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RADIOACTIVITY SURVEY DATA in Japan

Part 2
= Dietary 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 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) Strontium-90 and Cesium-137 in Total Diet (from Jun. 1988 to Jan. 1989)

-continued from NO. 85 of this publication-

Table (1): Strontium-90 and Cesium-137 in Total Diet

Location	Ash	Ca	K	^{90}Sr		^{137}Cs	
	(g/p·d)	(mg/p·d)	(mg/p·d)	(Bq/p·d)	(Bq/gCa)	(Bq/p·d)	(Bq/gK)
June, 1988							
Sapporo, HOKKAIDO	16.3	368	2310	0.081 ± 0.011	0.22 ± 0.030	0.12 ± 0.010	0.051 ± 0.004
Aomori, AOMORI	18.9	620	2330	0.098 ± 0.014	0.16 ± 0.022	0.099 ± 0.011	0.043 ± 0.005
Morioka, IWATE	17.4	754	2490	0.095 ± 0.012	0.13 ± 0.015	0.18 ± 0.011	0.071 ± 0.005
Fukushima, FUKUSHIMA	13.3	691	1780	0.058 ± 0.011	0.084 ± 0.016	0.046 ± 0.009	0.026 ± 0.005
Mito, IBARAGI	15.3	417	2040	0.060 ± 0.012	0.14 ± 0.030	0.047 ± 0.009	0.023 ± 0.004
Tokyo, TOKYO	9.97	346	903	0.019 ± 0.005	0.056 ± 0.016	0.039 ± 0.005	0.043 ± 0.005
Tochigi-ken, TOCHIGI	22.2	516	2490	0.085 ± 0.015	0.16 ± 0.029	0.10 ± 0.012	0.042 ± 0.005
Nishikawa-machi, NIIGATA	24.1	714	2830	0.13 ± 0.017	0.19 ± 0.024	0.11 ± 0.012	0.039 ± 0.004
Toyama-ken, TOYAMA	13.9	338	2040	0.059 ± 0.009	0.17 ± 0.026	0.097 ± 0.008	0.047 ± 0.004
Kanazawa, ISHIKAWA	17.4	494	1280	0.091 ± 0.012	0.18 ± 0.025	0.11 ± 0.010	0.089 ± 0.008
Nagano, NAGANO	19.5	729	2670	0.11 ± 0.014	0.15 ± 0.019	0.48 ± 0.021	0.18 ± 0.008
Koufu, YAMANASHI	16.3	738	2560	0.11 ± 0.012	0.15 ± 0.017	0.084 ± 0.009	0.033 ± 0.004
Shizuoka, SHIZUOKA	16.8	770	2650	0.10 ± 0.012	0.13 ± 0.016	0.56 ± 0.021	0.21 ± 0.008
Nagoya, AICHI	17.8	561	2280	0.074 ± 0.012	0.13 ± 0.021	0.090 ± 0.010	0.039 ± 0.004
Kyoto, KYOTO	21.0	892	2450	0.080 ± 0.014	0.090 ± 0.016	0.070 ± 0.011	0.028 ± 0.004
Neyagawa, OSAKA	15.8	575	2170	0.052 ± 0.011	0.090 ± 0.018	0.078 ± 0.009	0.036 ± 0.004
Wakayama, WAKAYAMA	11.5	312	1240	0.025 ± 0.006	0.081 ± 0.020	0.074 ± 0.006	0.059 ± 0.005
Fukube-mura, TOTTORI	13.4	375	1610	0.10 ± 0.011	0.28 ± 0.030	0.086 ± 0.008	0.054 ± 0.005
Matsue, SHIMANE	17.7	653	2230	0.063 ± 0.011	0.097 ± 0.016	0.10 ± 0.009	0.047 ± 0.004
Okayama, OKAYAMA	16.0	547	2190	0.071 ± 0.011	0.13 ± 0.020	0.075 ± 0.009	0.034 ± 0.004
Matsuyama, EHIME	11.6	445	1720	0.049 ± 0.008	0.11 ± 0.017	0.090 ± 0.008	0.052 ± 0.004
Kochi, KOCHI	16.4	594	2260	0.098 ± 0.013	0.17 ± 0.022	0.16 ± 0.012	0.069 ± 0.005
Dazaifu, FUKUOKA	12.4	465	1960	0.057 ± 0.009	0.12 ± 0.019	0.093 ± 0.008	0.048 ± 0.004
Saga, SAGA	14.2	387	1640	0.026 ± 0.009	0.067 ± 0.024	0.088 ± 0.009	0.053 ± 0.005
Nagasaki, NAGASAKI	16.3	553	1900	0.045 ± 0.010	0.082 ± 0.018	0.058 ± 0.008	0.031 ± 0.004
Ooita, OOITA	16.0	630	1920	0.074 ± 0.010	0.12 ± 0.017	0.058 ± 0.009	0.030 ± 0.004
Ookuchi, KAGOSHIMA	12.3	369	1500	0.052 ± 0.009	0.14 ± 0.024	0.080 ± 0.008	0.054 ± 0.005
Naha, OKINAWA	17.1	456	2200	0.055 ± 0.011	0.12 ± 0.025	0.20 ± 0.012	0.089 ± 0.005
July, 1988							
Ishinomaki, MIYAGI	14.9	461	2170	0.039 ± 0.009	0.084 ± 0.019	0.080 ± 0.008	0.037 ± 0.004
Akita, AKITA	17.4	525	2240	0.12 ± 0.015	0.23 ± 0.028	0.28 ± 0.016	0.13 ± 0.007

Location	Ash	Ca	K	^{90}Sr		^{137}Cs	
	(g/p·d)	(mg/p·d)	(mg/p·d)	(Bq/p·d)	(Bq/gCa)	(Bq/p·d)	(Bq/gK)
Hiratsuka, KANAGAWA	15.7	440	2490	0.067±0.010	0.15 ±0.024	0.15 ±0.012	0.061±0.005
Yamaguchi, YAMAGUCHI	13.0	545	1990	0.077±0.011	0.14 ±0.021	0.052±0.007	0.026±0.004
August, 1988							
Hiroshima, HIROSHIMA	13.8	297	1530	0.019±0.008	0.063±0.026	0.068±0.007	0.044±0.004
Miyazaki, MIYAZAKI	13.8	438	1740	0.059±0.010	0.14 ±0.022	0.15 ±0.010	0.084±0.006
September, 1988							
Takamatsu, KAGAWA	13.7	498	1790	0.050±0.009	0.10 ±0.018	0.040±0.006	0.022±0.004
November, 1988							
Akita, AKITA	22.1	594	2230	0.090±0.014	0.15 ±0.023	0.21 ±0.014	0.096±0.006
Yamagata, YAMAGATA	14.7	357	1180	0.085±0.010	0.24 ±0.028	0.067±0.007	0.057±0.006
Nishikawa-machi, NIIGATA	20.7	520	2680	0.10 ±0.015	0.20 ±0.030	0.15 ±0.012	0.057±0.004
Toyama-ken, TOYAMA	14.3	550	2040	0.090±0.011	0.16 ±0.020	0.10 ±0.009	0.051±0.004
Kanazawa, ISHIKAWA	20.7	803	2450	0.15 ±0.017	0.19 ±0.021	0.076±0.011	0.031±0.004
Fukui, FUKUI	16.4	840	2030	0.055±0.011	0.066±0.013	0.16 ±0.012	0.078±0.006
Nagano, NAGANO	19.2	1310	2450	0.11 ±0.016	0.082±0.012	0.10 ±0.012	0.043±0.005
Shizuoka, SHIZUOKA	19.1	701	2520	0.089±0.014	0.13 ±0.019	0.30 ±0.015	0.12 ±0.006
Nagoya, AICHI	16.2	635	2610	0.084±0.012	0.13 ±0.019	0.091±0.008	0.035±0.003
Fukube-mura, TOTTORI	15.8	435	2240	0.10 ±0.013	0.23 ±0.029	0.11 ±0.010	0.048±0.004
Okayama, OKAYAMA	17.2	614	2460	0.11 ±0.014	0.17 ±0.023	0.12 ±0.011	0.049±0.004
Matsuyama, EHIME	11.9	485	1820	0.043±0.008	0.088±0.017	0.16 ±0.010	0.090±0.005
Kochi, KOCHI	16.6	796	2490	0.081±0.013	0.10 ±0.016	0.11 ±0.010	0.045±0.004
Dazaifu, FUKUOKA	13.5	399	1950	0.066±0.012	0.17 ±0.030	0.048±0.006	0.025±0.003
Saga, SAGA	14.6	961	2000	0.075±0.011	0.078±0.011	0.085±0.009	0.043±0.004
Nagasaki, NAGASAKI	17.9	627	2360	0.12 ±0.016	0.19 ±0.025	0.094±0.009	0.040±0.004
Ookuchi, KAGOSHIMA	12.4	399	1390	0.055±0.009	0.14 ±0.022	0.048±0.006	0.034±0.004
December, 1988							
Sapporo, HOKKAIDO	17.7	595	2490	0.091±0.013	0.15 ±0.023	0.12 ±0.010	0.048±0.004
Aomori, AOMORI	18.9	617	2230	0.13 ±0.016	0.21 ±0.026	0.11 ±0.012	0.050±0.005
Mito, IBARAGI	21.5	612	2850	0.14 ±0.019	0.22 ±0.031	0.11 ±0.010	0.037±0.004
Tokyo, TOKYO	7.83	190	889	0.031±0.005	0.17 ±0.028	0.053±0.005	0.059±0.005
Koufu, YAMANASHI	17.5	671	2340	0.11 ±0.015	0.16 ±0.022	0.12 ±0.010	0.051±0.004
Kakogawa, HYOGO	15.0	731	1990	0.090±0.013	0.12 ±0.018	0.060±0.007	0.030±0.004
Miyazaki, MIYAZAKI	18.2	451	2000	0.10 ±0.015	0.22 ±0.034	0.12 ±0.011	0.058±0.006
January, 1989							
Hiroshima, HIROSHIMA	11.9	444	1620	0.068±0.009	0.15 ±0.021	0.079±0.006	0.049±0.004

(2)-1 Strontium-90 and Cesium-137 in Rice(producing districts)
(from Aug. 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

Table (2)-1: Strontium-90 and Cesium-137 in Rice

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
August, 1988							
Sadowara-machi, MIYAZAKI	0.504	0.0390	0.614	0.018 ± 0.0074	0.45 ± 0.19	0.0003 ± 0.0067	0.001 ± 0.011
October, 1988							
Mito, IBARAGI	0.634	0.0440	0.900	0.0026 ± 0.0082	0.06 ± 0.18	0.031 ± 0.0072	0.035 ± 0.0080
Utsunomiya, TOCHIGI	0.819	0.0370	1.24	0.001 ± 0.011	0.02 ± 0.29	0.13 ± 0.012	0.11 ± 0.010
Maki-machi, NIIGATA	0.520	0.0370	0.691	0.015 ± 0.0089	0.41 ± 0.24	0.019 ± 0.0061	0.027 ± 0.0088
Hodaka-machi, NAGANO	0.617	0.0350	0.974	0.009 ± 0.011	0.25 ± 0.31	0.0081 ± 0.0056	0.0083 ± 0.0057
Tsuda-machi, KAGAWA	0.783	0.0530	1.39	0.021 ± 0.0091	0.39 ± 0.17	0.017 ± 0.0068	0.012 ± 0.0049
Usa, OOITA	0.570	0.0330	0.894	0.000 ± 0.0094	0.00 ± 0.29	0.0092 ± 0.0054	0.010 ± 0.0060
November, 1988							
Ishikari-machi, HOKKAIDO	0.637	0.0430	0.859	0.0042 ± 0.0098	0.10 ± 0.23	0.0026 ± 0.0062	0.0030 ± 0.0073
Tajiri-machi, MIYAGI	0.777	0.0430	1.11	0.036 ± 0.011	0.83 ± 0.25	0.014 ± 0.0063	0.013 ± 0.0057
KKosugi-machi, TOYAMA	0.589	0.0440	0.671	0.0000 ± 0.0097	0.00 ± 0.22	0.011 ± 0.0065	0.016 ± 0.0096
December, 1988							
Fukushima, FUKUSHIMA	0.653	0.0310	1.30	0.015 ± 0.012	0.46 ± 0.37	0.017 ± 0.0063	0.013 ± 0.0048
Nagasaka-machi, YAMANASHI	0.771	0.0320	1.27	0.013 ± 0.011	0.41 ± 0.33	0.020 ± 0.0060	0.016 ± 0.0047
Kasai, HYOGO	0.476	0.0260	0.952	0.016 ± 0.011	0.62 ± 0.42	0.0093 ± 0.0058	0.0097 ± 0.0060
Yamaguchi, YAMAGUCHI	0.463	0.0410	0.713	0.0068 ± 0.0098	0.17 ± 0.24	0.014 ± 0.0060	0.019 ± 0.0084
Chikushino, FUKUOKA	0.656	0.0350	1.25	0.0061 ± 0.0099	0.17 ± 0.28	0.025 ± 0.0083	0.020 ± 0.0066

(2)-2 Strontium-90 and Cesium-137 in Rice(consuming districts)
(from Sep. 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

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

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
September, 1988							
Kanazawa, ISHIKAWA	0.604	0.0450	1.14	0.029 ± 0.0083	0.66 ± 0.19	0.021 ± 0.0081	0.019 ± 0.0071
October, 1988							
Akita, AKITA	0.535	0.0460	0.706	0.036 ± 0.0097	0.80 ± 0.21	0.042 ± 0.0083	0.060 ± 0.012
Mito, IBARAGI	0.498	0.0370	0.831	0.0080 ± 0.0087	0.21 ± 0.23	0.0079 ± 0.0058	0.0095 ± 0.0070
Shinjuku, TOKYO	0.588	0.0413	0.823	0.012 ± 0.0084	0.30 ± 0.21	0.054 ± 0.0088	0.065 ± 0.011
Niigata, NIIGATA	0.456	0.0330	0.674	0.010 ± 0.0074	0.31 ± 0.22	0.011 ± 0.0057	0.016 ± 0.0084
Matsuyama, EHIME	0.594	0.0390	0.938	0.0000 ± 0.0073	0.00 ± 0.19	0.022 ± 0.0068	0.024 ± 0.0073
November, 1988							
Sapporo, HOKKAIDO	0.657	0.0450	1.06	0.0089 ± 0.0095	0.20 ± 0.21	0.0000 ± 0.0051	0.0000 ± 0.0048
Yamagata, YAMAGATA	0.666	0.0430	0.872	0.021 ± 0.0092	0.49 ± 0.21	0.015 ± 0.0064	0.018 ± 0.0073
Fukui, FUKUI	0.613	0.0450	0.833	0.025 ± 0.0099	0.57 ± 0.22	0.061 ± 0.0090	0.073 ± 0.011
Shizuoka, SHIZUOKA	0.509	0.0300	0.819	0.018 ± 0.011	0.58 ± 0.36	0.028 ± 0.0070	0.034 ± 0.0085
Osaka, OSAKA	0.550	0.0396	1.03	0.018 ± 0.0088	0.46 ± 0.23	0.025 ± 0.0074	0.025 ± 0.0072
Hiroshima, HIROSHIMA	0.450	0.0400	0.756	0.0000 ± 0.0094	0.00 ± 0.23	0.011 ± 0.0062	0.015 ± 0.0082
Saga, SAGA	0.576	0.0310	1.08	0.000 ± 0.010	0.00 ± 0.33	0.066 ± 0.0087	0.061 ± 0.0080
December, 1988							
Yokohama, KANAGAWA	0.615	0.0310	0.787	0.009 ± 0.010	0.31 ± 0.34	0.0099 ± 0.0057	0.013 ± 0.0072
Nagoya, AICHI	0.562	0.0540	0.938	0.0006 ± 0.0095	0.01 ± 0.18	0.031 ± 0.0075	0.033 ± 0.0080
Kobe, HYOGO	0.589	0.0330	0.777	0.018 ± 0.012	0.55 ± 0.35	0.040 ± 0.0079	0.052 ± 0.010
Tottori, TOTTORI	0.518	0.0370	0.828	0.0060 ± 0.0094	0.16 ± 0.25	0.0079 ± 0.0057	0.0095 ± 0.0069
Seto-machi, OKAYAMA	0.529	0.0430	1.22	0.013 ± 0.010	0.31 ± 0.24	0.0000 ± 0.0052	0.0000 ± 0.0042
Kochi, KOCHI	0.568	0.0410	0.976	0.002 ± 0.010	0.05 ± 0.25	0.012 ± 0.0058	0.013 ± 0.0059
Kasuga, FUKUOKA	0.576	0.0340	0.967	0.0000 ± 0.0096	0.00 ± 0.28	0.012 ± 0.0069	0.013 ± 0.0071
Kagoshima, KAGOSHIMA	0.669	0.0470	1.06	0.016 ± 0.011	0.33 ± 0.22	0.075 ± 0.0098	0.070 ± 0.0092

(3)-1 Strontium-90 and Cesium-137 in Milk(producing districts for domestic program)
(from Jun. 1988 to Oct. 1988)

-continued from NO. 85 of this publication-

Table (3)-1: Strontium-90 and Cesium-137 in Milk

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
June, 1988							
Yamato-machi, SAGA	7.11	1.13	1.61	0.046±0.008	0.041±0.007	0.034±0.006	0.021±0.004
August, 1988							
Aomori, AOMORI	7.01	1.10	1.51	0.23 ±0.015	0.21 ±0.014	0.28 ±0.013	0.18 ±0.009
Takisawa-mura, IWATE	7.36	1.10	1.71	0.023±0.008	0.021±0.007	0.14 ±0.011	0.083±0.006
Mito, IBARAGI	7.54	1.20	1.72	0.035±0.007	0.029±0.006	0.016±0.005	0.009±0.003
Nishinasuno-machi, TOCHIGI	7.21	1.18	1.54	0.056±0.009	0.047±0.007	0.041±0.006	0.026±0.004
Tonami, TOYAMA	7.16	1.16	1.45	0.023±0.007	0.019±0.006	0.052±0.007	0.036±0.005
Oshimizu-machi, ISHIKAWA	7.04	1.14	1.60	0.045±0.008	0.040±0.007	0.15 ±0.011	0.094±0.007
Takane-machi, YAMANASHI	7.07	1.09	1.59	0.052±0.009	0.048±0.008	0.14 ±0.010	0.089±0.006
Mihara-machi, HYOGO	7.09	1.10	1.59	0.037±0.008	0.034±0.007	0.14 ±0.010	0.087±0.006
Matsuyama, EHIME	7.24	1.18	1.62	0.040±0.008	0.034±0.007	0.031±0.006	0.019±0.004
JKujuu-machi, OOITA	7.05	1.04	1.56	0.033±0.009	0.032±0.008	0.13 ±0.010	0.081±0.006
Takahara-machi, MIYAZAKI	6.84	1.06	1.53	0.045±0.008	0.043±0.008	0.92 ±0.024	0.60 ±0.016
September, 1988							
Takasa-machi, KAGAWA	7.30	1.10	1.64	0.032±0.008	0.029±0.007	0.021±0.005	0.013±0.003
October, 1988							
Yamato-machi, SAGA	7.29	1.14	1.53	0.028±0.008	0.025±0.007	0.011±0.005	0.007±0.003

(3)-2 Strontium-90 and Cesium-137 in Milk(producing districts for WHO program) (from May 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

Table (3)-2: Strontium-90 and Cesium-137 in Milk

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
May, 1988							
Nishikawa-machi, NIIGATA	7.64	1.23	1.70	0.046±0.010	0.038±0.008	0.070±0.008	0.041±0.005
Katsuyama, FUKUI	6.53	1.05	1.60	0.030±0.008	0.029±0.007	0.072±0.008	0.045±0.005
Kajiki-machi, KAGOSHIMA	7.49	1.19	1.67	0.042±0.010	0.035±0.008	0.027±0.007	0.016±0.004
June, 1988							
Hikawa-machi, SHIMANE	7.83	1.09	1.95	0.050±0.009	0.046±0.009	0.024±0.006	0.012±0.003
August, 1988							
Sapporo, HOKKAIDO	7.69	1.15	1.73	0.045±0.008	0.040±0.007	0.085±0.009	0.049±0.005
Hachijo-Island, TOKYO	7.83	1.22	1.16	0.082±0.011	0.067±0.009	0.29 ±0.014	0.25 ±0.012
Nishikawa-machi, NIIGATA	7.52	1.18	1.70	0.043±0.008	0.037±0.007	0.060±0.008	0.035±0.004
Katsuyama, FUKUI	6.63	1.05	1.41	0.039±0.008	0.038±0.007	0.18 ±0.011	0.13 ±0.008
Nose-machi, OSAKA	7.83	1.14	1.66	0.013±0.007	0.011±0.006	0.033±0.007	0.020±0.004
Hikawa-machi, SHIMANE	7.17	0.989	1.58	0.052±0.009	0.052±0.009	0.064±0.008	0.040±0.005
Takamiya-machi, HIROSHIMA	6.56	1.04	1.47	0.025±0.007	0.024±0.007	0.023±0.005	0.016±0.004
Kochi, KOCHI	7.13	1.07	1.47	0.081±0.011	0.075±0.010	0.079±0.008	0.054±0.006
Fukuma-machi, FUKUOKA	7.52	1.17	1.66	0.024±0.008	0.021±0.006	0.25 ±0.016	0.15 ±0.010
Kajiki-machi, KAGOSHIMA	7.35	1.17	1.56	0.035±0.008	0.030±0.007	0.045±0.007	0.029±0.004
November, 1988							
Sapporo, HOKKAIDO	7.37	1.21	1.47	0.052±0.009	0.043±0.008	0.13 ±0.010	0.091±0.007
Hachijo-Island, TOKYO	7.46	1.13	1.55	0.076±0.012	0.068±0.010	0.24 ±0.013	0.15 ±0.008
Nishikawa-machi, NIIGATA	7.51	1.09	1.66	0.020±0.004	0.018±0.004	0.035±0.006	0.021±0.004
Katsuyama, FUKUI	7.41	1.10	1.61	0.028±0.009	0.025±0.008	0.032±0.007	0.020±0.004
Nose-machi, OSAKA	7.72	1.12	1.61	0.019±0.004	0.017±0.004	0.035±0.006	0.022±0.004
Kochi, KOCHI	7.51	1.08	1.60	0.045±0.009	0.041±0.008	0.043±0.007	0.027±0.004
Fukuma-machi, FUKUOKA	8.02	1.18	1.72	0.023±0.005	0.019±0.004	0.050±0.008	0.029±0.005
Kajiki-machi, KAGOSHIMA	7.45	1.12	1.57	0.018±0.009	0.016±0.008	0.067±0.008	0.043±0.005
December, 1988							
Takamiya-machi, HIROSHIMA	6.41	0.987	1.37	0.018±0.003	0.018±0.003	0.016±0.005	0.011±0.004

(3)-3 Strontium-90 and Cesium-137 in Milk(consuming districts)
(from May 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

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

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
May, 1988							
Kyoto, KYOTO	7.37	1.09	1.60	0.025±0.007	0.023±0.006	0.044±0.007	0.028±0.004
June, 1988							
Matsue, SHIMANE	7.06	1.13	1.50	0.044±0.008	0.039±0.007	0.046±0.007	0.031±0.004
July, 1988							
Sendai, MIYAGI	7.28	1.10	1.57	0.019±0.007	0.017±0.006	0.029±0.007	0.018±0.005
Sshinguu, WAKAYAMA	6.56	1.01	1.38	0.049±0.008	0.048±0.008	0.029±0.006	0.021±0.004
Yonagusuku-mura, OKINAWA	7.23	1.11	1.66	0.015±0.007	0.013±0.007	0.020±0.005	0.012±0.003
August, 1988							
Sapporo, HOKKAIDO	7.39	1.11	1.59	0.054±0.008	0.049±0.008	0.23 ±0.013	0.14 ±0.008
Sendai, MIYAGI	7.54	1.14	1.62	0.022±0.007	0.019±0.006	0.039±0.007	0.024±0.005
Akita, AKITA	6.10	0.919	1.22	0.042±0.007	0.046±0.008	0.12 ±0.009	0.10 ±0.008
Yamagata, YAMAGATA	6.87	1.09	1.59	0.038±0.007	0.035±0.006	0.066±0.008	0.041±0.005
Fukushima, FUKUSHIMA	7.21	1.12	1.60	0.036±0.008	0.032±0.007	0.040±0.007	0.025±0.004
Shinjuku, TOKYO	7.15	1.12	1.57	0.046±0.009	0.041±0.008	0.030±0.006	0.019±0.004
Niigata, NIIGATA	7.88	1.21	1.75	0.075±0.010	0.062±0.008	0.17 ±0.012	0.096±0.007
Fukui, FUKUI	7.03	1.11	1.54	0.046±0.008	0.042±0.007	0.034±0.006	0.022±0.004
Shizuoka, SHIZUOKA	7.21	1.12	1.51	0.036±0.008	0.033±0.007	0.042±0.007	0.028±0.005
Nagoya, AICHI	7.30	1.08	1.57	0.034±0.007	0.032±0.007	0.030±0.006	0.019±0.004
Osaka, OSAKA	7.35	1.12	1.66	0.037±0.009	0.033±0.008	0.072±0.008	0.043±0.005
Yonago, TOTTORI	7.33	1.09	1.50	0.039±0.008	0.036±0.008	0.11 ±0.010	0.072±0.006
Okayama, OKAYAMA	6.90	1.07	1.52	0.037±0.008	0.035±0.008	0.027±0.006	0.018±0.004
Yamaguchi, YAMAGUCHI	7.19	1.12	1.57	0.034±0.008	0.031±0.007	0.030±0.006	0.019±0.004
Matsuyama, EHIME	7.32	1.11	1.52	0.041±0.008	0.037±0.008	0.10 ±0.009	0.067±0.006
Kochi, KOCHI	7.19	1.05	1.56	0.050±0.009	0.048±0.009	0.096±0.009	0.062±0.006
Chikushino, FUKUOKA	7.36	1.13	1.66	0.036±0.009	0.032±0.008	0.078±0.008	0.047±0.005
Kagoshima, KAGOSHIMA	7.39	1.14	1.59	0.022±0.008	0.020±0.007	0.052±0.008	0.033±0.005
September, 1988							
Nagano, NAGANO	7.21	1.09	1.53	0.045±0.008	0.041±0.007	0.023±0.006	0.015±0.004
December, 1988							
Akita, AKITA	5.80	0.859	1.21	0.032±0.007	0.037±0.009	0.053±0.006	0.043±0.005

(3)-4 Strontium-90 and Cesium-137 in Milk(powderd milk)

-continued from NO. 85 of this publication-

Table (3)-4: Strontium-90 and Cesium-137 in Milk

Market Milk	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
August, 1988							
Sample A	8.09	12.5	18.4	0.54 ± 0.032	0.043 ± 0.0026	0.71 ± 0.032	0.039 ± 0.0017
Sample B	2.50	3.18	6.08	0.11 ± 0.010	0.034 ± 0.0030	0.69 ± 0.019	0.11 ± 0.003
Sample C	7.99	11.9	18.1	0.96 ± 0.041	0.081 ± 0.0034	3.5 ± 0.07	0.20 ± 0.004
Sample D	2.59	3.91	5.91	0.068 ± 0.008	0.017 ± 0.0020	0.23 ± 0.011	0.039 ± 0.0019
Sample E	2.65	4.37	5.59	0.13 ± 0.011	0.031 ± 0.0025	1.2 ± 0.03	0.21 ± 0.005
Sample F	2.60	3.69	5.88	0.11 ± 0.010	0.028 ± 0.0027	1.1 ± 0.02	0.18 ± 0.004
November, 1988							
Sample A	8.00	12.8	18.0	0.58 ± 0.034	0.046 ± 0.0027	0.94 ± 0.034	0.052 ± 0.0019
Sample B	2.57	3.44	6.45	0.14 ± 0.018	0.040 ± 0.0051	0.85 ± 0.029	0.13 ± 0.005
Sample D	2.52	3.96	5.77	0.14 ± 0.015	0.034 ± 0.0038	0.70 ± 0.024	0.12 ± 0.004
Sample E	2.49	4.03	5.38	0.13 ± 0.014	0.031 ± 0.0036	0.72 ± 0.024	0.13 ± 0.004
Sample F	2.65	4.00	6.02	0.13 ± 0.015	0.031 ± 0.0037	0.83 ± 0.026	0.14 ± 0.004
January, 1989							
Sample C	8.08	12.4	17.8	0.95 ± 0.066	0.077 ± 0.0053	4.3 ± 0.11	0.24 ± 0.006

*Skim milk

(4)-1 Strontium-90 and Cesium-137 in Vegetables(producing districts)
(from Jul. 1988 to Jan. 1989)

-continued from NO. 85 of this publication-

Table (4)-1: Strontium-90 and Cesium-137 in Vegetables

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Japanese radish)							
July, 1988							
Takane-machi, YAMANASHI	0.630	0.178	2.82	0.15 ± 0.013	0.84 ± 0.070	0.002 ± 0.004	0.0005 ± 0.0015
Oota, SHIMANE	0.769	0.240	3.47	0.26 ± 0.016	1.1 ± 0.07	0.088 ± 0.009	0.025 ± 0.0025
August, 1988							
Ishikari-machi, HOKKAIDO	0.481	0.162	2.17	0.13 ± 0.010	0.83 ± 0.062	0.009 ± 0.004	0.0043 ± 0.0019
October, 1988							
Sannohe-machi, AOMORI	0.541	0.287	2.33	0.26 ± 0.018	0.90 ± 0.063	0.026 ± 0.007	0.011 ± 0.0032
November, 1988							
Ishikari-machi, HOKKAIDO	0.448	0.189	1.87	0.61 ± 0.020	3.2 ± 0.11	0.054 ± 0.008	0.029 ± 0.0041
Utsunomiya, TOCHIGI	0.604	0.260	2.58	0.10 ± 0.010	0.40 ± 0.037	0.001 ± 0.005	0.0003 ± 0.0019
KKosugi-machi, TOYAMA	0.464	0.214	1.80	0.21 ± 0.017	1.0 ± 0.08	0.019 ± 0.005	0.010 ± 0.0030
Fukui, FUKUI	0.486	0.173	2.19	0.30 ± 0.020	1.7 ± 0.12	0.000 ± 0.005	0.0000 ± 0.0023
Saku, NAGANO	0.525	0.222	2.15	0.019 ± 0.011	0.084 ± 0.049	0.012 ± 0.006	0.0057 ± 0.0027
Gotenba, SHIZUOKA	0.544	0.220	2.35	0.15 ± 0.011	0.67 ± 0.051	0.044 ± 0.008	0.019 ± 0.0033
Shime-machi, FUKUOKA	0.671	0.234	2.87	0.036 ± 0.006	0.16 ± 0.025	0.022 ± 0.007	0.0075 ± 0.0024
December, 1988							
Fukushima, FUKUSHIMA	0.639	0.305	2.53	0.025 ± 0.005	0.082 ± 0.018	0.004 ± 0.005	0.0017 ± 0.0020
Kasai, HYOGO	0.614	0.220	2.35	0.16 ± 0.012	0.72 ± 0.057	0.004 ± 0.005	0.0017 ± 0.0023
Kokufu-machi, TOTTORI	0.568	0.276	2.59	0.14 ± 0.015	0.50 ± 0.055	0.006 ± 0.006	0.0023 ± 0.0022
Takamatsu, KAGAWA	0.480	0.242	1.93	0.088 ± 0.015	0.36 ± 0.061	0.016 ± 0.006	0.0081 ± 0.0029
Usa, OOITA	0.590	0.182	2.77	0.070 ± 0.012	0.38 ± 0.067	0.000 ± 0.005	0.0000 ± 0.0020
Takanabe-machi, MIYAZAKI	0.508	0.231	2.23	0.18 ± 0.017	0.78 ± 0.074	0.033 ± 0.007	0.015 ± 0.0033
January, 1989							
Hiroshima, HIROSHIMA	0.494	0.200	1.67	0.042 ± 0.010	0.21 ± 0.050	0.004 ± 0.005	0.0024 ± 0.0030
(Onion)							
July, 1988							
Kumatori-machi, OSAKA	0.304	0.121	1.25	0.00 ± 0.010	0.00 ± 0.080	0.008 ± 0.005	0.0062 ± 0.0038
(Cabbage)							
July, 1988							
Oota, SHIMANE	0.939	1.01	2.90	1.3 ± 0.04	1.3 ± 0.04	1.4 ± 0.03	0.48 ± 0.012

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
October, 1988							
Sannohe-machi, AOMORI	0.565	0.475	2.08	0.29 ± 0.019	0.60 ± 0.039	0.16 ± 0.013	0.077 ± 0.0062
(Spinach)							
August, 1988							
Ishikari-machi, HOKKAIDO	1.74	0.498	7.44	0.067 ± 0.012	0.13 ± 0.024	0.020 ± 0.007	0.0027 ± 0.0009
October, 1988							
Saku, NAGANO	1.19	0.493	4.29	0.039 ± 0.010	0.079 ± 0.021	0.024 ± 0.005	0.0057 ± 0.0013
November, 1988							
Toyama, TOYAMA	1.86	1.15	7.71	0.15 ± 0.016	0.13 ± 0.014	0.023 ± 0.007	0.0030 ± 0.0009
Fukui, FUKUI	1.72	0.610	7.01	0.11 ± 0.014	0.18 ± 0.022	0.017 ± 0.006	0.0024 ± 0.0009
Kurayoshi, TOTTORI	1.64	0.532	7.28	0.10 ± 0.013	0.20 ± 0.024	0.056 ± 0.008	0.0077 ± 0.0011
Matsuyama, EHIME	1.75	1.13	6.28	0.093 ± 0.009	0.082 ± 0.008	0.053 ± 0.009	0.0084 ± 0.0015
Shime-machi, FUKUOKA	1.60	0.947	6.52	0.079 ± 0.008	0.083 ± 0.009	0.017 ± 0.006	0.0027 ± 0.0010
Usa, OOITA	2.31	0.482	11.1	0.078 ± 0.013	0.16 ± 0.028	0.023 ± 0.006	0.0021 ± 0.0006
Kaimon-machi, KAGOSHIMA	1.77	0.885	7.76	0.23 ± 0.018	0.26 ± 0.020	0.13 ± 0.012	0.017 ± 0.0015
December, 1988							
Fukushima, FUKUSHIMA	1.81	0.813	7.56	0.086 ± 0.009	0.11 ± 0.011	0.047 ± 0.007	0.0062 ± 0.0010
Fuji, SHIZUOKA	2.06	0.730	8.51	0.072 ± 0.013	0.099 ± 0.018	0.079 ± 0.010	0.0093 ± 0.0012
Kasai, HYOGO	1.76	0.391	8.13	0.10 ± 0.008	0.26 ± 0.020	0.000 ± 0.005	0.0000 ± 0.0006
Takamatsu, KAGAWA	1.57	0.554	6.72	0.067 ± 0.012	0.12 ± 0.022	0.008 ± 0.006	0.0012 ± 0.0009
Takanabe-machi, MIYAZAKI	1.58	0.623	6.82	0.24 ± 0.021	0.38 ± 0.033	0.24 ± 0.015	0.035 ± 0.0022
January, 1989							
Hiroshima, HIROSHIMA	1.39	0.461	5.91	0.023 ± 0.010	0.049 ± 0.022	0.008 ± 0.006	0.0013 ± 0.0009
(Chinese cabbage)							
November, 1988							
Utsunomiya, TOCHIGI	0.647	0.348	2.63	0.15 ± 0.010	0.43 ± 0.029	0.016 ± 0.005	0.0060 ± 0.0020

(4)-2 Strontium-90 and Cesium-137 in Vegetables(consuming districts)
(from May 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

Table (4)-2: Strontium-90 and Cesium-137 in Vegetables

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Japanese radish)							
August, 1988							
Sendai, MIYAGI	0.547	0.162	2.43	0.18 ± 0.012	1.1 ± 0.07	0.012 ± 0.004	0.0048 ± 0.0018
October, 1988							
Akita, AKITA	0.618	0.310	2.54	0.26 ± 0.015	0.83 ± 0.047	0.016 ± 0.005	0.0061 ± 0.0018
Yamagata, YAMAGATA	0.581	0.293	2.15	0.25 ± 0.014	0.86 ± 0.047	0.000 ± 0.004	0.0000 ± 0.0017
November, 1988							
Shinjuku, TOKYO	0.491	0.205	1.91	0.27 ± 0.018	1.3 ± 0.09	0.023 ± 0.007	0.012 ± 0.0037
Niigata, NIIGATA	0.410	0.141	1.71	0.016 ± 0.006	0.11 ± 0.041	0.010 ± 0.005	0.0058 ± 0.0030
Kanazawa, ISHIKAWA	0.459	0.185	1.94	0.13 ± 0.015	0.69 ± 0.081	0.002 ± 0.005	0.0010 ± 0.0027
Osaka, OSAKA	0.810	0.361	3.17	0.20 ± 0.017	0.55 ± 0.048	0.011 ± 0.005	0.0035 ± 0.0015
Okayama, OKAYAMA	0.441	0.166	1.54	0.040 ± 0.011	0.24 ± 0.067	0.034 ± 0.007	0.022 ± 0.0046
Saga, SAGA	0.569	0.247	2.67	0.11 ± 0.014	0.44 ± 0.056	0.010 ± 0.005	0.0037 ± 0.0020
Kaimon-machi, KAGOSHIMA	0.608	0.215	2.69	0.057 ± 0.014	0.26 ± 0.065	0.005 ± 0.006	0.0018 ± 0.0022
December, 1988							
Yonagusuku-mura, OKINAWA	0.747	0.353	2.87	0.049 ± 0.011	0.14 ± 0.030	0.000 ± 0.005	0.0001 ± 0.0020
(Cabbage)							
October, 1988							
Akita, AKITA	0.802	0.376	3.13	0.30 ± 0.019	0.81 ± 0.049	0.083 ± 0.009	0.026 ± 0.0028
(Spinach)							
May, 1988							
Sendai, MIYAGI	1.47	0.766	5.49	0.094 ± 0.012	0.12 ± 0.016	0.019 ± 0.006	0.0035 ± 0.0010
June, 1988							
Niigata, NIIGATA	1.18	0.477	5.03	0.041 ± 0.010	0.085 ± 0.021	0.017 ± 0.006	0.0034 ± 0.0012
October, 1988							
Yamagata, YAMAGATA	1.72	0.449	7.27	0.047 ± 0.011	0.10 ± 0.025	0.005 ± 0.006	0.0007 ± 0.0008
November, 1988							
Shinjuku, TOKYO	1.95	0.608	8.28	0.036 ± 0.014	0.06 ± 0.023	0.011 ± 0.007	0.0014 ± 0.0008

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
Kanazawa, ISHIKAWA	1.72	0.840	7.19	0.037±0.009	0.044±0.011	0.006±0.005	0.0009±0.0007
Osaka, OSAKA	1.85	0.571	8.69	0.048±0.012	0.083±0.022	0.008±0.005	0.0009±0.0005
Okayama, OKAYAMA	1.80	0.464	7.91	0.027±0.011	0.059±0.023	0.009±0.006	0.0011±0.0007
Matsuyama, EHIME	1.68	0.511	7.83	0.075±0.008	0.15 ±0.015	0.028±0.007	0.0036±0.0009
Saga, SAGA	2.09	2.22	7.11	0.059±0.011	0.027±0.005	0.11 ±0.012	0.015 ±0.0017
December, 1988							
Yonagusuku-mura, OKINAWA	1.88	0.906	8.29	0.026±0.006	0.029±0.006	0.047±0.008	0.0057±0.0010

(5) Strontium-90 and Cesium-137 in Tea(Japanese Tea)
(from May 1988 to Jun. 1988)

-continued from NO. 85 of this publication-

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

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kg	Bq/gCa	Bq/Kg	Bq/gK
May, 1988							
Shuzenji-machi, SHIZUOKA	5.22	2.75	19.8	3.0 ± 0.14	1.1 ± 0.05	3.6 ± 0.13	0.18 ± 0.006
Iwata, SHIZUOKA	5.17	2.49	19.3	0.59 ± 0.07	0.24 ± 0.029	1.2 ± 0.07	0.063 ± 0.0038
Uji, KYOTO	5.05	3.33	18.3	1.1 ± 0.09	0.33 ± 0.028	1.7 ± 0.08	0.093 ± 0.0046
Kaya-machi, KYOTO	4.93	2.63	18.6	1.2 ± 0.09	0.47 ± 0.035	0.55 ± 0.05	0.030 ± 0.0027
Kawaminami-machi, MIYAZAKI	4.75	2.31	18.2	0.89 ± 0.10	0.39 ± 0.041	7.9 ± 0.20	0.43 ± 0.011
Miyakonojou, MIYAZAKI	5.37	2.46	19.9	0.58 ± 0.08	0.23 ± 0.033	1.3 ± 0.09	0.064 ± 0.0043
June, 1988							
Miyanojou-machi, KAGOSHIMA	5.44	3.23	19.7	1.7 ± 0.11	0.52 ± 0.035	1.1 ± 0.07	0.056 ± 0.0037
Chiran-machi, KAGOSHIMA	4.63	1.81	17.4	0.39 ± 0.07	0.21 ± 0.036	1.5 ± 0.08	0.088 ± 0.0046

(6) Strontium-90 and Cesium-137 in Sea Fish
(from Sep. 1987 to Dec. 1988)

-continued from NO. 85 of this publication-

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

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Hexagrammos otakii)							
August, 1988							
Souma, FUKUSHIMA	1.77	2.24	4.17	0.006 ± 0.008	0.0025 ± 0.0037	0.23 ± 0.013	0.054 ± 0.0030
(Trachurus japonicus)							
August, 1988							
Kobe, HYOGO	3.14	7.50	4.00	0.013 ± 0.009	0.0017 ± 0.0011	0.36 ± 0.016	0.090 ± 0.0041
November, 1988							
Shizuoka, SHIZUOKA	3.45	7.82	2.55	0.019 ± 0.005	0.0024 ± 0.0006	0.23 ± 0.014	0.088 ± 0.0053
(Branchiostegus sp.)							
November, 1988							
Nagasaki, NAGASAKI	1.29	0.661	3.86	0.003 ± 0.006	0.0052 ± 0.0087	0.33 ± 0.019	0.086 ± 0.0048
(Sardinops melanosticta)							
September, 1988							
Yamagata, YAMAGATA	2.69	6.70	2.28	0.001 ± 0.007	0.0002 ± 0.0011	0.088 ± 0.011	0.039 ± 0.0048
December, 1988							
Nagano, NAGANO	3.17	7.73	3.27	0.002 ± 0.008	0.0003 ± 0.0010	0.14 ± 0.014	0.042 ± 0.0041
(Sebastiscus marmoratus)							
May, 1988							
Hamada, SHIMANE	5.89	12.5	3.41	0.036 ± 0.009	0.0029 ± 0.0007	0.17 ± 0.014	0.051 ± 0.0041
(Katsuwonus pelamis)							
May, 1988							
Tosa, KOCHI	1.26	0.291	3.71	0.016 ± 0.008	0.054 ± 0.028	0.44 ± 0.018	0.12 ± 0.005
(Limanda herzensteini)							
June, 1988							
Sendai, MIYAGI	2.97	6.66	3.39	0.010 ± 0.009	0.0015 ± 0.0013	0.089 ± 0.011	0.026 ± 0.0031
November, 1988							
Mutsu, AOMORI	1.45	0.883	4.03	0.007 ± 0.004	0.0078 ± 0.0042	0.19 ± 0.012	0.048 ± 0.0030
Niigata, NIIGATA	1.26	0.563	3.83	0.005 ± 0.004	0.0095 ± 0.0063	0.16 ± 0.011	0.043 ± 0.0029
Mikuni-machi, FUKUI	1.29	1.33	3.20	0.003 ± 0.004	0.0019 ± 0.0034	0.17 ± 0.014	0.053 ± 0.0044
Aji-machi, KAGAWA	1.37	0.201	4.61	0.000 ± 0.014	0.000 ± 0.069	0.21 ± 0.018	0.045 ± 0.0039

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Sillago sihama)							
June, 1988							
Minamichita-machi, AICHI	3.79	8.56	3.03	0.017 ± 0.009	0.0020 ± 0.0010	0.096 ± 0.011	0.032 ± 0.0035
(Spratelloides gracilis)							
December, 1988							
Akune, KAGOSHIMA	2.85	5.80	2.81	0.009 ± 0.010	0.0016 ± 0.0017	0.19 ± 0.015	0.069 ± 0.0053
(Oncorhynchus keta)							
September, 1988							
Urakawa-machi, HOKKAIDO	1.32	0.504	3.92	0.007 ± 0.008	0.015 ± 0.016	0.20 ± 0.013	0.050 ± 0.0034
(Scomber japonicus)							
August, 1988							
Matsuyama, EHIME	1.37	0.847	3.96	0.000 ± 0.008	0.010 ± 0.0095	0.24 ± 0.013	0.061 ± 0.0034
November, 1988							
Osaka, OSAKA	1.12	0.123	3.11	0.003 ± 0.009	0.021 ± 0.071	0.22 ± 0.015	0.069 ± 0.0047
(Chrysophrys major)							
September, 1987							
Oga, AKITA	4.85	13.8	3.52	0.025 ± 0.013	0.0018 ± 0.0009	0.27 ± 0.017	0.076 ± 0.0047
June, 1988							
Oga, AKITA	4.91	12.7	3.57	0.054 ± 0.011	0.0042 ± 0.0008	0.26 ± 0.016	0.074 ± 0.0046
July, 1988							
Fukuoka, FUKUOKA	1.44	0.312	4.67	0.006 ± 0.009	0.019 ± 0.030	0.24 ± 0.014	0.050 ± 0.0029
(Seriola quinqueradiata)							
September, 1988							
Togi-machi, ISHIKAWA	1.34	0.603	4.10	0.000 ± 0.010	0.000 ± 0.016	0.23 ± 0.017	0.055 ± 0.0042
(Mugil cephalus)							
September, 1988							
Morodomi-machi, SAGA	1.12	0.235	3.76	0.004 ± 0.007	0.018 ± 0.031	0.12 ± 0.010	0.033 ± 0.0028
November, 1988							
Ushimado-machi, OKAYAMA	1.16	0.614	3.36	0.084 ± 0.007	0.14 ± 0.012	0.20 ± 0.013	0.060 ± 0.0038
(Decapterus muroadsi)							
September, 1988							
Miyake-Island, TOKYO	1.69	2.65	3.32	0.018 ± 0.008	0.0066 ± 0.0031	0.18 ± 0.012	0.053 ± 0.0037

Sea Fish

Japanese name	English name	Scientific name
Ainame	Greenling	Hexagrammos otakii
Aji	Horse mackerel	Trachurus japonicus
Amadai	Tilefish	Branchiostegus sp.
Iwashi	Sardine	Sardinops melanosticta
Kasago	Scorpion-fish	Sebastiscus marmoratus
Katsuo	Bonito	Katsuwonus pelamis
Karei	Flatfish	Limanda herzensteini
Kisu	Sillago	Sillago sihama
Kibinago	Banded blue-sprat	Spratelloides gracilis
Sake	Salmon	Oncorhynchus keta
Saba	Common mackerel	Scomber japonicus
Tai	Sea bream	Chrysophrys major
Fukuragi	Yellow-tail	Seriola quinqueradiata
Bora	Gray mullet	Mugil cephalus
Muroaji	Horse-scad mackerel	Decapterus muroadsi

(7) Strontium-90 and Cesium-137 in Freshwater Fish
(from Jul. 1988 to Dec. 1988)

-continued from NO. 85 of this publication-

Table (7): Strontium-90 and Cesium-137 in Freshwater Fish

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Cyprinus carpio)							
July, 1988							
Akita, AKITA	3.89	10.3	3.01	3.5 ± 0.06	0.34 ± 0.006	0.64 ± 0.024	0.21 ± 0.008
September, 1988							
Fukushima, FUKUSHIMA	3.31	7.60	2.91	0.96 ± 0.030	0.13 ± 0.004	0.19 ± 0.014	0.064 ± 0.0047
October, 1988							
Shobara, HIROSHIMA	0.880	0.477	2.67	0.069 ± 0.011	0.15 ± 0.023	0.16 ± 0.012	0.061 ± 0.0046
(Carassius auratus)							
August, 1988							
Barato-lake, HOKKAIDO	4.11	8.94	2.82	0.68 ± 0.025	0.076 ± 0.0028	0.090 ± 0.010	0.032 ± 0.0037
November, 1988							
Toyanogata, NIIGATA	1.03	0.479	3.27	0.069 ± 0.008	0.14 ± 0.016	0.29 ± 0.016	0.089 ± 0.0050
December, 1988							
Mikata-lake, FUKUI	1.54	2.77	2.82	0.33 ± 0.016	0.12 ± 0.006	0.31 ± 0.018	0.11 ± 0.006
(Hypomesus transpacificus nipponensis)							
December, 1988							
Suwa-lake, NAGANO	2.26	5.24	2.72	0.099 ± 0.014	0.019 ± 0.0026	0.16 ± 0.014	0.058 ± 0.0051

Freshwater Fish

Japanese name	English name	Scientific name
Koi	Carp	Cyprinus carpio
Funa	A crucian carp	Carassius auratus
Wakasagi	Pond-smelt	Hypomesus transpacificus nipponensis

(8) Strontium-90 and Cesium-137 in Shellfish
(from May 1988 to Nov. 1988)

-continued from NO. 85 of this publication-

Table (8): Strontium-90 and Cesium-137 in Shellfish

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Venerupis phillipinarum)							
May, 1988							
Takaki-machi, NAGASAKI	2.04	1.06	2.40	0.021±0.015	0.019 ±0.014	0.053±0.015	0.022 ±0.0060
(Saxidomuspurpuratus)							
June, 1988							
Minamichita-machi, AICHI	1.78	0.452	2.83	0.000±0.016	0.000 ±0.034	0.056±0.012	0.020 ±0.0044
(Turbo cornutus)							
May, 1988							
Ryotsu, NIIGATA	2.54	0.668	2.42	0.000±0.022	0.000 ±0.032	0.042±0.016	0.017 ±0.0067
June, 1988							
Sakata, YAMAGATA	2.18	1.21	2.76	0.007±0.012	0.005 ±0.010	0.042±0.010	0.015 ±0.0037
August, 1988							
Togi-machi, ISHIKAWA	2.74	1.19	2.34	0.000±0.018	0.000 ±0.015	0.039±0.011	0.016 ±0.0048
(Pecter Yessoensis)							
November, 1988							
Mutsu, AOMORI	1.46	0.224	2.80	0.012±0.006	0.053 ±0.027	0.051±0.007	0.018 ±0.0026
(Mytilus eduls)							
June, 1988							
Mutsu, AOMORI	2.46	0.587	2.66	0.007±0.009	0.012 ±0.016	0.046±0.007	0.017 ±0.0028

Shellfish

Japanese name	English name	Scientific name
Asari	Short-necked clam	Venerupis phillipinarum
Ohasari		Saxidomuspurpuratus
Sazae	Wreath shell	Turbo cornutus
Hotategai	Scallop	Pecter Yessoensis
Murasakiigai	Mussuel	Mytilus eduls

(9) Strontium-90 and Cesium-137 in Seaweeds
(from Apr. 1988 to Jun. 1988)

-continued from NO. 85 of this publication-

Table (9): Strontium-90 and Cesium-137 in Seaweeds

Location	Component			^{90}Sr		^{137}Cs	
	Ash(%)	Ca(g/Kg)	K(g/Kg)	Bq/Kgwet	Bq/gCa	Bq/Kgwet	Bq/gK
(Sargassum fulvellum)							
May, 1988							
Mutsu, AOMORI	5.51	4.94	9.90	0.071 ± 0.011	0.014 ± 0.0022	0.088 ± 0.011	0.0089 ± 0.0011
June, 1988							
Fukaura-machi, AOMORI	3.95	1.83	7.20	0.077 ± 0.017	0.042 ± 0.0093	0.080 ± 0.013	0.011 ± 0.0018
(Undaria pinnatifida)							
April, 1988							
Togi-machi, ISHIKAWA	1.85	0.693	5.21	0.036 ± 0.011	0.052 ± 0.015	0.051 ± 0.009	0.0097 ± 0.0017
May, 1988							
Ryotsu, NIIGATA	2.55	0.931	5.73	0.023 ± 0.011	0.024 ± 0.012	0.026 ± 0.008	0.0046 ± 0.0014
June, 1988							
Sakata, YAMAGATA	2.77	1.39	5.97	0.060 ± 0.009	0.043 ± 0.0067	0.061 ± 0.009	0.010 ± 0.0014

Seaweeds

Japanese name	English name	Scientific name
Hondawara	Gulfweed	Sargassum fulvellum
Wakame	Wakame seaweed	Undaria pinnatifida

＊＊＊　Total Diet　＊＊＊

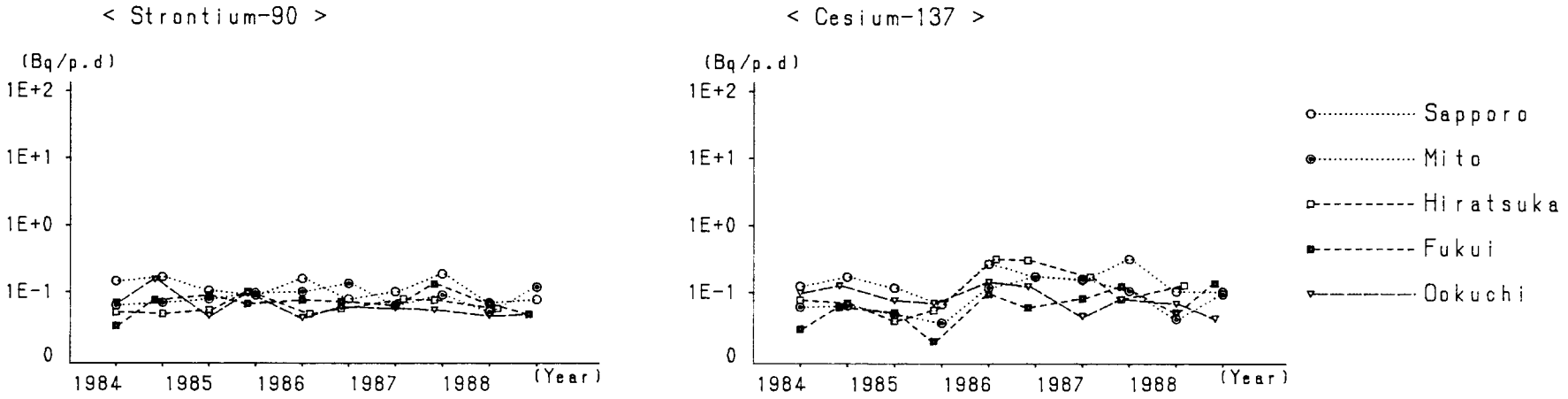

Fig. 1

＊＊＊　Rice(producing districts)　＊＊＊

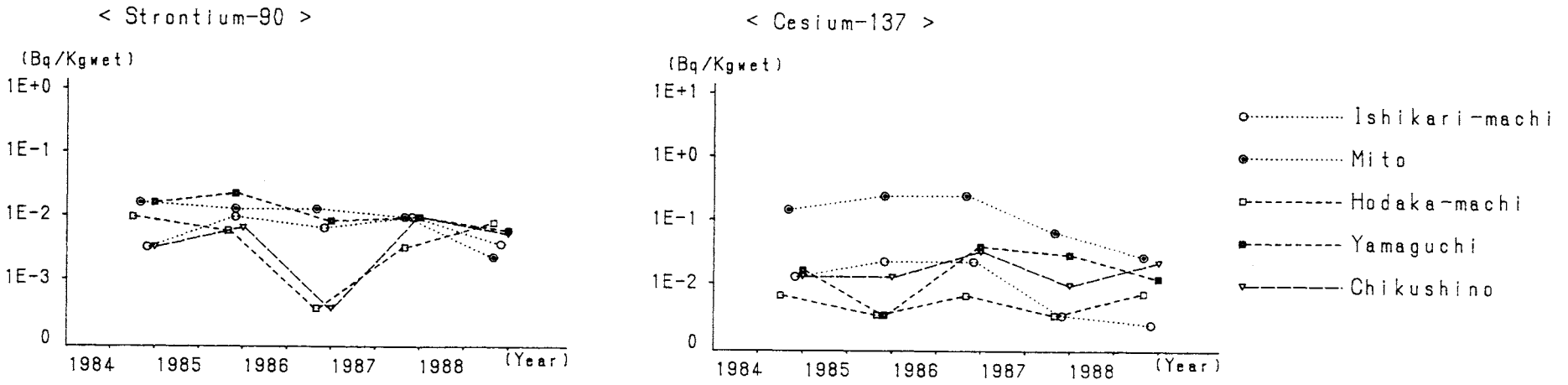

Fig.2-1

* * * Rice (consuming districts) * * *

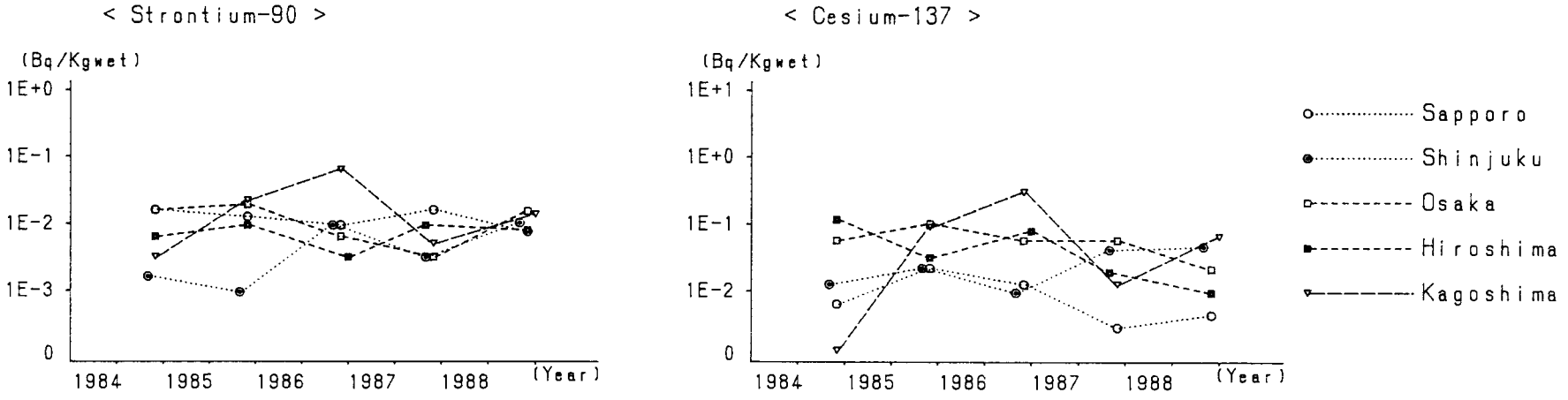

Fig. 2-2

* * * Milk(producing districts for domestic program) * * *

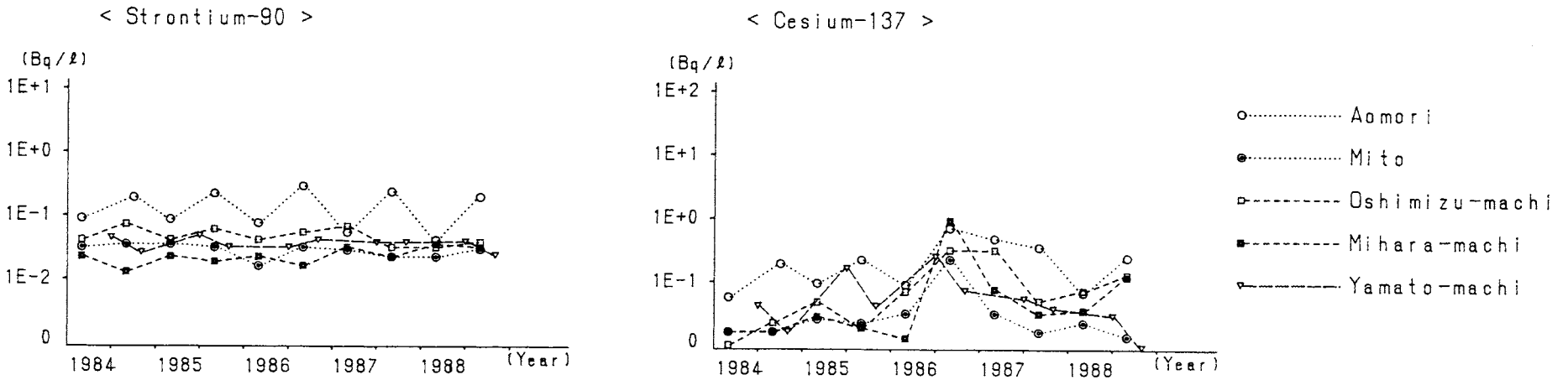

Fig.3-1

* * * Milk(producing districts for WHO program) * * *

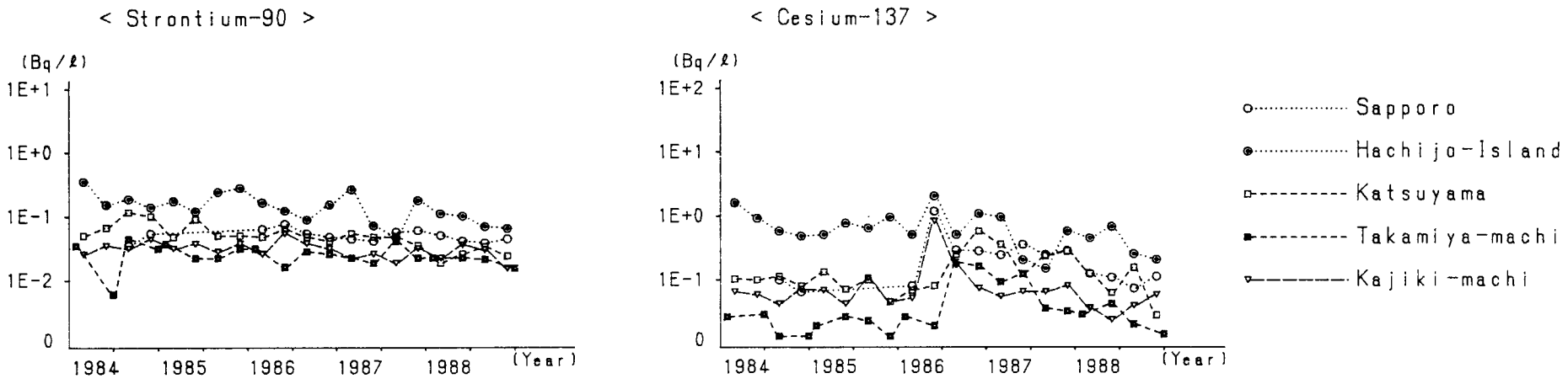

Fig.3-2

* * * Milk (consuming districts) * * *

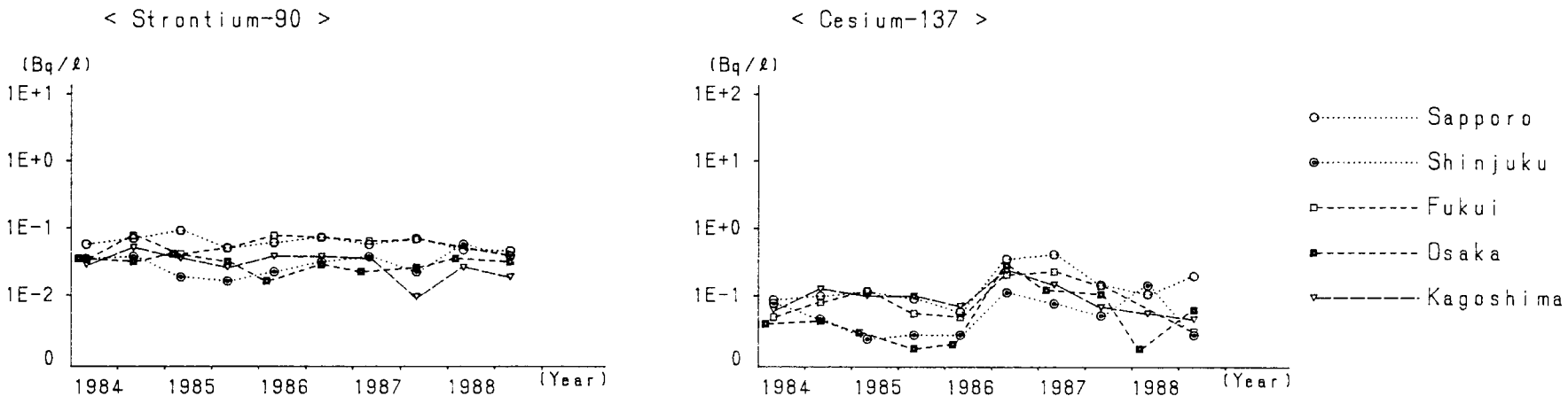

Fig. 3-3

* * * Vegetables(producing districts) * * *

[Japanese radish]

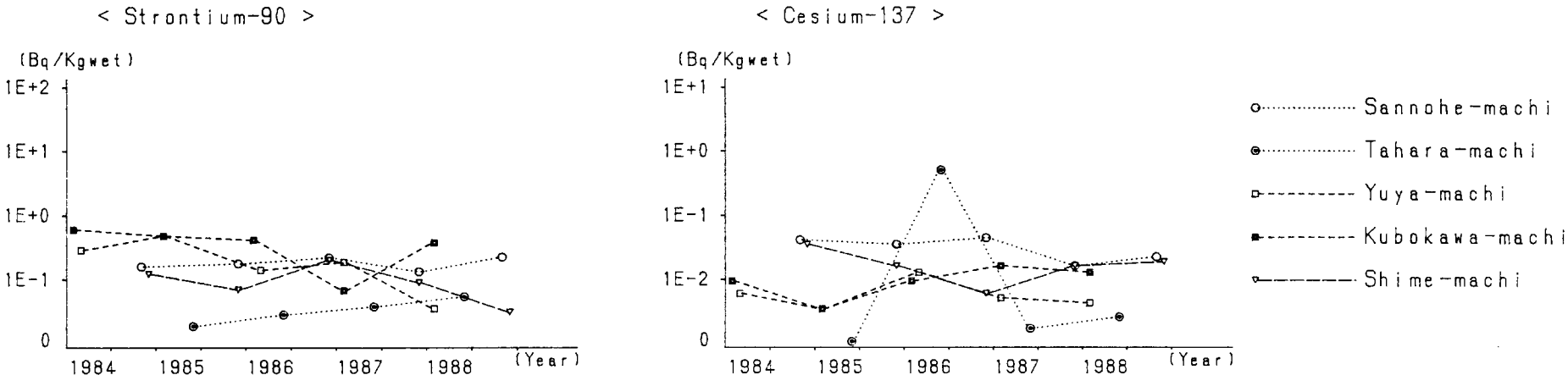

Fig.4-1

* * * Vegetables(consuming districts) * * *

[Japanese radish]

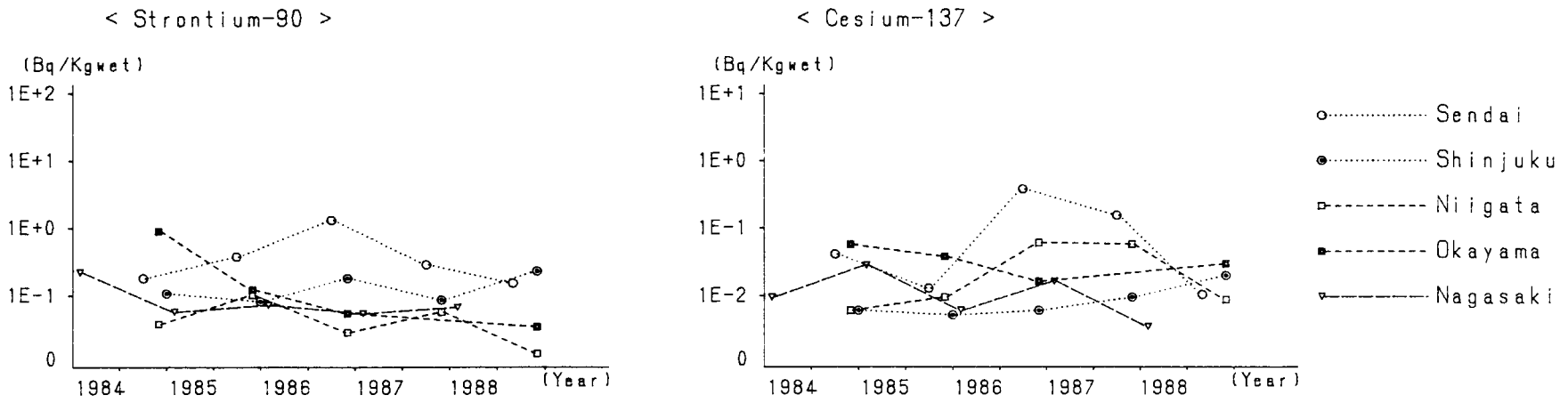

Fig.4-2

* * * Tea (Japanese Tea) * * *

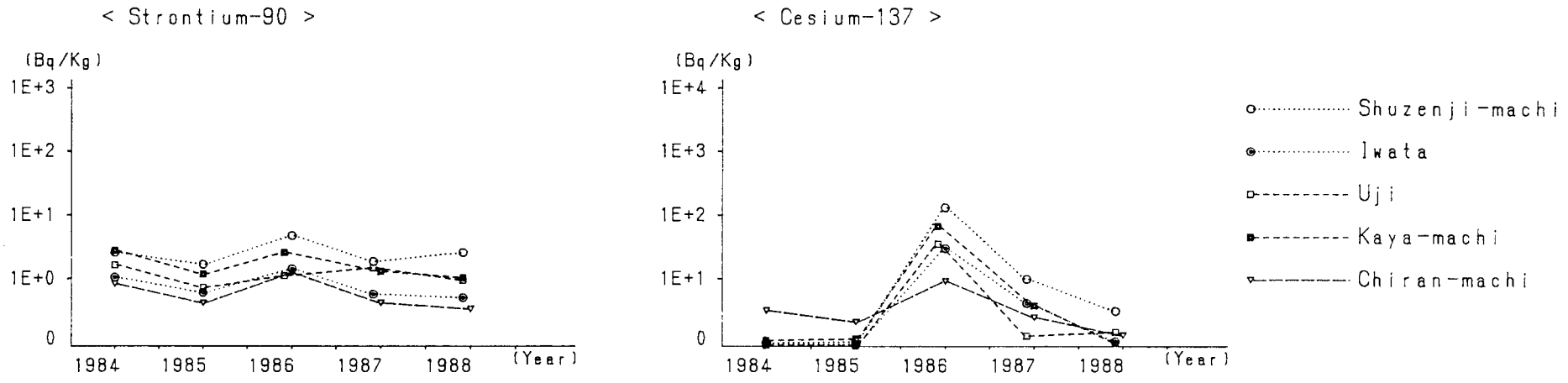

Fig.5

＊＊＊　Sea Fish　＊＊＊

(Scomber japonicus)

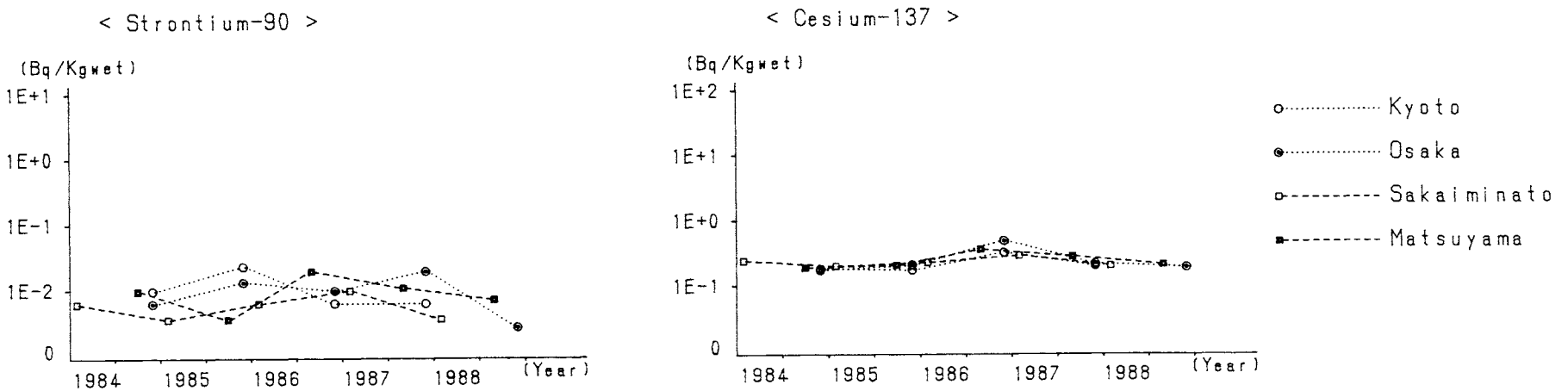

Fig. 6

* * * Freshwater Fish * * *

(Carassius auratus)

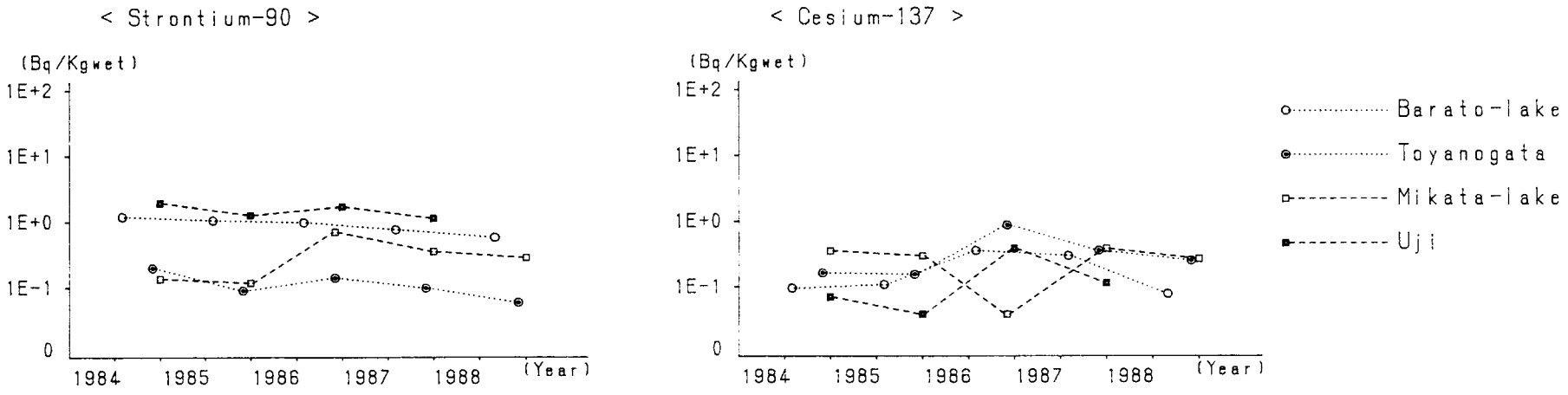

Fig.7

* * * Shellfish * * *

(Turbo cornutus)

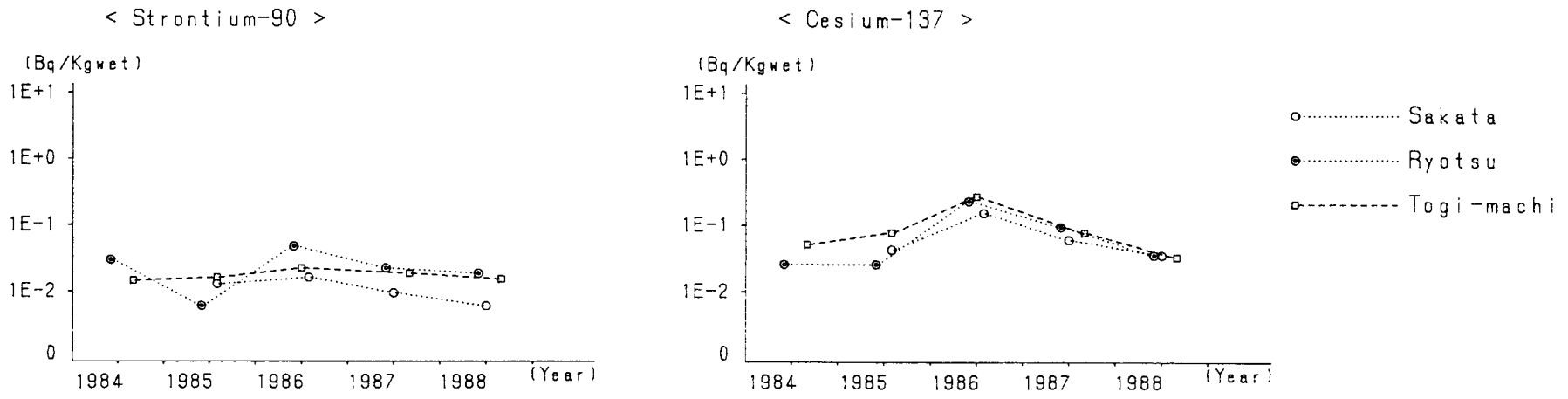

Fig.8

* * * Seaweeds * * *

(Undaria pinnatifida)

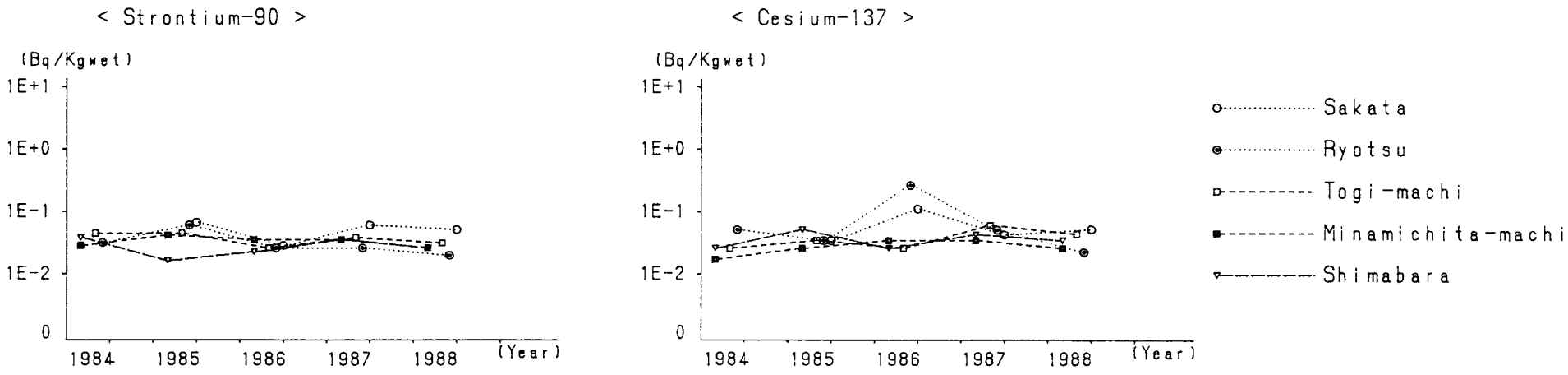

Fig.9

** 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 : Shinjuku
13 : Nagano
14 : Yokohama
15 : Kouhu
16 : Toyama
17 : Kanazawa
18 : Shizuoka
19 : Fukui
20 : Nagoya
21 : Kyoto
22 : Osaka
23 : Tottori
24 : Kobe
25 : Wakayama
26 : Okayama
27 : Matsue
28 : Hiroshima
29 : Kochi
30 : Matsuyama
31 : Yamaguchi
32 : Ooita
33 : Fukuoka
34 : Saga
35 : Nagasaki
36 : Kagoshima
37 : Naha