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RADIOACTIVITY SURVEY DATA in Japan

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 a sampling tray, approximately 5000 cm^2 in area, which was filled with water to a depth of 1 cm at the beginning of every month.

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

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

(2) Airborne dust

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

(3) Service water and freshwater

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

(4) Soil

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

(5) Sea water

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

(6) Sea sediments

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

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

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

(7) Total diet

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

(8) Rice

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

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

(9) Milk

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

(10) Vegetables

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

(11) Tea

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

(12) Fish, shellfish and seaweeds

a. Sea fish and freshwater fish

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

b. Shellfish

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

c. Seaweeds

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

Table 1 shows detailes of sample collection.

Table 1 Details of sample collection

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

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

2. Preparation of samples for analysis

(1) Rain, service water and freshwater

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

(2) Soil and Sea sediment

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

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

(3) Rice

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

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

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

3. Separation of strontium-90 and cesium-137

(1) Strontium-90

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

(2) Cesium-137

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

dophosphate added.

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

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

4. Determination of stable strontium, calcium and potassium

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

5. Counting

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

6. Results

(1)-1 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for domestic program)
(from May 1987 to Jan. 1988)

-continued from NO. 80 of this publication-

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

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
May, 1987				
Matsue, SHIMANE	31	87.1	0.002 ± 0.0006	0.004 ± 0.0006
June, 1987				
Aomori, AOMORI	30	61.0	0.005 ± 0.0007	0.007 ± 0.0007
Mito, IBARAGI	31	59.0	0.001 ± 0.0006	0.006 ± 0.0006
Matsue, SHIMANE	32	115.8	0.002 ± 0.0007	0.004 ± 0.0006
July, 1987				
Sapporo, HOKKAIDO	31	100.0	0.002 ± 0.0007	0.005 ± 0.0007
Aomori, AOMORI	34	200.5	0.005 ± 0.0007	0.002 ± 0.0005
Onagawa-machi, MIYAGI	31	128.0	0.002 ± 0.0006	0.002 ± 0.0005
Yamagata, YAMAGATA	32	141.9	0.002 ± 0.0006	0.004 ± 0.0006
Ookuma-machi, FUKUSHIMA	32	35.0	0.002 ± 0.0005	0.003 ± 0.0006
Mito, IBARAGI	32	147.5	0.000 ± 0.0005	0.005 ± 0.0007
Shinjuku, TOKYO	32	220.5	0.001 ± 0.0005	0.005 ± 0.0007
Yokohama, KANAGAWA	32	132.7	0.002 ± 0.0007	0.013 ± 0.0010
Fukui, FUKUI	31	139.1	0.002 ± 0.0007	0.004 ± 0.0007
Shizuoka, SHIZUOKA	34	256.0	0.001 ± 0.0006	0.008 ± 0.0009
Nagoya, AICHI	32	177.0	0.002 ± 0.0007	0.005 ± 0.0006
Kyoto, KYOTO	34	265.0	0.002 ± 0.0006	0.004 ± 0.0007
Kobe, HYOGO	32	188.8	0.002 ± 0.0006	0.001 ± 0.0005
Wakayama, WAKAYAMA	32	150.5	0.001 ± 0.0005	0.003 ± 0.0006
Tottori, TOTTORI	34	160.6	0.003 ± 0.0006	0.004 ± 0.0006
Matsue, SHIMANE	32	167.6	0.002 ± 0.0006	0.003 ± 0.0006
Hiroshima, HIROSHIMA	34	327.0	0.002 ± 0.0006	0.002 ± 0.0005
Matsuyama, EHIME	32	293.5	0.002 ± 0.0007	0.002 ± 0.0005
Dazaifu, FUKUOKA	31	439.3	0.002 ± 0.0006	0.001 ± 0.0004
Saga, SAGA	34	375.0	0.002 ± 0.0007	0.002 ± 0.0005
Nagasaki, NAGASAKI	32	770.0	0.000 ± 0.0005	0.003 ± 0.0005
Yonagusuku-mura, OKINAWA	32	38.5	0.000 ± 0.0006	0.001 ± 0.0005
August, 1987				
Sapporo, HOKKAIDO	33	137.5	0.001 ± 0.0006	0.007 ± 0.0008

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
Aomori, AOMORI	29	203.5	0.004 ± 0.0006	0.002 ± 0.0005
Onagawa-machi, MIYAGI	33	191.2	0.000 ± 0.0005	0.002 ± 0.0006
Yamagata, YAMAGATA	32	212.1	0.001 ± 0.0006	0.001 ± 0.0005
Ookuma-machi, FUKUSHIMA	32	88.0	0.000 ± 0.0006	0.002 ± 0.0006
Mito, IBARAGI	32	117.5	0.000 ± 0.0005	0.003 ± 0.0005
Shinjuku, TOKYO	32	77.5	0.000 ± 0.0005	0.004 ± 0.0007
Yokohama, KANAGAWA	32	56.1	0.003 ± 0.0007	0.006 ± 0.0007
Fukui, FUKUI	33	165.8	0.001 ± 0.0005	0.003 ± 0.0007
Shizuoka, SHIZUOKA	31	338.0	0.001 ± 0.0005	0.005 ± 0.0007
Nagoya, AICHI	32	98.0	0.002 ± 0.0007	0.004 ± 0.0006
Kyoto, KYOTO	30	42.6	0.002 ± 0.0006	0.002 ± 0.0005
Kobe, HYOGO	32	64.7	0.001 ± 0.0006	0.002 ± 0.0005
Wakayama, WAKAYAMA	32	61.6	0.002 ± 0.0008	0.001 ± 0.0004
Tottori, TOTTORI	30	165.1	0.003 ± 0.0007	0.005 ± 0.0006
Matsue, SHIMANE	33	90.1	0.002 ± 0.0003	0.004 ± 0.0007
Hiroshima, HIROSHIMA	30	226.2	0.002 ± 0.0007	0.001 ± 0.0005
Matsuyama, EHIME	32	149.0	0.001 ± 0.0006	0.006 ± 0.0007
Dazaifu, FUKUOKA	33	421.7	0.001 ± 0.0005	0.001 ± 0.0004
Saga, SAGA	30	157.5	0.001 ± 0.0005	0.001 ± 0.0007
Nagasaki, NAGASAKI	32	373.0	0.002 ± 0.0006	0.002 ± 0.0005
Yonagusuku-mura, OKINAWA	32	135.0	0.002 ± 0.0006	0.002 ± 0.0005
September, 1987				
Sapporo, HOKKAIDO	31	54.5	0.002 ± 0.0006	0.002 ± 0.0006
Aomori, AOMORI	32	48.0	0.002 ± 0.0006	0.002 ± 0.0005
Onagawa-machi, MIYAGI	31	226.9	0.002 ± 0.0006	0.002 ± 0.0005
Yamagata, YAMAGATA	31	92.3	0.000 ± 0.0005	0.001 ± 0.0004
Ookuma-machi, FUKUSHIMA	31	354.4	0.003 ± 0.0006	0.003 ± 0.0006
Mito, IBARAGI	31	157.0	0.002 ± 0.0006	0.000 ± 0.0005
Shinjuku, TOKYO	31	223.6	0.002 ± 0.0006	0.002 ± 0.0005
Yokohama, KANAGAWA	31	221.9	0.002 ± 0.0006	0.010 ± 0.0009
Fukui, FUKUI	29	106.8	0.001 ± 0.0006	0.005 ± 0.0007
Shizuoka, SHIZUOKA	30	250.5	0.000 ± 0.0005	0.003 ± 0.0006
Nagoya, AICHI	31	215.4	0.001 ± 0.0005	0.003 ± 0.0006
Kyoto, KYOTO	31	141.3	0.003 ± 0.0007	0.003 ± 0.0006
Kobe, HYOGO	31	89.0	0.001 ± 0.0006	0.004 ± 0.0006
Wakayama, WAKAYAMA	31	130.0	0.001 ± 0.0005	0.001 ± 0.0005
Tottori, TOTTORI	31	97.6	0.004 ± 0.0007	0.002 ± 0.0005
Hiroshima, HIROSHIMA	31	204.2	0.003 ± 0.0006	0.001 ± 0.0005

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
Matsuyama, EHIME	31	134.0	0.001 ± 0.0006	0.002 ± 0.0006
Dazaifu, FUKUOKA	31	162.1	0.003 ± 0.0008	0.001 ± 0.0006
Saga, SAGA	31	101.3	0.002 ± 0.0003	0.001 ± 0.0004
Nagasaki, NAGASAKI	31	67.0	0.002 ± 0.0007	0.002 ± 0.0007
Yonagusuku-mura, OKINAWA	31	55.0	0.001 ± 0.0008	0.003 ± 0.0008
October, 1987				
Sapporo, HOKKAIDO	33	100.5	0.002 ± 0.0006	0.003 ± 0.0005
Aomori, AOMORI	33	38.0	0.004 ± 0.0004	0.002 ± 0.0005
Onagawa-machi, MIYAGI	33	63.3	0.003 ± 0.0006	0.001 ± 0.0004
Ookuma-machi, FUKUSHIMA	31	82.1	0.001 ± 0.0006	0.006 ± 0.0007
Mito, IBARAGI	33	126.0	0.002 ± 0.0006	0.001 ± 0.0004
Shinjuku, TOKYO	33	189.4	0.002 ± 0.0006	0.002 ± 0.0004
Yokohama, KANAGAWA	32	198.3	0.003 ± 0.0006	0.003 ± 0.0006
Fukui, FUKUI	32	74.5	0.001 ± 0.0006	0.001 ± 0.0005
Shizuoka, SHIZUOKA	33	95.5	0.002 ± 0.0007	0.002 ± 0.0005
Nagoya, AICHI	33	81.3	0.002 ± 0.0006	0.002 ± 0.0004
Kyoto, KYOTO	33	94.2	0.001 ± 0.0007	0.001 ± 0.0004
Kobe, HYOGO	31	84.3	0.003 ± 0.0007	0.004 ± 0.0006
Wakayama, WAKAYAMA	33	117.8	0.003 ± 0.0004	0.002 ± 0.0005
Tottori, TOTTORI	33	198.9	0.007 ± 0.0005	0.004 ± 0.0006
Hiroshima, HIROSHIMA	35	150.3	0.004 ± 0.0004	0.002 ± 0.0004
Matsuyama, EHIME	33	229.0	0.002 ± 0.0003	0.002 ± 0.0004
Dazaifu, FUKUOKA	31	106.7	0.003 ± 0.0004	0.001 ± 0.0004
Saga, SAGA	30	86.2	0.001 ± 0.0003	0.001 ± 0.0004
Nagasaki, NAGASAKI	33	82.5	0.002 ± 0.0004	0.001 ± 0.0004
Yonagusuku-mura, OKINAWA	36	134.0	0.001 ± 0.0003	0.001 ± 0.0005
November, 1987				
Sapporo, HOKKAIDO	29	55.0	0.002 ± 0.0006	0.004 ± 0.0006
Aomori, AOMORI	30	76.0	0.003 ± 0.0003	0.005 ± 0.0007
Onagawa-machi, MIYAGI	29	52.3	0.005 ± 0.0008	0.003 ± 0.0005
Ookuma-machi, FUKUSHIMA	31	46.6	0.001 ± 0.0006	0.005 ± 0.0006
Mito, IBARAGI	30	62.5	0.001 ± 0.0003	0.001 ± 0.0004
Shinjuku, TOKYO	30	54.6	0.001 ± 0.0003	0.001 ± 0.0005
Yokohama, KANAGAWA	31	53.6	0.001 ± 0.0003	0.002 ± 0.0006
Fukui, FUKUI	32	83.9	0.002 ± 0.0007	0.003 ± 0.0006
Shizuoka, SHIZUOKA	30	60.0	0.003 ± 0.0004	0.003 ± 0.0005
Nagoya, AICHI	30	41.3	0.001 ± 0.0007	0.001 ± 0.0005
Kyoto, KYOTO	30	48.1	0.001 ± 0.0003	0.001 ± 0.0004
Wakayama, WAKAYAMA	30	33.1	0.002 ± 0.0008	0.002 ± 0.0006

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
Tottori, TOTTORI	30	169.2	0.004 ± 0.0004	0.003 ± 0.0005
Hiroshima, HIROSHIMA	30	40.8	0.004 ± 0.0004	0.003 ± 0.0006
Matsuyama, EHIME	30	33.0	0.002 ± 0.0003	0.001 ± 0.0004
Dazaifu, FUKUOKA	32	33.0	0.006 ± 0.0005	0.001 ± 0.0005
Nagasaki, NAGASAKI	30	28.0	0.002 ± 0.0004	0.001 ± 0.0005
Yonagusuku-mura, OKINAWA	27	129.0	0.001 ± 0.0003	0.000 ± 0.0004
December, 1987				
Sapporo, HOKKAIDO	29	60.0	0.001 ± 0.0005	0.002 ± 0.0004
Aomori, AOMORI	35	74.5	0.002 ± 0.0006	0.004 ± 0.0006
Onagawa-machi, MIYAGI	37	20.6	0.003 ± 0.0006	0.003 ± 0.0005
Yamagata, YAMAGATA	35	42.6	0.002 ± 0.0003	0.003 ± 0.0006
Ookuma-machi, FUKUSHIMA	27	23.6	0.002 ± 0.0003	0.007 ± 0.0008
Mito, IBARAGI	36	40.5	0.001 ± 0.0003	0.002 ± 0.0005
Shinjuku, TOKYO	35	70.4	0.002 ± 0.0006	0.003 ± 0.0005
Yokohama, KANAGAWA	32	82.1	0.001 ± 0.0005	0.005 ± 0.0006
Fukui, FUKUI	36	191.0	0.001 ± 0.0006	0.004 ± 0.0005
Shizuoka, SHIZUOKA	36	41.5	0.001 ± 0.0006	0.007 ± 0.0007
Kobe, HYOGO	29	9.5	0.003 ± 0.0004	0.002 ± 0.0004
Wakayama, WAKAYAMA	37	25.7	0.002 ± 0.0007	0.001 ± 0.0005
Tottori, TOTTORI	36	170.8	0.003 ± 0.0007	0.004 ± 0.0006
Hiroshima, HIROSHIMA	34	13.4	0.006 ± 0.0005	0.002 ± 0.0005
Matsuyama, EHIME	35	58.5	0.001 ± 0.0003	0.002 ± 0.0004
Dazaifu, FUKUOKA	35	41.7	0.001 ± 0.0003	0.001 ± 0.0005
Nagasaki, NAGASAKI	35	29.0	0.001 ± 0.0003	0.001 ± 0.0004
Yonagusuku-mura, OKINAWA	37	142.5	0.002 ± 0.0003	0.002 ± 0.0005
January, 1988				
Onagawa-machi, MIYAGI	28	23.8	0.001 ± 0.0003	0.003 ± 0.0006
Ookuma-machi, FUKUSHIMA	38	17.6	0.002 ± 0.0004	0.009 ± 0.0008
Hiroshima, HIROSHIMA	28	17.5	0.005 ± 0.0004	0.001 ± 0.0005

(1)-2 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for WHO program)
(from Jul. 1987 to Jan. 1988)

-continued from NO. 80 of this publication-

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

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
July, 1987				
Akita, AKITA	32	248.5	0.002 ± 0.0006	0.005 ± 0.0006
Niigata, NIIGATA	32	206.0	0.001 ± 0.0006	0.003 ± 0.0006
Kanazawa, ISHIKAWA	32	179.5	0.002 ± 0.0006	0.004 ± 0.0007
Nagano, NAGANO	32	67.3	0.002 ± 0.0006	0.002 ± 0.0005
Osaka, OSAKA	31	134.9	0.002 ± 0.0006	0.002 ± 0.0006
Okayama, OKAYAMA	32	221.2	0.001 ± 0.0005	0.003 ± 0.0006
Yamaguchi, YAMAGUCHI	32	356.5	0.002 ± 0.0006	0.002 ± 0.0005
Kochi, KOCHI	32	569.8	0.002 ± 0.0006	0.006 ± 0.0007
Kagoshima, KAGOSHIMA	32	441.0	0.003 ± 0.0008	0.003 ± 0.0006
August, 1987				
Akita, AKITA	32	513.1	0.001 ± 0.0006	0.005 ± 0.0006
Chiba, CHIBA	30	127.0	0.000 ± 0.0005	0.004 ± 0.0006
Niigata, NIIGATA	32	82.0	0.000 ± 0.0005	0.002 ± 0.0006
Kanazawa, ISHIKAWA	32	216.5	0.002 ± 0.0006	0.004 ± 0.0007
Nagano, NAGANO	32	78.6	0.003 ± 0.0006	0.002 ± 0.0006
Osaka, OSAKA	33	63.1	0.001 ± 0.0005	0.003 ± 0.0005
Okayama, OKAYAMA	32	62.0	0.002 ± 0.0006	0.002 ± 0.0006
Yamaguchi, YAMAGUCHI	32	187.5	0.001 ± 0.0005	0.008 ± 0.0008
Kochi, KOCHI	32	183.4	0.004 ± 0.0008	0.004 ± 0.0006
Kagoshima, KAGOSHIMA	31	138.5	0.002 ± 0.0007	0.002 ± 0.0005
September, 1987				
Akita, AKITA	31	138.5	0.001 ± 0.0007	0.002 ± 0.0005
Chiba, CHIBA	31	341.2	0.001 ± 0.0005	0.001 ± 0.0003
Niigata, NIIGATA	31	60.9	0.000 ± 0.0005	0.002 ± 0.0005
Kanazawa, ISHIKAWA	31	104.5	0.002 ± 0.0006	0.004 ± 0.0006
Nagano, NAGANO	30	63.0	0.001 ± 0.0006	0.001 ± 0.0005
Osaka, OSAKA	30	109.4	0.001 ± 0.0005	0.002 ± 0.0006
Okayama, OKAYAMA	31	130.5	0.002 ± 0.0006	0.002 ± 0.0006
Yamaguchi, YAMAGUCHI	31	132.0	0.002 ± 0.0007	0.001 ± 0.0006
Kochi, KOCHI	31	228.0	0.003 ± 0.0007	0.002 ± 0.0005
Kagoshima, KAGOSHIMA	32	68.5	0.004 ± 0.0007	0.002 ± 0.0006
October, 1987				
Akita, AKITA	33	77.7	0.002 ± 0.0006	0.002 ± 0.0005

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/Km^2)	^{137}Cs (mCi/Km^2)
Chiba, CHIBA	33	206.2	0.000 ± 0.0006	0.002 ± 0.0004
Niigata, NIIGATA	32	57.6	0.002 ± 0.0006	0.002 ± 0.0004
Kanazawa, ISHIKAWA	30	116.5	0.001 ± 0.0006	0.003 ± 0.0005
Nagano, NAGANO	34	19.4	0.001 ± 0.0005	0.002 ± 0.0004
Osaka, OSAKA	34	114.9	0.001 ± 0.0006	0.002 ± 0.0006
Okayama, OKAYAMA	33	135.5	0.001 ± 0.0003	0.002 ± 0.0005
Yamaguchi, YAMAGUCHI	33	136.0	0.003 ± 0.0004	0.002 ± 0.0005
Kochi, KOCHI	33	263.9	0.004 ± 0.0004	0.002 ± 0.0005
Kagoshima, KAGOSHIMA	33	165.5	0.001 ± 0.0005	0.001 ± 0.0004
November, 1987				
Akita, AKITA	30	186.9	0.001 ± 0.0006	0.004 ± 0.0006
Chiba, CHIBA	31	78.6	0.000 ± 0.0006	0.001 ± 0.0003
Niigata, NIIGATA	30	64.2	0.003 ± 0.0004	0.002 ± 0.0005
Kanazawa, ISHIKAWA	33	216.5	0.002 ± 0.0003	0.003 ± 0.0005
Osaka, OSAKA	29	42.7	0.001 ± 0.0007	0.001 ± 0.0005
Okayama, OKAYAMA	30	35.1	0.001 ± 0.0003	0.000 ± 0.0004
Yamaguchi, YAMAGUCHI	33	61.0	0.003 ± 0.0004	0.001 ± 0.0005
Kochi, KOCHI	30	42.8	0.003 ± 0.0004	0.002 ± 0.0005
Kagoshima, KAGOSHIMA	30	29.0	0.003 ± 0.0020	0.002 ± 0.0005
December, 1987				
Akita, AKITA	31	147.2	0.002 ± 0.0007	0.004 ± 0.0005
Chiba, CHIBA	35	80.3	0.002 ± 0.0004	0.002 ± 0.0004
Niigata, NIIGATA	35	79.8	0.001 ± 0.0005	0.002 ± 0.0005
Kanazawa, ISHIKAWA	29	148.0	0.000 ± 0.0005	0.002 ± 0.0005
Osaka, OSAKA	37	28.4	0.001 ± 0.0006	0.002 ± 0.0005
Okayama, OKAYAMA	36	16.5	0.003 ± 0.0007	0.001 ± 0.0004
Yamaguchi, YAMAGUCHI	32	28.0	0.002 ± 0.0006	0.001 ± 0.0004
Kochi, KOCHI	36	11.6	0.002 ± 0.0003	0.001 ± 0.0004
Kagoshima, KAGOSHIMA	28	34.5	0.003 ± 0.0004	0.001 ± 0.0004
January, 1988				
Akita, AKITA	33	139.2	0.002 ± 0.0003	0.009 ± 0.0008
Chiba, CHIBA	28	28.7	0.001 ± 0.0005	0.002 ± 0.0005
Osaka, OSAKA	28	25.6	0.003 ± 0.0004	0.003 ± 0.0006

(2) Strontium-90 and Cesium-137 in Airborne Dust
(from Apr. 1987 to Dec. 1987)

-continued from NO. 80 of this publication-

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

Location	Sampling period	Absorption volume (m^3)	^{90}Sr ($10^{-3}pCi/m^3$)	^{137}Cs ($10^{-3}pCi/m^3$)
April～June, 1987				
Ookuma-machi, FUKUSHIMA	4～6	11,819	0.0 ± 0.02	0.1 ± 0.02
Mito, IBARAGI	4～6	9,684	0.02 ± 0.02	0.04 ± 0.02
Niigata, NIIGATA	4～6	13,949	0.0 ± 0.02	0.1 ± 0.02
July～September, 1987				
Ookuma-machi, FUKUSHIMA	7～9	10,678	0.02 ± 0.01	0.1 ± 0.03
Mito, IBARAGI	7～9	10,395	0.02 ± 0.01	0.01 ± 0.02
Niigata, NIIGATA	7～9	14,902	0.02 ± 0.01	0.02 ± 0.01
Fukui, FUKUI	7～9	17,905	0.0 ± 0.01	0.01 ± 0.01
Hamaoka-machi, SHIZUOKA	7～9	11,104	0.02 ± 0.02	0.1 ± 0.02
Nagoya, AICHI	7～9	9,814	0.04 ± 0.01	0.02 ± 0.02
Kyoto, KYOTO	7～9	8,747	0.03 ± 0.03	0.1 ± 0.03
Osaka, OSAKA	7～9	14,063	0.04 ± 0.02	0.05 ± 0.02
Kobe, HYOGO	7～9	10,104	0.02 ± 0.03	0.04 ± 0.02
Tottori, TOTTORI	7～9	9,015	0.02 ± 0.01	0.04 ± 0.02
Hiroshima, HIROSHIMA	7～9	11,278	0.0 ± 0.02	0.01 ± 0.02
Nagasaki, NAGASAKI	7～9	10,295	0.0 ± 0.01	0.02 ± 0.02
October～December, 1987				
Niigata, NIIGATA	10～12	13,792	0.01 ± 0.02	0.02 ± 0.01
Fukui, FUKUI	10～12	16,889	0.03 ± 0.01	0.03 ± 0.01
Hamaoka-machi, SHIZUOKA	10～12	10,631	0.02 ± 0.02	0.1 ± 0.02
Nagoya, AICHI	10～12	9,534	0.0 ± 0.02	0.02 ± 0.01
Kyoto, KYOTO	10～12	7,307	0.05 ± 0.04	0.1 ± 0.02
Kobe, HYOGO	10～12	9,837	0.02 ± 0.01	0.01 ± 0.01
Tottori, TOTTORI	10～12	12,321	0.01 ± 0.02	0.1 ± 0.01
Hiroshima, HIROSHIMA	10～12	10,699	0.02 ± 0.01	0.01 ± 0.01
Nagasaki, NAGASAKI	10～12	9,272	0.0 ± 0.03	0.0 ± 0.01

(3) Strontium-90 and Cesium-137 in Service Water
(from Jun. 1987 to Jan. 1988)

-continued from NO. 80 of this publication-

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

Location	pH	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)
(Source Water)			
June, 1987			
Nagano, NAGANO	7.0	0.06 ± 0.005	0.02 ± 0.003
August, 1987			
Kyoto, KYOTO	6.8	0.16 ± 0.005	0.02 ± 0.004
December, 1987			
Katsushika, TOKYO	7.3	0.06 ± 0.004	0.02 ± 0.003
Tsukui-machi, KANAGAWA	8.1	0.01 ± 0.003	0.01 ± 0.002
Inuyama, AICHI	6.9	0.10 ± 0.006	0.01 ± 0.002
Moriguchi, OSAKA	7.0	0.13 ± 0.006	0.01 ± 0.003
Fukuoka, FUKUOKA	6.9	0.07 ± 0.003	0.00 ± 0.003
January, 1988			
Sapporo, HOKKAIDO	7.1	0.06 ± 0.005	0.01 ± 0.003
(Tap Water)			
June, 1987			
Matsue, SHIMANE	7.1	0.11 ± 0.004	0.01 ± 0.002
August, 1987			
Kyoto, KYOTO	6.5	0.15 ± 0.005	0.01 ± 0.003
October, 1987			
Sendai, MIYAGI	6.4	0.06 ± 0.004	0.01 ± 0.002
November, 1987			
Fukui, FUKUI	7.3	0.02 ± 0.003	0.001 ± 0.002
December, 1987			
Wakkanai, HOKKAIDO	6.8	0.05 ± 0.005	0.003 ± 0.002
Aomori, AOMORI	7.4	0.04 ± 0.004	0.01 ± 0.002
Akita, AKITA	6.7	0.12 ± 0.006	0.01 ± 0.003
Yamagata, YAMAGATA	6.8	0.07 ± 0.005	0.01 ± 0.002
Fukushima, FUKUSHIMA	7.0	0.10 ± 0.005	0.003 ± 0.002
Mito, IBARAGI	7.7	0.06 ± 0.005	0.004 ± 0.002
Katsushika, TOKYO	7.3	0.04 ± 0.004	0.01 ± 0.002

Location	pH	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)
Niigata, NIIGATA	7.0	0.11 ± 0.004	0.005 ± 0.002
Kanazawa, ISHIKAWA	7.1	0.09 ± 0.004	0.01 ± 0.002
Shizuoka, SHIZUOKA	7.8	0.04 ± 0.003	0.00 ± 0.003
Nagoya, AICHI	6.7	0.08 ± 0.003	0.01 ± 0.003
Osaka, OSAKA	6.8	0.13 ± 0.005	0.01 ± 0.003
Kobe, HYOGO	7.4	0.13 ± 0.004	0.003 ± 0.003
Tottori, TOTTORI	7.5	0.09 ± 0.004	0.002 ± 0.003
Okayama, OKAYAMA	6.9	0.08 ± 0.004	0.01 ± 0.003
Hiroshima, HIROSHIMA	6.9	0.10 ± 0.004	0.01 ± 0.003
Ube, YAMAGUCHI	6.8	0.06 ± 0.003	0.004 ± 0.003
Matsuyama, EHIME	7.1	0.05 ± 0.003	0.003 ± 0.003
Kochi, KOCHI	7.3	0.06 ± 0.003	0.01 ± 0.003
Fukuoka, FUKUOKA	6.9	0.08 ± 0.004	0.003 ± 0.003
Nagasaki, NAGASAKI	7.4	0.07 ± 0.003	0.003 ± 0.003
Kagoshima, KAGOSHIMA	7.1	0.01 ± 0.002	0.001 ± 0.003
January, 1988			
Yokohama, KANAGAWA	7.5	0.02 ± 0.003	0.002 ± 0.002

(4) Strontium-90 and Cesium-137 in Freshwater (from Aug. 1987 to Nov. 1987)

-continued from NO. 80 of this publication-

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

Location	pH	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)
(Freshwater)			
August, 1987			
Akita, AKITA	6.3	0.11 ± 0.006	0.02 ± 0.004
September, 1987			
Inogaike, FUKUI	6.7	0.22 ± 0.009	0.13 ± 0.007
October, 1987			
Fukushima, FUKUSHIMA	6.6	0.07 ± 0.005	0.01 ± 0.002
November, 1987			
Toyanogata, NIIGATA	6.7	0.18 ± 0.005	0.03 ± 0.004
Shobara, HIROSHIMA	6.8	0.06 ± 0.003	0.01 ± 0.003

(5) Strontium-90 and Cesium-137 in Soil
(from Jun. 1987 to Sep. 1987)

-continued from NO. 80 of this publication-

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

Location	Sampling Depth (cm)	^{90}Sr (pCi/Kg)	^{90}Sr (mCi/Km^2)	^{137}Cs (pCi/Kg)	^{137}Cs (mCi/Km^2)
June, 1987					
Fukushima, FUKUSHIMA	0～5	100 ± 6	4.5 ± 0.26	350 ± 10	15 ± 0.4
〃	5～20	41 ± 4.7	2.4 ± 0.28	52 ± 4.6	3.1 ± 0.28
July, 1987					
Kanazawa, ISHIKAWA	0～5	440 ± 8	14 ± 0.3	1400 ± 20	44 ± 0.6
〃	5～20	330 ± 7	49 ± 1.0	1000 ± 16	150 ± 2
Nagano, NAGANO	0～5	70 ± 3.3	3.4 ± 0.16	240 ± 8	12 ± 0.4
〃	5～20	52 ± 2.9	5.9 ± 0.33	160 ± 7	18 ± 0.8
Gotenba, SHIZUOKA	0～5	30 ± 4.0	1.0 ± 0.14	280 ± 9	9.6 ± 0.31
〃	5～20	50 ± 4.7	8.7 ± 0.81	190 ± 8	34 ± 1.4
Miyazu, KYOTO	0～5	35 ± 4.0	1.2 ± 0.14	1400 ± 20	48 ± 0.7
〃	5～20	64 ± 5.0	15 ± 1.1	160 ± 7	36 ± 1.5
Kumatori-machi, OSAKA	0～5	71 ± 5.3	4.1 ± 0.31	57 ± 4.5	3.3 ± 0.26
〃	5～20	36 ± 4.1	7.1 ± 0.81	32 ± 3.6	6.4 ± 0.70
Kobe, HYOGO	0～5	24 ± 3.9	1.3 ± 0.21	270 ± 9	14 ± 0.5
〃	5～20	37 ± 4.3	4.2 ± 0.48	390 ± 11	45 ± 1.3
Kokufu-machi, TOTTORI	0～5	12 ± 3.1	1.2 ± 0.30	110 ± 6	11 ± 0.5
〃	5～20	21 ± 3.4	2.4 ± 0.39	72 ± 4.6	8.2 ± 0.52
Oota, SHIMANE	0～5	790 ± 15	15 ± 0.3	1200 ± 20	22 ± 0.3
〃	5～20	170 ± 8	14 ± 0.7	310 ± 9	27 ± 0.8
Tsuyama, OKAYAMA	0～5	12 ± 3.2	0.5 ± 0.13	130 ± 7	5.1 ± 0.27
〃	5～20	24 ± 3.7	2.6 ± 0.41	39 ± 4.0	4.3 ± 0.45
Hiroshima, HIROSHIMA	0～5	72 ± 5.2	2.8 ± 0.20	770 ± 15	30 ± 0.6
〃	5～20	110 ± 6	15 ± 0.9	200 ± 8	28 ± 1.1
Matsuyama, EHIME	0～5	56 ± 4.7	2.1 ± 0.17	680 ± 14	25 ± 0.5
〃	5～20	18 ± 3.4	1.9 ± 0.36	130 ± 7	13 ± 0.7
Kochi, KOCHI	0～5	340 ± 12	16 ± 0.6	1300 ± 20	62 ± 1.0
〃	5～20	230 ± 9	32 ± 1.2	370 ± 11	50 ± 1.5

Location	Sampling Depth (cm)	^{90}Sr (pCi/Kg)	^{90}Sr (mCi/Km^2)	^{137}Cs (pCi/Kg)	^{137}Cs (mCi/Km^2)
Fukuoka, FUKUOKA	0～5	200 ± 8	7.4 ± 0.31	380 ± 10	14 ± 0.4
〃	5～20	210 ± 9	18 ± 0.7	130 ± 6	11 ± 0.5
Obama-machi, NAGASAKI	0～5	210 ± 8	5.4 ± 0.21	1300 ± 20	33 ± 0.5
〃	5～20	210 ± 8	22 ± 0.9	1000 ± 20	110 ± 2.0
Kaimon-machi, KAGOSHIMA	0～5	8 ± 2.7	0.5 ± 0.18	23 ± 2.9	1.5 ± 0.19
〃	5～20	3 ± 2.7	0.4 ± 0.36	7 ± 2.1	1.0 ± 0.29
Naha, OKINAWA	0～5	50 ± 4.6	3.0 ± 0.28	130 ± 7.0	7.8 ± 0.41
〃	5～20	61 ± 5.0	11 ± 0.9	100 ± 6.0	19 ± 1.1
August, 1987					
Sapporo, HOKKAIDO	0～5	330 ± 10	13 ± 0.4	850 ± 15	34 ± 0.6
〃	5～20	220 ± 8	32 ± 1.2	210 ± 8	30 ± 1.2
Aomori, AOMORI	0～5	26 ± 2.1	1.3 ± 0.11	41 ± 3.6	2.0 ± 0.18
〃	5～20	2 ± 1.0	0.2 ± 0.10	6 ± 2.1	0.6 ± 0.20
Iwadeyama-machi, MIYAGI	0～5	81 ± 5.5	3.9 ± 0.26	120 ± 6	5.8 ± 0.28
〃	5～20	76 ± 5.5	12 ± 0.9	99 ± 5.4	16 ± 0.9
Yokohama, KANAGAWA	0～5	270 ± 9	6.9 ± 0.24	840 ± 16	22 ± 0.4
〃	5～20	330 ± 11	29 ± 1.0	450 ± 12	40 ± 1.1
Saga, SAGA	0～5	33 ± 4.0	1.2 ± 0.15	91 ± 5.1	3.3 ± 0.19
〃	5～20	64 ± 5.1	9.0 ± 0.72	120 ± 6	16 ± 0.8
September, 1987					
Kawabe-machi, AKITA	0～5	300 ± 10	11 ± 0.4	2800 ± 30	99 ± 1.0
〃	5～20	430 ± 12	48 ± 1.4	2300 ± 30	260 ± 3
Hagi, YAMAGUCHI	0～5	50 ± 3.0	3.4 ± 0.20	200 ± 7	13 ± 0.5
〃	5～20	56 ± 3.1	15 ± 0.8	100 ± 5	28 ± 1.5

(6) Strontium-90 and Cesium-137 in Sea Water
(from Jul. 1987 to Dec. 1987)

-continued from NO. 80 of this publication-

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

Location	Sample volume analyzed (ℓ)	Cl (‰)	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)
July, 1987				
Niigata-Port, NIIGATA	44	16.7	0.07 ± 0.008	0.11 ± 0.010
Ise-bay, AICHI	40	8.2	0.08 ± 0.009	0.06 ± 0.008
Moji-Port, FUKUOKA	40	17.45	0.08 ± 0.009	0.10 ± 0.010
Kaseda, KAGOSHIMA	40	17.69	0.08 ± 0.009	0.08 ± 0.010
August, 1987				
Matsukawaura, FUKUSHIMA	40	16.3	0.08 ± 0.009	0.11 ± 0.011
Odawa-bay, KANAGAWA	40	17.9	0.08 ± 0.009	0.09 ± 0.010
Osaka-Port, OSAKA	40	7.8	0.08 ± 0.010	0.05 ± 0.008
Yamaguchi-bay, YAMAGUCHI	40	18.0	0.07 ± 0.009	0.10 ± 0.010
Kinnakagusuku-bay, OKINAWA	40	19.30	0.07 ± 0.009	0.09 ± 0.010
November, 1987				
Yoichi-bay, HOKKAIDO	40	18.67	0.08 ± 0.009	0.13 ± 0.010
December, 1987				
Mutsu-bay, AOMORI	40	18.5	0.08 ± 0.009	0.11 ± 0.009

(7) Strontium-90 and Cesium-137 in Sea Sediments
(from May 1987 to Dec. 1987)

-continued from NO. 80 of this publication-

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

Location	Depth (m)	^{90}Sr (pCi/Kg)	^{137}Cs (pCi/Kg)
May, 1987			
Sekine-machi, AOMORI	10	0 ± 2.5	9 ± 2.2
July, 1987			
Tokai, IBARAGI	7	0.1± 2.4	15 ± 2.6
Niigata-Port, NIIGATA	24	2 ± 2.4	33 ± 3.3
Ise-bay, AICHI	20	5 ± 2.5	140 ± 6
Moji-Port, FUKUOKA	11	5 ± 2.1	86 ± 5.5
Kaseda, KAGOSHIMA	18	5 ± 2.2	5 ± 2.3
August, 1987			
Matsukawaura, FUKUSHIMA	5	0 ± 2.4	29 ± 3.2
Odawa-bay, KANAGAWA	6	3 ± 2.3	86 ± 5.1
Osaka-Port, OSAKA	12	5 ± 2.1	140 ± 7
Yamaguchi-bay, YAMAGUCHI	10	7 ± 2.3	130 ± 7
Kinnakagusuku-bay, OKINAWA	14.3	7 ± 2.8	10 ± 2.7
November, 1987			
Yoichi-bay, HOKKAIDO	13	5 ± 1.3	23 ± 3.7
December, 1987			
Mutsu-bay, AOMORI	12	16 ± 1.9	220 ± 8

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

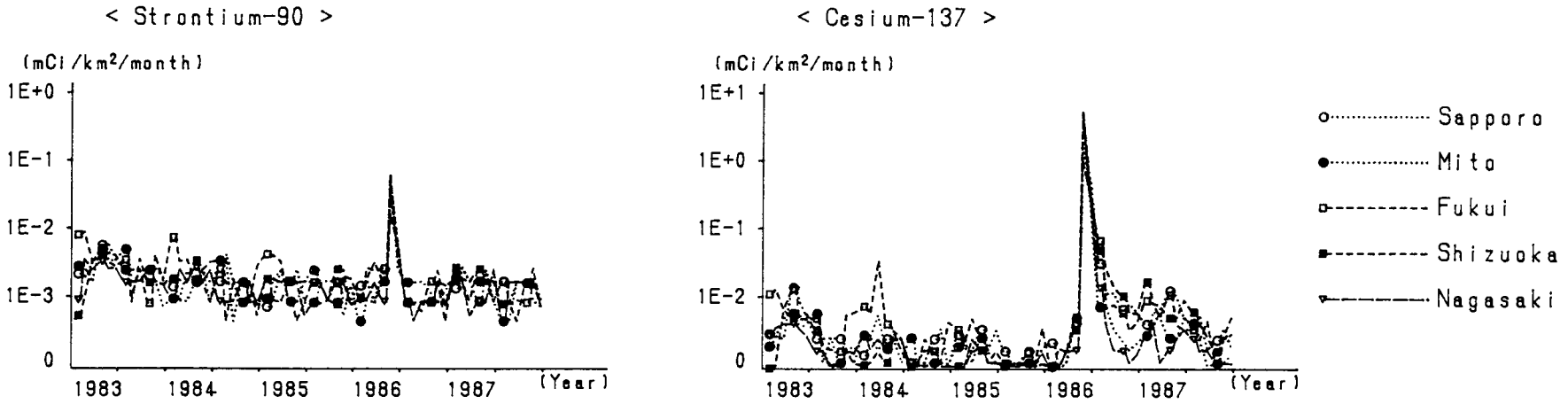


Fig. 1-1

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

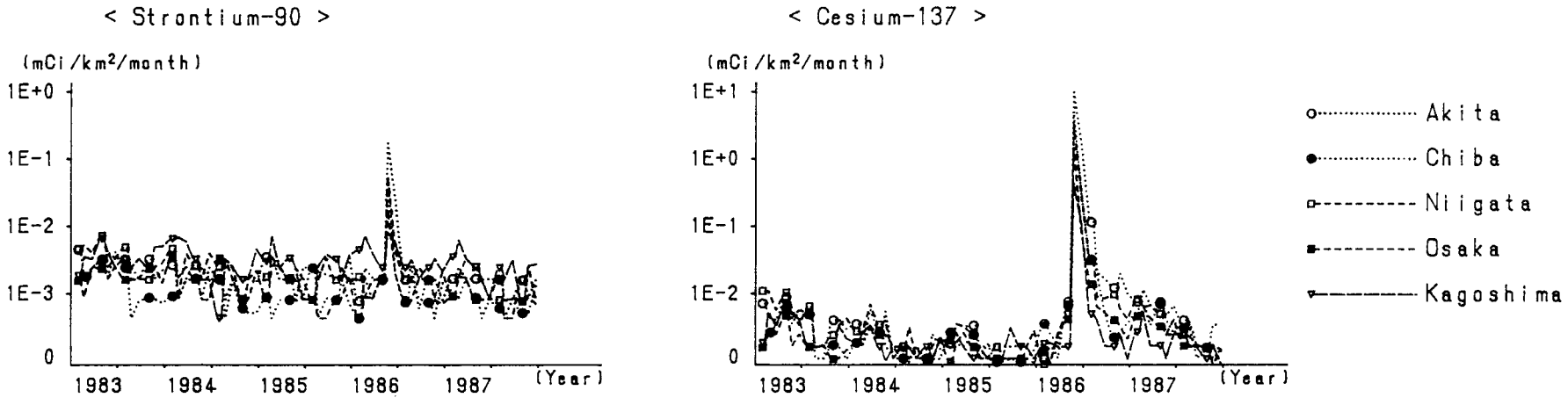


Fig. 1-2

＊＊＊　Airborne Dust　＊＊＊

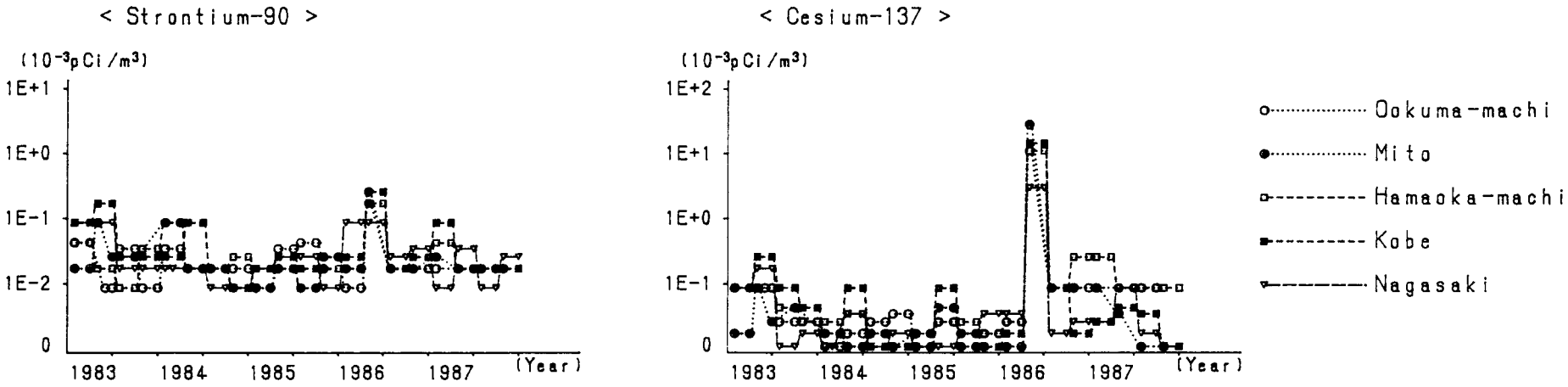


Fig.2

* * * Service Water (tap water) * * *

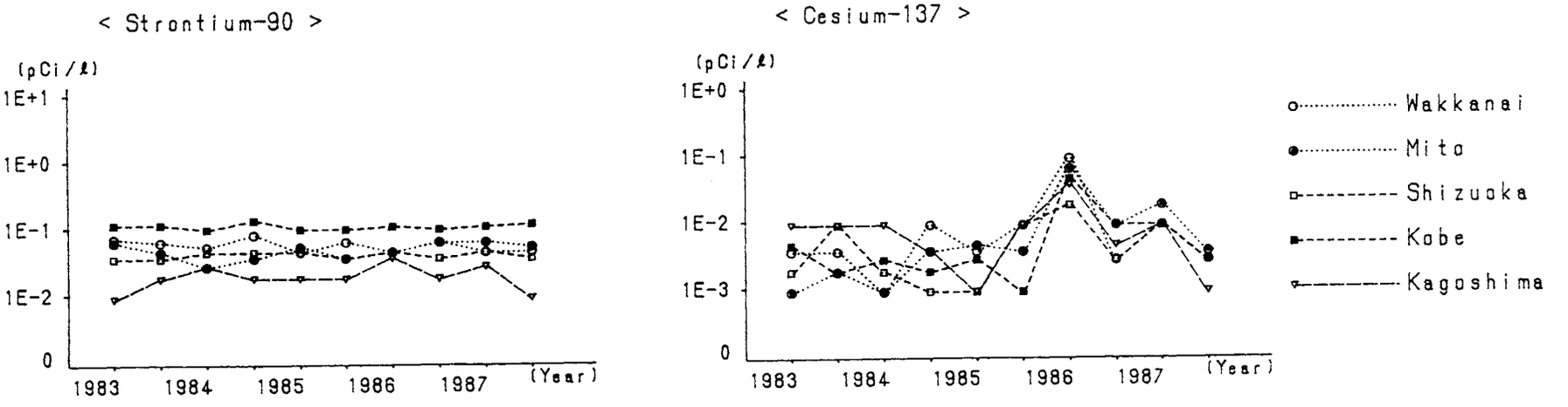


Fig. 3

* * * Service Water (freshwater) * * *

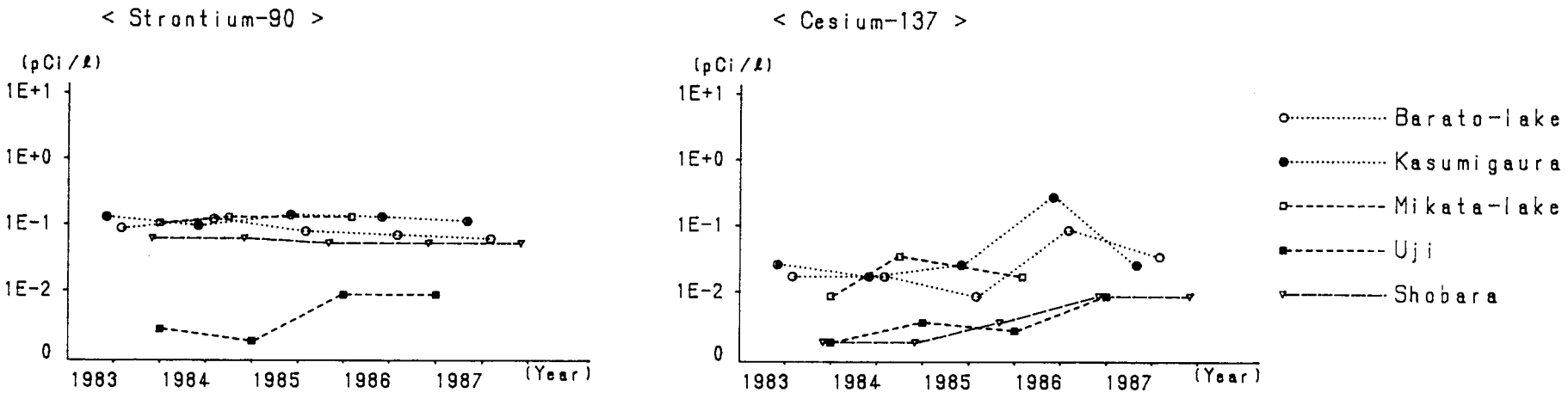
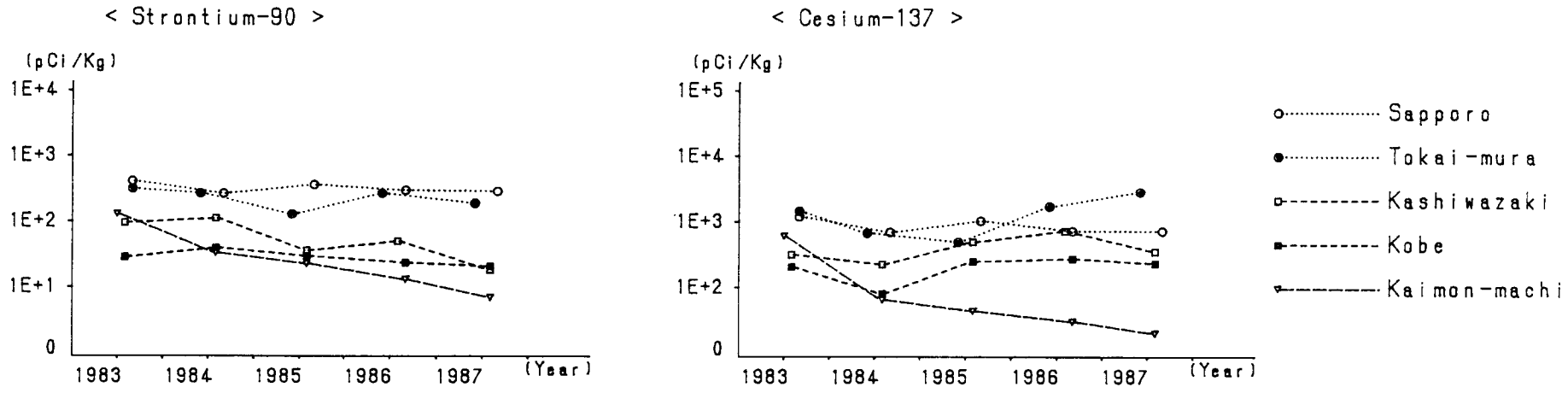


Fig. 4

* * * Soil * * *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(pCi/Kg)
1E+4
1E+3
1E+2
1E+1
0
1983
1984
1985
1986
1987
(Year)
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(pCi/Kg)
1E+5
1E+4
1E+3
1E+2
0
1983
1984
1985
1986
1987
(Year)
Sapporo
Tokai-mura
Kashiwazaki
Kobe
Kaimon-machi

Fig.5

* * * Sea Water * * *

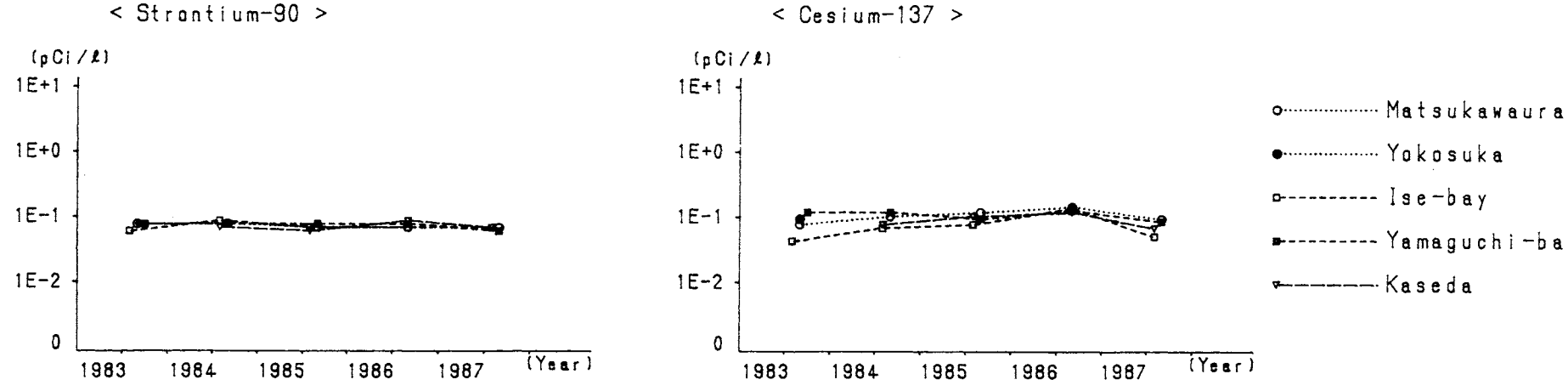

Fig.6

* * * Sea Sediments * * *

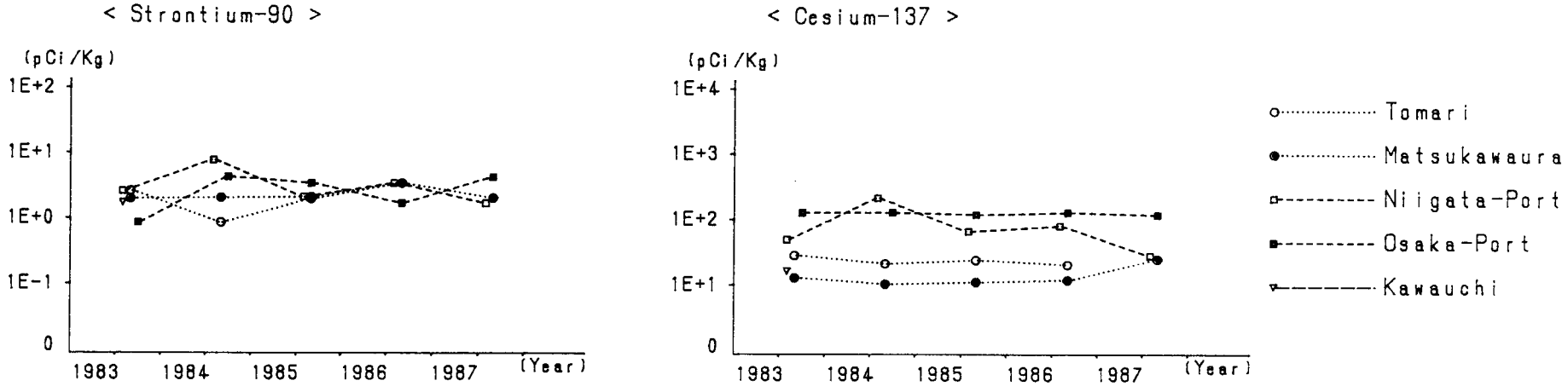

Fig.7

** Sampling Locations in Japan **

1 : Sapporo
2 : Aomori
3 : Akita
4 : Sendai
5 : Yamagata
6 : Fukushima
7 : Niigata
8 : Mito
9 : Chiba
10 : Shinjuku
11 : Nagano
12 : Yokohama
13 : Kanazawa
14 : Shizuoka
15 : Fukui
16 : Nagoya
17 : Kyoto
18 : Osaka
19 : Tottori
20 : Kobe
21 : Wakayama
22 : Okayama
23 : Matsue
24 : Hiroshima
25 : Kochi
26 : Matsuyama
27 : Yamaguchi
28 : Fukuoka
29 : Saga
30 : Nagasaki
31 : Kagoshima
32 : Naha