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(Japan Chemical Analysis Center)

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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 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. The tray 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 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 dust storms, inflow and out flow 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°C. 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 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 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 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°C.

(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 transferred to a porcelain dish and then ashed at 450°C 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 nonstarch 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 4kg 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 details 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 0.25mm in size by a crusher. The sieved sample was ashed in an electric muffle furnace regulated at 450 °C. 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 0.25mm 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 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 molybdophosphate added.

After filtered off and washed with hydrochloric 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°C 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 90min. Net sample counting rates were corrected for counter efficiency, recovery, self-absorption and decay to obtain the content of strontium-90 and cesium-137per 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)

(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Oct, 1999								
Sapporo, HOKKAIDO	31	72	0.023	±	0.0077	0.003	±	0.013
Aomori, AOMORI	31	217.3	0.042	±	0.012	0.029	±	0.012
Morioka, IWATE	31	99.8	0.0041	±	0.0075	0.01	±	0.011
Onagawa-machi, MIYAGI	31	211.5	0.033	±	0.015	0.015	±	0.013
Yamagata, YAMAGATA	31	85	0	±	0.012	0.015	±	0.013
Okuma-machi, FUKUSHIMA	31	143	0.025	±	0.0077	0.014	±	0.013
Mito, IBARAKI	31	80.5	0.009	±	0.011	0	±	0.008
Kawachi-machi, TOCHIGI	31	82.5	0	±	0.01	0	±	0.012
Maebashi, GUNMA	28	88.5	0.019	±	0.0078	0.016	±	0.013
Urawa, SAITAMA	31	135.5	0.052	±	0.039	0	±	0.019
Shinjuku, TOKYO	31	124.7	0.022	±	0.0093	0	±	0.0072
Yokohama, KANAGAWA	32	100.1	0.008	±	0.012	0.0042	±	0.0081
Kosugi-machi, TOYAMA	31	162.2	0.01	±	0.0071	0.014	±	0.012
Fukui, FUKUI	31	131.4	0.12	±	0.068	0	±	0.038
Kofu, YAMANASHI	31	67	0.016	±	0.0068	0	±	0.012
Kagamigahara, GIFU	31	81.5	0.018	±	0.0099	0	±	0.0086
Shizuoka, SHIZUOKA	31	50.5	0.0088	±	0.0065	0.051	±	0.012
Nagoya, AICHI	31	76.4	0.016	±	0.0072	0.033	±	0.014
Yokkaichi, MIE	31	89.5	0.023	±	0.0073	0	±	0.012
Otsu, SHIGA	31	152	0.01	±	0.0076	0	±	0.013
Kyoto, KYOTO	35	179.5	0.012	±	0.0077	0.015	±	0.013

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Kobe, HYOGO	29	108.2	0.017	±	0.0068	0	±	0.009
Nara, NARA	31	147	0.003	±	0.01	0	±	0.0068
Wakayama, WAKAYAMA	31	77.5	0.038	±	0.012	0.009	±	0.013
Tottori, TOTTORI	31	134.5	0.052	±	0.0091	0.002	±	0.012
Matsue, SHIMANE	31	93.4	0.057	±	0.0082	0.024	±	0.0099
Hiroshima, HIROSHIMA	32	87.8	0.059	±	0.024	0.002	±	0.01
Ishii-machi, TOKUSHIMA	31	56.1	0.026	±	0.0089	0.29	±	0.024
Takamatsu, KAGAWA	31	78	0.017	±	0.0075	0.005	±	0.014
Matsuyama, EHIME	31	76.5	0.014	±	0.011	0	±	0.0077
Dazaifu, FUKUOKA	31	60.1	0.0005	±	0.0082	0	±	0.012
Saga, SAGA	31	54.7	0.016	±	0.0068	0.004	±	0.013
Nagasaki, NAGASAKI	31	99	0	±	0.0093	0.0083	±	0.0085
Uto, KUMAMOTO	31	34.3	0.005	±	0.012	0.0071	±	0.0084
Oita, OITA	31	58.1	0.017	±	0.0086	0.0098	±	0.0078
Miyazaki, MIYAZAKI	31	95.7	0.035	±	0.01	0.005	±	0.012
Yonagusuku-machi, OKINAWA	32	23.6	0.0097	±	0.0073	0.014	±	0.016
Nov, 1999								
Sapporo, HOKKAIDO	30	60	0.0051	±	0.0068	0.025	±	0.014
Aomori, AOMORI	31	153.5	0.018	±	0.0096	0	±	0.0076
Morioka, IWATE	30	32.5	0	±	0.0098	0.0006	±	0.0097
Onagawa-machi, MIYAGI	30	47	0.008	±	0.014	0	±	0.011
Yamagata, YAMAGATA	30	70.9	0.006	±	0.011	0.005	±	0.013
Okuma-machi, FUKUSHIMA	30	48	0.014	±	0.0078	0	±	0.0078
Mito, IBARAKI	30	58	0	±	0.01	0	±	0.0077
Kawachi-machi, TOCHIGI	30	43	0	±	0.0097	0.013	±	0.013
Urawa, SAITAMA	30	41	0.044	±	0.033	0	±	0.015
Shinjuku, TOKYO	30	57.4	0.029	±	0.012	0	±	0.0084

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Yokohama, KANAGAWA	29	130.5	0.011	±	0.0088	0	±	0.0087
Kosugi-machi, TOYAMA	30	198.3	0.008	±	0.01	0.017	±	0.012
Fukui, FUKUI	30	234.4	0	±	0.064	0	±	0.044
Kofu, YAMANASHI	30	47.5	0.015	±	0.013	0.002	±	0.012
Kagamigahara, GIFU	30	77	0.004	±	0.014	0	±	0.008
Shizuoka, SHIZUOKA	30	168	0.011	±	0.0064	0.06	±	0.011
Nagoya, AICHI	30	72.9	0	±	0.0076	0.0024	±	0.0083
Yokkaichi, MIE	30	56	0.014	±	0.007	0	±	0.013
Otsu, SHIGA	30	59.8	0.0067	±	0.0076	0	±	0.0072
Kyoto, KYOTO	29	42.5	0.031	±	0.0088	0.02	±	0.013
Kobe, HYOGO	32	62.4	0.009	±	0.015	0	±	0.0092
Nara, NARA	30	74.8	0	±	0.0079	0	±	0.0085
Wakayama, WAKAYAMA	30	85.5	0.003	±	0.01	0.005	±	0.015
Tottori, TOTTORI	30	184.1	0.056	±	0.011	0.021	±	0.0097
Matsue, SHIMANE	30	143.5	0	±	0.013	0.0069	±	0.0061
Hiroshima, HIROSHIMA	30	46.8	0.072	±	0.019	0	±	0.0079
Ishii-machi, TOKUSHIMA	28	157	0.047	±	0.011	0.1	±	0.018
Takamatsu, KAGAWA	30	48.5	0	±	0.0098	0.003	±	0.0079
Matsuyama, EHIME	30	64.5	0	±	0.0083	0	±	0.0078
Dazaifu, FUKUOKA	30	59.5	0.01	±	0.0069	0.007	±	0.013
Saga, SAGA	30	89.6	0.026	±	0.0083	0	±	0.013
Nagasaki, NAGASAKI	30	127.5	0.007	±	0.011	0	±	0.0079
Uto, KUMAMOTO	30	88.8	0.022	±	0.008	0.0044	±	0.0089
Oita, OITA	30	63	0.0059	±	0.0069	0.004	±	0.0072
Miyazaki, MIYAZAKI	30	31.3	0.014	±	0.009	0.032	±	0.013
Yonagusuku-machi, OKINAWA	30	76.6	0.017	±	0.009	0.035	±	0.018

Dec, 1999

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Sapporo, HOKKAIDO	27	58	0.003	±	0.017	0	±	0.013
Aomori, AOMORI	33	185.5	0.046	±	0.012	0.027	±	0.011
Morioka, IWATE	34	17	0.001	±	0.014	0	±	0.008
Onagawa-machi, MIYAGI	35	18	0	±	0.0077	0	±	0.0085
Yamagata, YAMAGATA	34	137.1	0	±	0.0097	0.0085	±	0.0087
Okuma-machi, FUKUSHIMA	34	10.5	0.0079	±	0.0072	0.0045	±	0.0078
Mito, IBARAKI	34	12.5	0	±	0.012	0.01	±	0.01
Kawachi-machi, TOCHIGI	34	7.6	0.0045	±	0.0071	0	±	0.012
Maebashi, GUNMA	34	0	0	±	0.011	0.017	±	0.013
Urawa, SAITAMA	34	2.4	0.013	±	0.0095	0.024	±	0.011
Shinjuku, TOKYO	34	6.5	0.004	±	0.01	0	±	0.0084
Yokohama, KANAGAWA	28	5.7	0	±	0.012	0	±	0.013
Kosugi-machi, TOYAMA	26	294	0.018	±	0.012	0	±	0.012
Fukui, FUKUI	27	398.1	0	±	0.043	0.039	±	0.066
Kofu, YAMANASHI	34	0	0.02	±	0.013	0	±	0.013
Kagamigahara, GIFU	34	2	0	±	0.0067	0	±	0.0072
Shizuoka, SHIZUOKA	34	1	0.011	±	0.0073	0.068	±	0.013
Nagoya, AICHI	34	1.1	0.004	±	0.01	0.0047	±	0.0091
Yokkaichi, MIE	34	2.5	0.014	±	0.011	0	±	0.0071
Otsu, SHIGA	34	2.8	0.005	±	0.011	0.0018	±	0.0078
Kyoto, KYOTO	27	3	0.017	±	0.0081	0.001	±	0.012
Kobe, HYOGO	28	3	0.0072	±	0.0072	0	±	0.0079
Nara, NARA	34	3.3	0.001	±	0.0084	0	±	0.0073
Wakayama, WAKAYAMA	34	5	0.026	±	0.018	0.013	±	0.014
Tottori, TOTTORI	34	260.6	0.063	±	0.01	0.027	±	0.0097
Matsue, SHIMANE	34	131.5	0.021	±	0.013	0.99	±	0.028

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Hiroshima, HIROSHIMA	30	12.2	0.2	±	0.056	0.015	±	0.041
Ishii-machi, TOKUSHIMA	37	1.3	0.024	±	0.0078	0.046	±	0.014
Takamatsu, KAGAWA	34	2	0.009	±	0.016	0.0018	±	0.008
Matsuyama, EHIME	34	25	0.012	±	0.0086	0.0024	±	0.0086
Dazaifu, FUKUOKA	34	24.8	0.0049	±	0.0089	0.004	±	0.011
Saga, SAGA	34	12.6	0.0081	±	0.0066	0	±	0.011
Nagasaki, NAGASAKI	34	27.5	0.001	±	0.012	0.019	±	0.0091
Uto, KUMAMOTO	34	22.2	0.0014	±	0.0073	0.0053	±	0.0084
Oita, OITA	34	18.7	0	±	0.011	0	±	0.0097
Miyazaki, MIYAZAKI	34	20.8	0.026	±	0.0074	0.016	±	0.013
Yonagusuku-machi, OKINAWA	34	157.5	0.0006	±	0.0091	0	±	0.01
Jan, 2000								
Sapporo, HOKKAIDO	35	94	0	±	0.014	0	±	0.012
Aomori, AOMORI	28	132.6	0.02	±	0.011	0.0072	±	0.0093
Morioka, IWATE	28	58.4	0.023	±	0.017	0	±	0.0082
Onagawa-machi, MIYAGI	-338	58.5	0	±	0.0066	0	±	0.0078
Yamagata, YAMAGATA	28	65.8	0.001	±	0.013	0	±	0.0086
Okuma-machi, FUKUSHIMA	28	60.5	0	±	0.013	0.004	±	0.013
Mito, IBARAKI	28	66	0.0067	±	0.0074	0	±	0.0084
Kawachi-machi, TOCHIGI	28	54.7	0.03	±	0.018	0	±	0.012
Maebashi, GUNMA	35	13.5	0.043	±	0.0091	0.036	±	0.014
Urawa, SAITAMA	28	60.3	0.0054	±	0.0063	0.023	±	0.0096
Shinjuku, TOKYO	28	72.1	0.006	±	0.023	0.034	±	0.015
Yokohama, KANAGAWA	34	90.6	0.011	±	0.012	0.006	±	0.0085
Kosugi-machi, TOYAMA	36	135.1	0.011	±	0.012	0.037	±	0.014
Fukui, FUKUI	35	138.6	0	±	0.089	0	±	0.39
Kofu, YAMANASHI	28	43	0.01	±	0.0085	0.012	±	0.013

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Kagamigahara, GIFU	393	76.5	0.025	±	0.014	0.0006	±	0.008
Shizuoka, SHIZUOKA	29	112	0.007	±	0.007	0.13	±	0.019
Nagoya, AICHI	28	68.7	0.0016	±	0.007	0.009	±	0.014
Yokkaichi, MIE	28	57	0	±	0.01	0.014	±	0.0083
Otsu, SHIGA	28	76.4	0.0073	±	0.0083	0.0094	±	0.0089
Kyoto, KYOTO	37	64	0.0083	±	0.008	0	±	0.013
Kobe, HYOGO	34	49.6	0	±	0.012	0.015	±	0.0092
Nara, NARA	28	86.4	0.024	±	0.012	0.015	±	0.013
Wakayama, WAKAYAMA	28	52.5	0.012	±	0.017	0	±	0.0082
Tottori, TOTTORI	28	154.5	0.044	±	0.016	0	±	0.0093
Matsue, SHIMANE	28	110.7	0.013	±	0.01	0.014	±	0.0071
Hiroshima, HIROSHIMA	31	61	0.11	±	0.019	0	±	0.01
Ishii-machi, TOKUSHIMA	26	69.4	0.015	±	0.0089	0.055	±	0.015
Takamatsu, KAGAWA	28	34	0.022	±	0.013	0	±	0.008
Matsuyama, EHIME	28	73	0.029	±	0.0075	0	±	0.0081
Dazaifu, FUKUOKA	28	69.1	0.0039	±	0.0064	0	±	0.011
Saga, SAGA	28	74	0.012	±	0.007	0	±	0.012
Nagasaki, NAGASAKI	28	84	0.0082	±	0.0067	0	±	0.008
Uto, KUMAMOTO	28	87.5	0.022	±	0.0078	0.027	±	0.013
Oita, OITA	28	81.9	0.001	±	0.015	0	±	0.0075
Miyazaki, MIYAZAKI	28	105.6	0	±	0.0061	0	±	0.012
Yonagusuku-machi, OKINAWA	28	79.8	0.006	±	0.016	0	±	0.016
Feb, 2000								
Sapporo, HOKKAIDO	29	97	0.014	±	0.0073	0.019	±	0.013
Aomori, AOMORI	29	136.4	0.0012	±	0.0068	0.034	±	0.024
Morioka, IWATE	29	18.1	0.013	±	0.0088	0.018	±	0.013
Onagawa-machi, MIYAGI	394	12	0.01	±	0.008	0.0046	±	0.0084

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Yamagata, YAMAGATA	29	72.5	0.024	±	0.0081	0.018	±	0.0097
Okuma-machi, FUKUSHIMA	29	22	0.009	±	0.015	0	±	0.012
Mito, IBARAKI	29	20.5	0	±	0.0071	0.0095	±	0.0084
Kawachi-machi, TOCHIGI	29	11.5	0.005	±	0.016	0	±	0.012
Maebashi, GUNMA	22	0	0.0094	±	0.0076	0	±	0.012
Urawa, SAITAMA	29	2.8	0.026	±	0.0068	0.081	±	0.012
Shinjuku, TOKYO	29	4.7	0.019	±	0.012	0	±	0.012
Yokohama, KANAGAWA	29	2.7	0.012	±	0.011	0.02	±	0.013
Kosugi-machi, TOYAMA	29	189.3	0	±	0.01	0.01	±	0.012
Fukui, FUKUI	30	188.9	0.072	±	0.064	0.053	±	0.067
Kofu, YAMANASHI	29	1	0.0013	±	0.0076	0.008	±	0.013
Kagamigahara, GIFU	29	54	0.002	±	0.02	0	±	0.0077
Shizuoka, SHIZUOKA	28	27	0.028	±	0.0081	0.11	±	0.018
Nagoya, AICHI	29	40.3	0	±	0.008	0.01	±	0.014
Yokkaichi, MIE	29	24.5	0	±	0.01	0.018	±	0.0087
Otsu, SHIGA	29	40	0.024	±	0.012	0.0056	±	0.0077
Kyoto, KYOTO	26	35	0.016	±	0.0081	0.014	±	0.013
Kobe, HYOGO	29	23.9	0.011	±	0.0078	0.0036	±	0.0086
Nara, NARA	29	53.3	0.009	±	0.01	0.005	±	0.013
Wakayama, WAKAYAMA	29	46	0	±	0.018	0.0049	±	0.0098
Tottori, TOTTORI	29	184	0.064	±	0.02	0.009	±	0.01
Matsue, SHIMANE	29	63.2	0.027	±	0.012	0.022	±	0.0071
Hiroshima, HIROSHIMA	31	51.2	0.061	±	0.012	0.022	±	0.015
Ishii-machi, TOKUSHIMA	29	26.1	0.061	±	0.012	0.26	±	0.022
Takamatsu, KAGAWA	29	19.5	0.0015	±	0.0089	0.012	±	0.0096
Matsuyama, EHIME	29	31.5	0.0093	±	0.0061	0	±	0.0081

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)	137Cs (MBq/km2)
Dazaifu, FUKUOKA	29	28	0.0054 ± 0.0068	0.018 ± 0.013
Saga, SAGA	29	40.5	0.0088 ± 0.0064	0 ± 0.013
Nagasaki, NAGASAKI	29	49	0.0012 ± 0.0063	0.0055 ± 0.0092
Uto, KUMAMOTO	29	43.9	0.012 ± 0.014	0.016 ± 0.012
Oita, OITA	29	40	0.018 ± 0.0082	0.009 ± 0.012
Miyazaki, MIYAZAKI	29	60.4	0.035 ± 0.0093	0.026 ± 0.014
Mar, 2000				
Sapporo, HOKKAIDO	30	72.5	0.023 ± 0.0081	0.062 ± 0.015
Aomori, AOMORI	33	114.3	0.024 ± 0.0077	0.075 ± 0.012
Morioka, IWATE	33	104.2	0.035 ± 0.0093	0.069 ± 0.016
Onagawa-machi, MIYAGI	33	74	0.045 ± 0.009	0.039 ± 0.01
Yamagata, YAMAGATA	33	66.2	0.051 ± 0.021	0.067 ± 0.017
Okuma-machi, FUKUSHIMA	33	94.5	0.032 ± 0.0087	0.028 ± 0.013
Mito, IBARAKI	33	51	0.039 ± 0.0098	0.09 ± 0.013
Kawachi-machi, TOCHIGI	30	67.1	0.047 ± 0.021	0.049 ± 0.016
Urawa, SAITAMA	33	70.5	0.034 ± 0.0073	0.12 ± 0.014
Shinjuku, TOKYO	33	102	0.033 ± 0.013	0.049 ± 0.014
Yokohama, KANAGAWA	31	136.4	0.041 ± 0.01	0.13 ± 0.017
Fukui, FUKUI	32	243	0.18 ± 0.069	0.31 ± 0.061
Kofu, YAMANASHI	33	86.5	0.0061 ± 0.0085	0.02 ± 0.013
Kagamigahara, GIFU	31	130	0.012 ± 0.013	0.019 ± 0.0091
Shizuoka, SHIZUOKA	33	178	0.016 ± 0.0077	0.055 ± 0.016
Nagoya, AICHI	33	95.3	0.037 ± 0.0091	0.027 ± 0.014
Yokkaichi, MIE	33	91.5	0.034 ± 0.01	0.074 ± 0.012
Otsu, SHIGA	33	99.1	0.0033 ± 0.0073	0.026 ± 0.015
Kyoto, KYOTO	29	103	0.069 ± 0.011	0.4 ± 0.026
Kobe, HYOGO	31	100.6	0.0065 ± 0.0076	0.022 ± 0.013

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Nara, NARA	33	105.9	0.04	±	0.011	0.029	±	0.013
Wakayama, WAKAYAMA	33	93.5	0.029	±	0.027	0.038	±	0.012
Tottori, TOTTORI	33	168.9	0.27	±	0.028	0.019	±	0.01
Matsue, SHIMANE	33	101.7	0.056	±	0.0064	0.16	±	0.012
Hiroshima, HIROSHIMA	29	173.4	0.038	±	0.019	0.075	±	0.017
Ishii-machi, TOKUSHIMA	34	69	0.058	±	0.013	0.29	±	0.024
Takamatsu, KAGAWA	33	62	0.002	±	0.012	0.026	±	0.014
Matsuyama, EHIME	33	118	0.021	±	0.0073	0.065	±	0.012
Dazaifu, FUKUOKA	33	115.2	0.012	±	0.0073	0.096	±	0.016
Saga, SAGA	33	111.7	0.012	±	0.007	0	±	0.013
Nagasaki, NAGASAKI	33	101	0.018	±	0.0089	0.056	±	0.015
Uto, KUMAMOTO	33	104.3	0.012	±	0.0087	0.053	±	0.015
Oita, OITA	33	107.7	0.017	±	0.0089	0.071	±	0.016
Miyazaki, MIYAZAKI	33	126	0.035	±	0.0085	0.094	±	0.017
Yonagusuku-machi, OKINAWA	35	224	0.019	±	0.01	0.011	±	0.015

(1)-2 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for WHO proguram)
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

Table (1)-2 Strontium-90 and Cesium-137 in Rain and Dry Fallout(for WHO proguram)

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)	137Cs (MBq/km2)
Oct, 1999				
Akita, AKITA	31	164.5	0.028 ± 0.0074	0.02 ± 0.013
Chiba, CHIBA	31	68.4	0.0078 ± 0.0073	0.028 ± 0.014
Ichihara, CHIBA	31	97.3	0.01 ± 0.012	0 ± 0.0078
Niigata, NIIGATA	31	165	0.025 ± 0.014	0.006 ± 0.008
Kanazawa, ISHIKAWA	32	213.5	0.013 ± 0.0082	0.028 ± 0.011
Nagano, NAGANO	32	121.1	0.0058 ± 0.0087	0 ± 0.008
Osaka, OSAKA	33	124.5	0.036 ± 0.0087	0.006 ± 0.01
Okayama, OKAYAMA	31	79.7	0.0004 ± 0.0063	0 ± 0.0086
Yamaguchi, YAMAGUCHI	31	77.5	0.014 ± 0.0071	0.001 ± 0.013
Kochi, KOCHI	31	222.8	0.027 ± 0.0091	0 ± 0.0073
Kagoshima, KAGOSHIMA	31	72.5	0.041 ± 0.0087	0.009 ± 0.014
Nov, 1999				
Akita, AKITA	29	217.3	0.025 ± 0.02	0.012 ± 0.0089
Chiba, CHIBA	30	73.2	0 ± 0.0066	0.019 ± 0.014
Ichihara, CHIBA	30	72.1	0 ± 0.018	0 ± 0.013
Niigata, NIIGATA	30	230.6	0.012 ± 0.01	0.012 ± 0.0096
Kanazawa, ISHIKAWA	29	236.5	0.018 ± 0.0082	0 ± 0.0077
Nagano, NAGANO	29	29.5	0.0005 ± 0.0094	0 ± 0.0086
Osaka, OSAKA	29	32.2	0.041 ± 0.011	0 ± 0.0089
Okayama, OKAYAMA	30	34.8	0 ± 0.0084	0 ± 0.0077
Yamaguchi, YAMAGUCHI	30	76	0.0004 ± 0.0066	0.0097 ± 0.0086
Kochi, KOCHI	30	117.7	0 ± 0.0092	0 ± 0.013

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Kagoshima, KAGOSHIMA	29	21	0.063	±	0.0087	0.008	±	0.013
Dec, 1999								
Akita, AKITA	35	159.8	0.001	±	0.012	0.014	±	0.0094
Chiba, CHIBA	34	17.9	0.014	±	0.0083	0.011	±	0.013
Ichihara, CHIBA	34	13.3	0	±	0.022	0.012	±	0.014
Niigata, NIIGATA	34	286.9	0.007	±	0.011	0.027	±	0.011
Kanazawa, ISHIKAWA	35	379.5	0.018	±	0.013	0.036	±	0.014
Nagano, NAGANO	34	20.8	0	±	0.0079	0	±	0.0075
Osaka, OSAKA	34	4.8	0.021	±	0.01	0	±	0.0084
Okayama, OKAYAMA	34	2.4	0	±	0.042	0	±	0.1
Yamaguchi, YAMAGUCHI	34	39	0.0053	±	0.0081	0.01	±	0.013
Kochi, KOCHI	34	8.8	0.027	±	0.011	0.007	±	0.0096
Kagoshima, KAGOSHIMA	28	18.5	0.054	±	0.01	0	±	0.013
Jan, 2000								
Akita, AKITA	28	241.1	0	±	0.014	0.0086	±	0.0086
Chiba, CHIBA	28	70.2	0.027	±	0.0094	0.008	±	0.013
Ichihara, CHIBA	28	77.5	0.015	±	0.023	0.026	±	0.014
Niigata, NIIGATA	28	129.1	0.005	±	0.011	0	±	0.009
Kanazawa, ISHIKAWA	392	198.5	0.023	±	0.014	0.017	±	0.013
Nagano, NAGANO	28	20.2	0.017	±	0.014	0	±	0.013
Osaka, OSAKA	28	36.3	0.007	±	0.018	0	±	0.0096
Okayama, OKAYAMA	28	57.1	0.035	±	0.0093	0	±	0.011
Yamaguchi, YAMAGUCHI	28	83.5	0.004	±	0.011	0	±	0.0084
Kochi, KOCHI	28	92.4	0	±	0.012	0.0037	±	0.0095
Kagoshima, KAGOSHIMA	34	60.5	0.051	±	0.011	0.002	±	0.014
Feb, 2000								
Akita, AKITA	29	143.1	0.014	±	0.0097	0.034	±	0.0096
Chiba, CHIBA	29	9	0.02	±	0.0093	0.064	±	0.015

Location	Duration (Days)	Precipitation (mm)	90Sr (MBq/km2)			137Cs (MBq/km2)		
Ichihara, CHIBA	29	6.3	0	±	0.019	0.027	±	0.013
Niigata, NIIGATA	29	111.1	0.021	±	0.012	0.039	±	0.01
Kanazawa, ISHIKAWA	29	225.5	0.026	±	0.014	0.012	±	0.015
Nagano, NAGANO	29	23.8	0.0059	±	0.0085	0.005	±	0.014
Osaka, OSAKA	29	36.3	0.011	±	0.0084	0.0062	±	0.009
Okayama, OKAYAMA	29	19.2	0.0005	±	0.0073	0	±	0.012
Yamaguchi, YAMAGUCHI	29	46.5	0	±	0.0075	0.016	±	0.0091
Kochi, KOCHI	29	42.2	0.028	±	0.011	0.0069	±	0.0095
Kagoshima, KAGOSHIMA	29	39.5	0.08	±	0.011	0.014	±	0.014
Mar, 2000								
Akita, AKITA	33	141.9	0.017	±	0.0092	0.075	±	0.013
Chiba, CHIBA	33	70.3	0.013	±	0.0089	0.079	±	0.016
Ichihara, CHIBA	33	82.4	0.029	±	0.026	0.049	±	0.014
Niigata, NIIGATA	33	109.3	0.019	±	0.012	0.2	±	0.02
Kosugi-machi, TOYAMA	30	170.2	0.055	±	0.015	0.31	±	0.023
Kanazawa, ISHIKAWA	31	245.5	0.072	±	0.017	0.38	±	0.023
Nagano, NAGANO	31	76.4	0.0071	±	0.0076	0.019	±	0.014
Osaka, OSAKA	30	75.2	0	±	0.0083	0.053	±	0.016
Okayama, OKAYAMA	33	79.6	0.024	±	0.0087	0.065	±	0.016
Yamaguchi, YAMAGUCHI	31	167.5	0.034	±	0.0088	0.096	±	0.016
Kochi, KOCHI	33	233.9	0.024	±	0.0095	0.11	±	0.017
Kagoshima, KAGOSHIMA	31	79	0.11	±	0.012	0.04	±	0.014

(2) Strontium-90 and Cesium-137 in Airborn Dust
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	Sampling period	Absorption (m2)	90Sr (mBq/m3)			137Cs (mBq/m3)		
October～December, 1999								
Morioka, IWATE	10 ～ 12	11055.0	0.00071	±	0.00054	0.00009	±	0.0004
Akita, AKITA	10 ～ 12	10800.0	0	±	0.00047	0	±	0.00039
Yamagata, YAMAGATA	10 ～ 12	12960.0	0.00041	±	0.00042	0.0002	±	0.00025
Okuma-machi, FUKUSHIMA	10 ～ 12	10455.0	0	±	0.0006	0	±	0.00026
Kawachi-machi, TOCHIGI	10 ～ 12	13998.0	0.00054	±	0.00029	0.00019	±	0.00023
Maebashi, GUNMA	10 ～ 12	10131.0	0.00097	±	0.00044	0	±	0.00029
Ichihara, CHIBA	10 ～ 12	10204.0	0.00023	±	0.00034	0.00006	±	0.0003
Yokohama, KANAGAWA	10 ～ 12	10261.0	0.00007	±	0.00035	0.00051	±	0.00032
Niigata, NIIGATA	10 ～ 12	10011.0	0.00023	±	0.00056	0.00017	±	0.00044
Kosugi-machi, TOYAMA	10 ～ 12	16547.0	0	±	0.0003	0.00068	±	0.0003
Fukui, FUKUI	10 ～ 12	11597.0	0.00093	±	0.0004	0.00011	±	0.00026
Kofu, YAMANASHI	10 ～ 12	13774.0	0	±	0.00045	0.00011	±	0.00033
Nagano, NAGANO	10 ～ 12	10688.0	0	±	0.00046	0.00047	±	0.00045
Kagamigahara, GIFU	10 ～ 12	11969.0	0.00042	±	0.00044	0.00081	±	0.00035
Hamaoka-machi, SHIZUOKA	10 ～ 12	10226.0	0.00042	±	0.0006	0.00057	±	0.00045
Nagoya, AICHI	10 ～ 12	10160.0	0.00011	±	0.00034	0.00022	±	0.00029
Yokkaichi, MIE	10 ～ 12	13584.0	0.00019	±	0.00025	0.00027	±	0.00023
Otsu, SHIGA	10 ～ 12	10956.0	0	±	0.00058	0	±	0.00027
Kyoto, KYOTO	10 ～ 12	10285.0	0.00054	±	0.00076	0.0011	±	0.00049
Osaka, OSAKA	10 ～ 12	16801.0	0.00027	±	0.00036	0	±	0.00016
Kobe, HYOGO	10 ～ 12	10337.0	0.00043	±	0.00031	0.00011	±	0.00028
Nara, NARA	10 ～ 12	11396.0	0.00039	±	0.0003	0.00014	±	0.00025

Location	Sampling period	Absorption (m2)	90Sr (mBq/m3)			137Cs (mBq/m3)		
Wakayama, WAKAYAMA	10 ~ 12	7282.0	0.00071	±	0.00051	0	±	0.00039
Tottori, TOTTORI	10 ~ 12	15306.0	0	±	0.00037	0	±	0.00032
Okayama, OKAYAMA	10 ~ 12	12679.0	0	±	0.00026	0	±	0.00023
Hiroshima, HIROSHIMA	10 ~ 12	10055.0	0.00022	±	0.00036	0	±	0.00029
Yamaguchi, YAMAGUCHI	10 ~ 12	21600.0	0	±	0.00016	0	±	0.00013
Tokushima, TOKUSHIMA	10 ~ 12	10080.0	0	±	0.00057	0	±	0.00033
Takamatsu, KAGAWA	10 ~ 12	14270.0	0.00008	±	0.00046	0.0003	±	0.00023
Saga, SAGA	10 ~ 12	9398.0	0.00056	±	0.00043	0	±	0.00033
Nagasaki, NAGASAKI	10 ~ 12	10368.0	0.0012	±	0.00059	0.00063	±	0.00045
Uto, KUMAMOTO	10 ~ 12	12055.0	0.0013	±	0.00034	0.00035	±	0.00028
Oita, OITA	10 ~ 12	10417.0	0	±	0.00064	0	±	0.00027
Miyazaki, MIYAZAKI	10 ~ 12	13120.0	0.00032	±	0.00042	0.00061	±	0.00036
October~January, 2000								
Mito, IBARAKI	10 ~ 01	9870.0	0.00014	±	0.00054	0.0007	±	0.00047
January~March, 2000								
Morioka, IWATE	01 ~ 03	10849.0	0.00096	±	0.00059	0	±	0.0003
Akita, AKITA	01 ~ 03	10800.0	0.00072	±	0.00035	0	±	0.00027
Yamagata, YAMAGATA	01 ~ 03	12960.0	0.00004	±	0.00049	0.00023	±	0.00038
Okuma-machi, FUKUSHIMA	01 ~ 03	9918.0	0.00056	±	0.00065	0.00085	±	0.00049
Kawachi-machi, TOCHIGI	01 ~ 03	13691.0	0.00002	±	0.00025	0	±	0.0002
Maebashi, GUNMA	01 ~ 03	10126.0	0.00043	±	0.00043	0	±	0.00032
Ichihara, CHIBA	01 ~ 03	10296.0	0.00015	±	0.00033	0	±	0.00027
Yokohama, KANAGAWA	01 ~ 03	10275.0	0.0002	±	0.00055	0.00009	±	0.00033
Niigata, NIIGATA	01 ~ 03	10222.0	0.0017	±	0.00043	0.00044	±	0.00031
Kosugi-machi, TOYAMA	01 ~ 03	17049.0	0.00068	±	0.00025	0	±	0.00016
Fukui, FUKUI	01 ~ 03	11734.0	0.00005	±	0.00048	0	±	0.00024
Kofu, YAMANASHI	01 ~ 03	13887.0	0.00008	±	0.00043	0.00006	±	0.00025
Nagano, NAGANO	01 ~ 03	11550.0	0	±	0.00053	0.00022	±	0.00041

Location	Sampling period	Absorption (m2)	90Sr (mBq/m3)			137Cs (mBq/m3)		
Kagamigahara, GIFU	01 ～ 03	12174.0	0.0012	±	0.00055	0.0002	±	0.00026
Hamaoka-machi, SHIZUOKA	01 ～ 03	10179.0	0	±	0.00054	0	±	0.0003
Nagoya, AICHI	01 ～ 03	10366.0	0.0011	±	0.00071	0	±	0.00028
Yokkaichi, MIE	01 ～ 03	14294.0	0	±	0.00037	0.00036	±	0.00024
Otsu, SHIGA	01 ～ 03	10395.0	0.00005	±	0.00057	0.00019	±	0.0003
Kyoto, KYOTO	01 ～ 03	10244.0	0.001	±	0.00057	0.00048	±	0.00046
Osaka, OSAKA	01 ～ 03	16875.0	0	±	0.00033	0.00001	±	0.0002
Kobe, HYOGO	01 ～ 03	10368.0	0	±	0.00059	0.00006	±	0.00033
Nara, NARA	01 ～ 03	11346.0	0	±	0.00048	0	±	0.00027
Wakayama, WAKAYAMA	01 ～ 03	7282.0	0.00078	±	0.00052	0	±	0.00042
Tottori, TOTTORI	01 ～ 03	15306.0	0.00057	±	0.00027	0.00009	±	0.00021
Okayama, OKAYAMA	01 ～ 03	12521.0	0.00014	±	0.00052	0	±	0.00023
Hiroshima, HIROSHIMA	01 ～ 03	10252.0	0.00075	±	0.00069	0	±	0.00029
Yamaguchi, YAMAGUCHI	01 ～ 03	22200.0	0	±	0.0003	0.00042	±	0.00018
Tokushima, TOKUSHIMA	01 ～ 03	10080.0	0.001	±	0.00061	0	±	0.00032
Takamatsu, KAGAWA	01 ～ 03	12940.0	0.00012	±	0.00046	0	±	0.00038
Saga, SAGA	01 ～ 03	8948.0	0.0013	±	0.00052	0	±	0.00031
Nagasaki, NAGASAKI	01 ～ 03	10368.0	0	±	0.00048	0	±	0.00047
Uto, KUMAMOTO	01 ～ 03	11395.0	0.00042	±	0.00031	0	±	0.00025
Oita, OITA	01 ～ 03	10432.0	0.00057	±	0.00054	0	±	0.00031
Miyazaki, MIYAZAKI	01 ～ 03	13229.0	0	±	0.0004	0.0002	±	0.00034
January～April, 2000								
Mito, IBARAKI	01 ～ 04	11006.0	0.00023	±	0.0005	0.00022	±	0.00029

(3) Strontium-90 and Cesium-137 in Service Water
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	pH (pH)	90Sr (mBq/l)			137Cs (mBq/l)		
(Source Water)							
Nov, 1999							
Nagano, NAGANO	7.48	1.2	±	0.22	0.25	±	0.09
Dec, 1999							
Sapporo, HOKKAIDO	7	1.5	±	0.13	0.043	±	0.061
Urawa, SAITAMA	7.3	0.69	±	0.26	0.07	±	0.071
Kisarazu, CHIBA	7.5	1.5	±	0.13	0.044	±	0.064
Katsushika, TOKYO	7.1	1	±	0.14	0.19	±	0.07
Tsukui-machi, KANAGAWA	7.7	0.24	±	0.046	0.073	±	0.06
Inuyama, AICHI	6.8	2.1	±	0.17	0.27	±	0.072
Moriguchi, OSAKA	7.4	2.1	±	0.12	0.072	±	0.045
Fukuoka, FUKUOKA	7.11	1.9	±	0.15	0.23	±	0.071
Jan, 2000							
Kyoto, KYOTO	8.29	2.9	±	0.19	0.19	±	0.096
(Tap Water)							
Nov, 1999							
Fukushima, FUKUSHIMA	7.54	1.5	±	0.13	0.086	±	0.058
Dec, 1999							
Aomori, AOMORI	7	0.76	±	0.1	0.24	±	0.069
Morioka, IWATE	7.1	0.85	±	0.12	0.13	±	0.062
Akita, AKITA	6.27	0.86	±	0.12	0.041	±	0.06
Yamagata, YAMAGATA	7.1	1.9	±	0.1	0.11	±	0.055

Location	pH (pH)	90Sr (mBq/l)			137Cs (mBq/l)		
Mito, IBARAKI	8.08	0.91	±	0.11	0.22	±	0.067
Kawachi-machi, TOCHIGI	7.44	0.23	±	0.042	0.073	±	0.051
Urawa, SAITAMA	6.8	0.91	±	0.16	0.043	±	0.05
Ichihara, CHIBA	7.93	1.6	±	0.15	0	±	0.063
Katsushika, TOKYO	6.9	1.2	±	0.13	0.086	±	0.067
Yokohama, KANAGAWA	7.7	0.47	±	0.056	0.15	±	0.063
Niigata, NIIGATA	7.65	2	±	0.16	0.049	±	0.061
Kosugi-machi, TOYAMA	6.9	1.6	±	0.14	0	±	0.054
Kanazawa, ISHIKAWA	7.51	1.8	±	0.14	0.099	±	0.063
Fukui, FUKUI	7	0.62	±	0.08	0	±	0.046
Kofu, YAMANASHI	7.2	0.68	±	0.099	0.059	±	0.058
Nagano, NAGANO	7.23	0.54	±	0.089	0.076	±	0.061
Gifu, GIFU	7.05	1.1	±	0.09	0	±	0.036
Shizuoka, SHIZUOKA	7.5	0.53	±	0.086	0.01	±	0.06
Nagoya, AICHI	6.8	1.8	±	0.16	0.076	±	0.06
Yokkaichi, MIE	7.2	2.8	±	0.13	0.16	±	0.065
Otsu, SHIGA	6.8	2.4	±	0.13	0	±	0.041
Osaka, OSAKA	7.4	2.4	±	0.14	0.021	±	0.047
Kobe, HYOGO	7.26	1.9	±	0.1	0.034	±	0.047
Nara, NARA	7.1	2	±	0.12	0.031	±	0.051
Wakayama, WAKAYAMA	6	1.3	±	0.11	0.047	±	0.045
Tottori, TOTTORI	7.5	1.6	±	0.15	0.068	±	0.063
Matsue, SHIMANE	0	1.9	±	0.14	0.003	±	0.054
Okayama, OKAYAMA	6.1	1.7	±	0.11	0	±	0.043
Hiroshima, HIROSHIMA	7	0.77	±	0.076	0.07	±	0.044
Ube, YAMAGUCHI	7.1	1.6	±	0.1	0	±	0.044

Location	pH (pH)	90Sr (mBq/l)			137Cs (mBq/l)		
Tokushima, TOKUSHIMA	6.78	1.6	±	0.17	0.033	±	0.067
Takamatsu, KAGAWA	7.6	2.1	±	0.24	0.076	±	0.069
Matsuyama, EHIME	7.6	1.3	±	0.13	0.041	±	0.062
Kochi, KOCHI	6.99	1.5	±	0.1	0	±	0.057
Fukuoka, FUKUOKA	6.85	2.5	±	0.16	0.07	±	0.063
Nagasaki, NAGASAKI	6.96	0.89	±	0.11	0.05	±	0.059
Uto, KUMAMOTO	7.18	0	±	0.063	0.038	±	0.064
Oita, OITA	7.5	0.64	±	0.11	0.13	±	0.064
Miyazaki, MIYAZAKI	7.25	1.5	±	0.15	0.025	±	0.091
Kagoshima, KAGOSHIMA	7.5	0.46	±	0.057	0.17	±	0.067
Naha, OKINAWA	7.51	2.8	±	0.13	0.051	±	0.044
Jan, 2000							
Wakkanai, HOKKAIDO	7.1	1.1	±	0.13	0.032	±	0.064
Maebashi, GUNMA	6.9	1.1	±	0.13	0	±	0.067
Kyoto, KYOTO	8.12	2.2	±	0.19	0.052	±	0.059

(4) Strontium-90 and Cesium-137 in Freshwater
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	pH (pH)	90Sr (mBq/l)			137Cs (mBq/l)		
(Fresh Water)							
Oct, 1999							
Shobara, HIROSHIMA	6.91	0.71	±	0.077	0.045	±	0.045
Nov, 1999							
Toyanogata, NIIGATA	7.07	2.8	±	0.19	0.11	±	0.069
Suwa-lake, NAGANO	8.54	0.83	±	0.11	0.38	±	0.075
Dec, 1999							
Uji, KYOTO	7.81	0	±	0.052	0.085	±	0.061

(5) Strontium-90 and Cesium-137 in Seawater
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	Sample volume analyzed (l)	Cl (l)	90Sr (mBq/l)	137Cs (mBq/l)
Oct, 1999				
Kaseda, KAGOSHIMA	40	18	1.8 ± 0.23	2 ± 0.26
White-beach, OKINAWA	40	19	2.1 ± 0.24	2.2 ± 0.27

(6) Strontium-90 and Cesium-137 in Sea Sediments
(form Oct. 1999 to Mar. 2000)

-continued from No. 130 for this publication-

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

Location	(m)	90Sr (Bq/kg)		137Cs (Bq/kg)	
Oct, 1999					
Kaseda, KAGOSHIMA	7	0.06	0.056	0.35	0.082
White-beach, OKINAWA	0	0.13	0.062	0.3	0.079

＊＊Sampling Locations in Japan＊＊

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