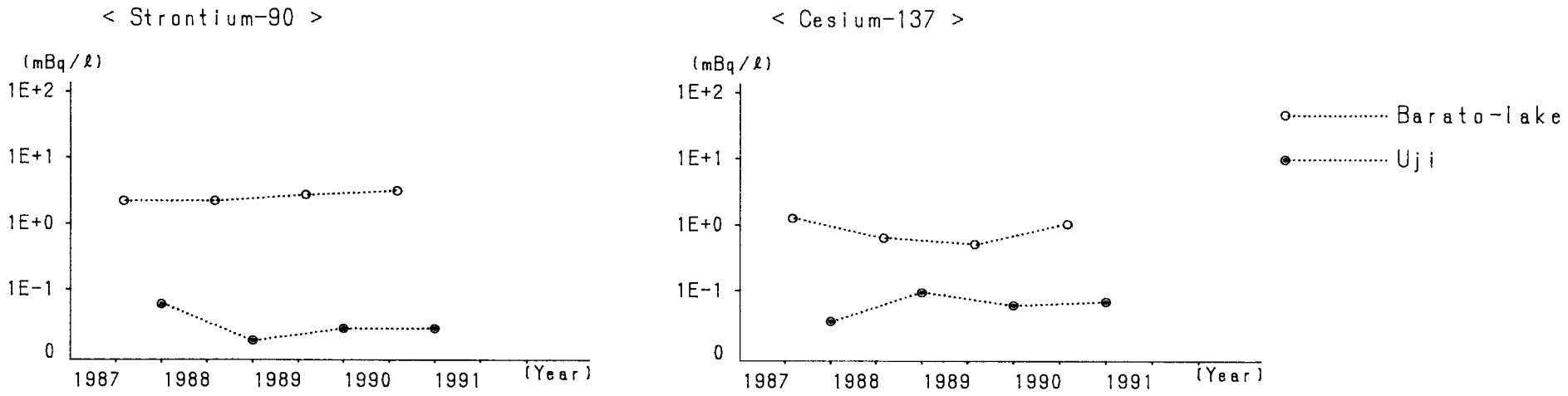


Fig. 4

* * *　Soil　* * *

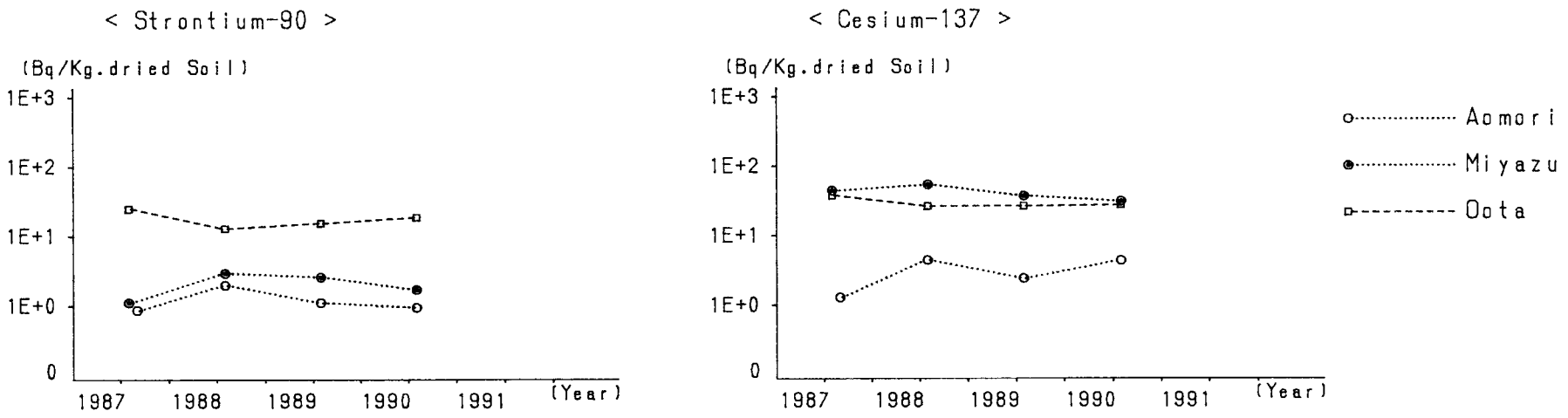


Fig.5-1 (Sampling Depth 0-5cm)

* * *　Soil　* * *

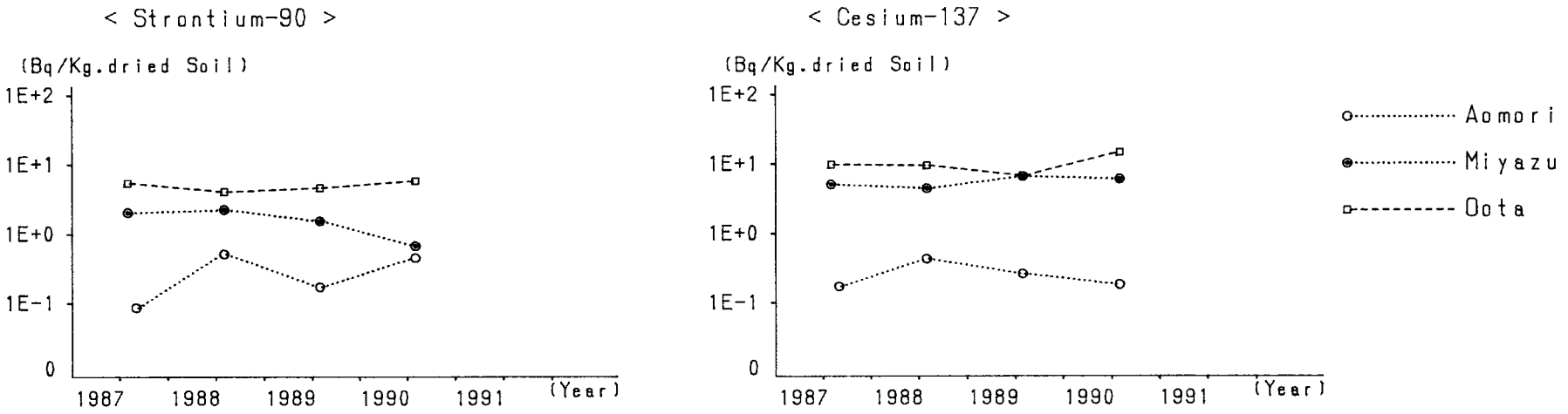


Fig.5-2 (Sampling Depth 5-20cm)

* * * Sea Sediments * * *

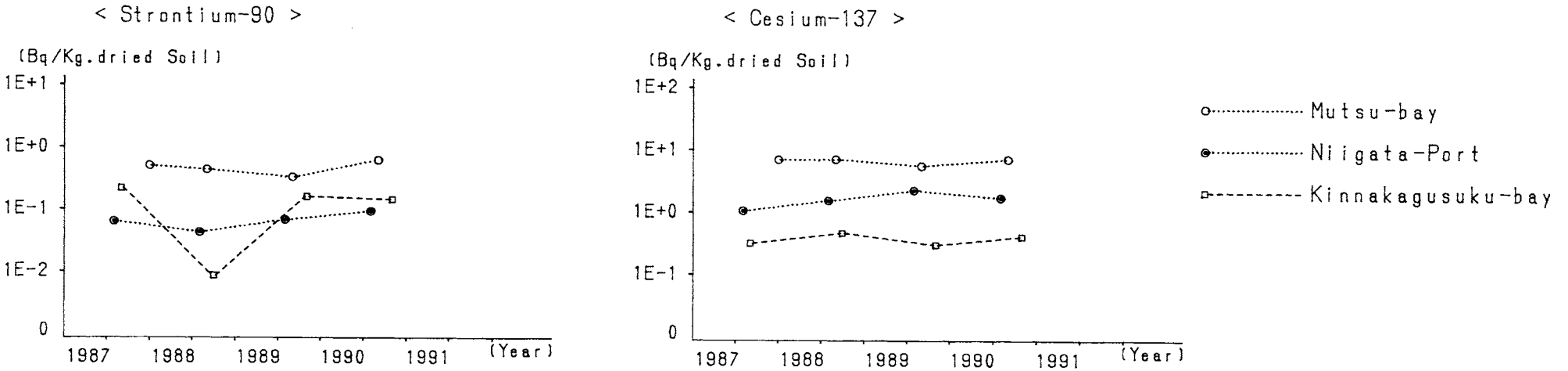
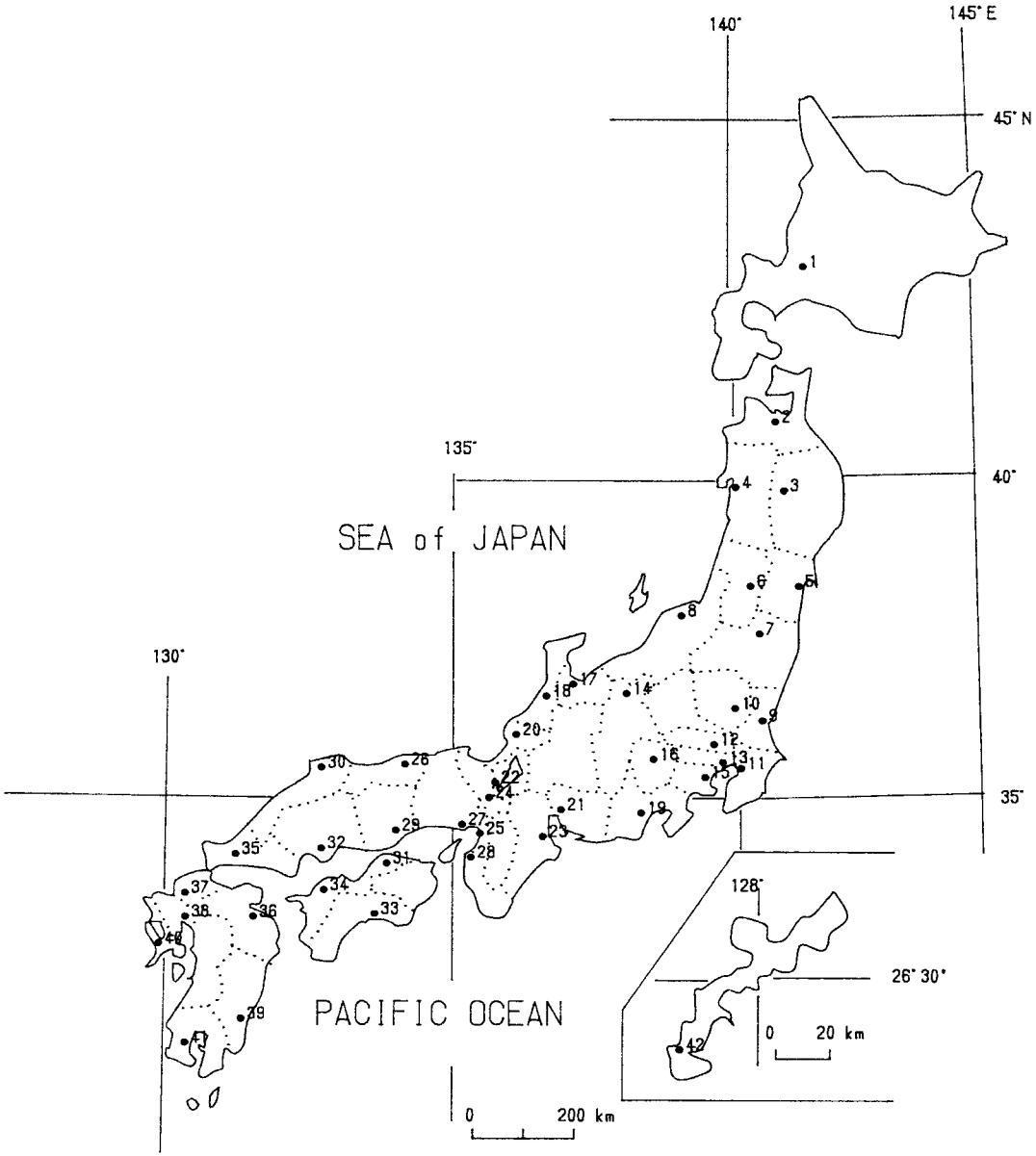


Fig.6

** 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



Notice for Changing of the Address and the Telephone Number

National Institute of Radiological Sciences, Japan, has changed the addresss and the telephone number as follows, from April 1992.

Address(from April 1, 1992) : Anagawa 4-9-1, Inage-ku, 263 Japan

Telephone Number(from April 29, 1992): 81-43-251-2111

Fax Number(from April 29, 1992) : 81-43-256-9616