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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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Number 95

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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. 1990 to Nov. 1990)

-continued from NO. 93 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, 1990							
Aomori, AOMORI	17.6	609	2520	0.095±0.014	0.16 ±0.023	0.098±0.010	0.039±0.004
Ajigasawa-machi, AOMORI	18.5	794	2160	0.20 ±0.017	0.25 ±0.022	0.071±0.008	0.033±0.004
Fukushima, FUKUSHIMA	13.4	488	1850	0.067±0.009	0.14 ±0.018	0.037±0.007	0.020±0.004
Mito, IBARAGI	16.3	595	2220	0.093±0.012	0.16 ±0.020	0.033±0.006	0.015±0.003
Tokai-mura, IBARAGI	16.6	453	2150	0.032±0.010	0.071±0.022	0.040±0.006	0.019±0.003
Shinjuku, TOKYO	10.1	402	1380	0.052±0.006	0.13 ±0.015	0.073±0.007	0.053±0.005
Utsunomiya, TOCHIGI	13.9	534	1620	0.055±0.010	0.10 ±0.018	0.051±0.006	0.031±0.004
Kanuma, TOCHIGI	12.8	310	1500	0.053±0.008	0.17 ±0.027	0.068±0.008	0.045±0.005
Kashiwazaki, NIIGATA	17.6	450	1820	0.077±0.012	0.17 ±0.027	0.056±0.007	0.031±0.004
Nishikawa-machi, NIIGATA	23.4	706	2940	0.13 ±0.016	0.18 ±0.022	0.10 ±0.010	0.035±0.003
Nagano, NAGANO	16.4	933	1870	0.029±0.009	0.031±0.010	0.028±0.009	0.015±0.005
Ueda, NAGANO	18.2	737	2460	0.067±0.012	0.091±0.016	0.041±0.010	0.017±0.004
Koufu, YAMANASHI	13.1	397	1580	0.089±0.010	0.22 ±0.025	0.046±0.007	0.029±0.005
Sudama-machi, YAMANASHI	13.5	558	1420	0.037±0.008	0.066±0.015	0.041±0.008	0.029±0.005
Nagoya, AICHI	15.3	706	2060	0.046±0.010	0.065±0.014	0.049±0.007	0.024±0.003
Shinshiro, AICHI	17.7	470	2170	0.062±0.015	0.13 ±0.032	0.036±0.008	0.017±0.004
Tsu, MIE	14.0	326	1750	0.057±0.010	0.17 ±0.031	0.032±0.006	0.018±0.004
Owase, MIE	15.8	442	2260	0.14 ±0.015	0.32 ±0.035	0.088±0.009	0.039±0.004
Ootsu, SHIGA	15.0	643	1780	0.044±0.009	0.068±0.015	0.062±0.009	0.035±0.005
Imazu-chou, SHIGA	11.7	350	1500	0.051±0.008	0.14 ±0.023	0.025±0.006	0.017±0.004
Osaka, OSAKA	19.8	660	2430	0.084±0.013	0.13 ±0.020	0.037±0.007	0.015±0.003
Kashihara, NARA	10.9	687	1560	0.041±0.008	0.060±0.011	0.041±0.005	0.026±0.003
Gojyou, NARA	10.5	924	1590	0.072±0.009	0.078±0.010	0.048±0.005	0.030±0.003
Wakayama, WAKAYAMA	16.3	1070	1760	0.036±0.010	0.034±0.010	0.050±0.010	0.028±0.006
Tottori, TOTTORI	13.1	450	1500	0.053±0.008	0.12 ±0.018	0.036±0.005	0.024±0.003
Fukube-mura, TOTTORI	16.9	604	2070	0.060±0.011	0.099±0.018	0.041±0.006	0.020±0.003
Matsue, SHIMANE	20.3	1390	2510	0.12 ±0.009	0.086±0.007	0.048±0.008	0.019±0.003
Kashima-chou, SHIMANE	18.2	696	2520	0.083±0.008	0.12 ±0.011	0.062±0.008	0.025±0.003
Yamaguchi, YAMAGUCHI	14.8	942	1930	0.052±0.010	0.055±0.011	0.19 ±0.011	0.097±0.006
Ajisu-machi, YAMAGUCHI	16.3	516	2260	0.043±0.011	0.083±0.022	0.079±0.009	0.035±0.004
Matsuyama, EHIME	11.6	378	1740	0.041±0.008	0.11 ±0.021	0.050±0.005	0.029±0.003

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)
Kochi, KOCHI	14.3	616	1750	0.065±0.008	0.11 ±0.013	0.041±0.007	0.023±0.004
Saga-chou, KOCHI	12.0	377	1680	0.11 ±0.011	0.30 ±0.030	0.024±0.007	0.015±0.004
Tokushima, TOKUSHIMA	13.8	353	2100	0.041±0.005	0.12 ±0.014	0.024±0.005	0.011±0.002
Takamatsu, KAGAWA	15.6	533	2430	0.046±0.010	0.087±0.018	0.14 ±0.011	0.060±0.005
Ayauta-gun, KAGAWA	16.6	573	1890	0.054±0.011	0.095±0.019	0.035±0.009	0.019±0.005
Fukuoka, FUKUOKA	11.9	248	1060	0.047±0.006	0.19 ±0.026	0.017±0.005	0.016±0.004
Dazaifu, FUKUOKA	19.3	837	2500	0.11 ±0.012	0.13 ±0.014	0.063±0.010	0.025±0.004
Saga, SAGA	10.4	314	1430	0.035±0.006	0.11 ±0.020	0.032±0.004	0.022±0.003
Karatsu, SAGA	17.6	648	1890	0.041±0.010	0.064±0.016	0.047±0.007	0.025±0.003
Nagasaki, NAGASAKI	12.0	381	1590	0.037±0.008	0.098±0.020	0.063±0.006	0.040±0.004
Matsuura, NAGASAKI	14.6	441	1850	0.043±0.009	0.098±0.021	0.056±0.006	0.031±0.003
Kumamoto, KUMAMOTO	12.6	422	1830	0.021±0.008	0.049±0.019	0.047±0.008	0.025±0.004
Aso-machi, KUMAMOTO	19.7	700	2440	0.096±0.017	0.14 ±0.024	0.11 ±0.014	0.043±0.006
Takahara-machi, MIYAZAKI	13.3	689	2510	0.073±0.010	0.11 ±0.014	0.19 ±0.013	0.077±0.005
Ookuchi, KAGOSHIMA	17.1	397	1670	0.082±0.014	0.21 ±0.036	0.047±0.008	0.028±0.005
Sendai, KAGOSHIMA	11.3	409	1300	0.043±0.008	0.10 ±0.019	0.055±0.006	0.042±0.005
Naha, OKINAWA	16.8	590	2020	0.055±0.011	0.094±0.018	0.090±0.010	0.044±0.005
Ginowan, OKINAWA	13.9	419	1800	0.052±0.009	0.13 ±0.021	0.089±0.009	0.049±0.005
July, 1990							
Ishinomaki, MIYAGI	13.5	464	1350	0.055±0.006	0.12 ±0.012	0.030±0.005	0.022±0.004
Onagawa-machi, MIYAGI	16.0	669	1940	0.079±0.007	0.12 ±0.011	0.14 ±0.010	0.071±0.005
Akita, AKITA	14.8	1020	1800	0.096±0.012	0.094±0.012	0.22 ±0.012	0.12 ±0.006
Oomagari, AKITA	16.4	409	2010	0.080±0.012	0.20 ±0.030	0.10 ±0.008	0.050±0.004
Ookuma-machi, FUKUSHIMA	16.2	387	1640	0.053±0.009	0.14 ±0.024	0.037±0.008	0.023±0.005
Hachijo-machi, TOKYO	14.6	656	1780	0.055±0.008	0.084±0.012	0.078±0.008	0.044±0.005
Yokohama, KANAGAWA	12.7	334	1520	0.059±0.005	0.18 ±0.016	0.046±0.006	0.030±0.004
Hiratsuka, KANAGAWA	16.3	631	2100	0.048±0.010	0.077±0.016	0.065±0.010	0.031±0.005
Koza-chou, WAKAYAMA	12.5	726	1410	0.036±0.007	0.049±0.010	0.032±0.007	0.023±0.005
Ikata-chou, EHIME	8.06	317	892	0.019±0.005	0.059±0.016	0.018±0.003	0.020±0.003
Ooita, OOITA	17.1	618	2490	0.055±0.015	0.088±0.023	0.070±0.008	0.028±0.003
Saiki, OOITA	13.4	657	1820	0.039±0.008	0.059±0.012	0.043±0.007	0.023±0.004
Miyazaki, MIYAZAKI	9.95	567	1750	0.043±0.007	0.076±0.012	0.067±0.008	0.038±0.005
August, 1990							
Hiroshima, HIROSHIMA	11.2	808	1400	0.036±0.004	0.045±0.005	0.033±0.005	0.024±0.003
Miyoshi, HIROSHIMA	11.0	483	1580	0.059±0.008	0.12 ±0.016	0.058±0.006	0.037±0.004
September, 1990							
Hamaoka-machi, SHIZUOKA	14.1	532	1790	0.063±0.010	0.12 ±0.019	0.052±0.007	0.029±0.004
Kamiita-machi, TOKUSHIMA	14.6	411	1860	0.050±0.013	0.12 ±0.030	0.042±0.010	0.023±0.005

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)
October, 1990							
Yamagata, YAMAGATA	11.7	261	1480	0.043 ± 0.005	0.16 ± 0.020	0.071 ± 0.007	0.048 ± 0.005
November, 1990							
Akita, AKITA	15.3	688	2000	0.080 ± 0.007	0.12 ± 0.011	0.26 ± 0.014	0.13 ± 0.007
Oomagari, AKITA	15.6	915	1570	0.13 ± 0.009	0.15 ± 0.009	0.11 ± 0.010	0.070 ± 0.006
Iwaizumi-machi, IWATE	14.5	525	2000	0.11 ± 0.008	0.21 ± 0.015	0.063 ± 0.007	0.031 ± 0.004
Nanyou, YAMAGATA	10.8	426	1460	0.055 ± 0.005	0.13 ± 0.012	0.10 ± 0.008	0.069 ± 0.005
Kanazawa, ISHIKAWA	16.2	1460	1560	0.058 ± 0.006	0.039 ± 0.004	0.060 ± 0.008	0.038 ± 0.005
Yoshinodani-mura, ISHIKAWA	13.4	597	1650	0.093 ± 0.007	0.16 ± 0.011	0.095 ± 0.008	0.057 ± 0.005
Turuga, FUKUI	15.8	1180	1680	0.059 ± 0.006	0.051 ± 0.006	0.048 ± 0.007	0.028 ± 0.004
Shizuoka, SHIZUOKA	14.4	515	2530	0.058 ± 0.007	0.11 ± 0.013	0.047 ± 0.007	0.019 ± 0.003
Nagoya, AICHI	17.7	924	2220	0.13 ± 0.010	0.14 ± 0.010	0.046 ± 0.008	0.021 ± 0.003
Shinshiro, AICHI	15.6	785	2190	0.078 ± 0.007	0.099 ± 0.009	0.062 ± 0.008	0.028 ± 0.003
Matsuyama, EHIME	13.7	545	1930	0.062 ± 0.007	0.11 ± 0.012	0.034 ± 0.006	0.018 ± 0.003
Kochi, KOCHI	15.0	571	2140	0.086 ± 0.008	0.15 ± 0.013	0.069 ± 0.008	0.032 ± 0.004
Saga-chou, KOCHI	13.9	536	1850	0.084 ± 0.007	0.16 ± 0.013	0.063 ± 0.007	0.034 ± 0.004
Saga, SAGA	15.6	609	2390	0.081 ± 0.007	0.13 ± 0.011	0.083 ± 0.008	0.035 ± 0.004
Genkai-chou, SAGA	17.6	598	1840	0.067 ± 0.007	0.11 ± 0.012	0.033 ± 0.007	0.018 ± 0.004

(2)-1 Strontium-90 and Cesium-137 in Rice(producing districts)
(from Sep. 1989 to Oct. 1989)

-continued from NO. 93 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
September, 1989							
Kashihara, NARA	0.782	0.055	1.29	0.0053 ± 0.0042	0.096 ± 0.075	0.000 ± 0.0083	0.000 ± 0.0064
October, 1989							
Maki-machi, NIIGATA	0.577	0.040	0.698	0.0069 ± 0.0042	0.17 ± 0.11	0.017 ± 0.0087	0.024 ± 0.012
Shiga-chou, SHIGA	0.683	0.056	1.11	0.0064 ± 0.0043	0.11 ± 0.076	0.035 ± 0.0099	0.032 ± 0.0089
Ishii-machi, TOKUSHIMA	0.704	0.059	1.28	0.0074 ± 0.0045	0.13 ± 0.076	0.000 ± 0.0082	0.000 ± 0.0064
Koushi-machi, KUMAMOTO	0.555	0.029	0.966	0.0055 ± 0.0033	0.19 ± 0.11	0.012 ± 0.0069	0.012 ± 0.0072

(2)-2 Strontium-90 and Cesium-137 in Rice(consuming districts)
(from Oct. 1989 to Mar. 1990)

-continued from NO. 93 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
October, 1989							
Shinjuku, TOKYO	0.420	0.040	0.752	0.013 ± 0.0040	0.31 ± 0.10	0.030 ± 0.0077	0.040 ± 0.010
Niigata, NIIGATA	0.471	0.040	0.589	0.0053 ± 0.0035	0.13 ± 0.087	0.019 ± 0.0078	0.031 ± 0.013
December, 1989							
Matsue, SHIMANE	0.683	0.040	0.785	0.0028 ± 0.0042	0.07 ± 0.10	0.098 ± 0.012	0.12 ± 0.015
January, 1990							
Hirosaki, AOMORI	0.623	0.048	1.18	0.0050 ± 0.0039	0.10 ± 0.082	0.028 ± 0.0088	0.024 ± 0.0075
Nagasaki, NAGASAKI	0.465	0.040	0.823	0.000 ± 0.0026	0.00 ± 0.065	0.039 ± 0.0072	0.048 ± 0.0088
February, 1990							
Kochi, KOCHI	0.470	0.043	0.808	0.0098 ± 0.0032	0.23 ± 0.075	0.011 ± 0.0058	0.014 ± 0.0071
March, 1990							
Shinguu, WAKAYAMA	0.506	0.043	0.911	0.0077 ± 0.0032	0.18 ± 0.075	0.025 ± 0.0069	0.027 ± 0.0076

(3)-1 Strontium-90 and Cesium-137 in Milk(producing districts for domestic program) (from Aug. 1989 to Dec. 1990)

-continued from NO. 93 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
August, 1989							
Oouchiyama-mura, MIE	7.40	1.19	1.68	0.028±0.004	0.023±0.004	0.013±0.004	0.008±0.003
August, 1990							
Akita, AKITA	5.39	0.787	1.15	0.054±0.014	0.068±0.017	0.064±0.010	0.056±0.009
Takisawa-mura, IWATE	7.40	1.25	1.63	0.038±0.009	0.031±0.007	0.084±0.007	0.052±0.005
Mito, IBARAGI	7.26	1.14	1.66	0.038±0.009	0.033±0.008	0.019±0.005	0.011±0.003
Nishinasuno-machi, TOCHIGI	7.53	1.25	1.68	0.058±0.011	0.047±0.009	0.076±0.007	0.045±0.004
Tonami, TOYAMA	7.21	1.11	1.58	0.036±0.004	0.032±0.004	0.051±0.007	0.032±0.004
Takane-machi, YAMANASHI	6.38	1.00	1.41	0.019±0.004	0.019±0.004	0.005±0.004	0.003±0.003
Oouchiyama-mura, MIE	7.25	1.11	1.73	0.032±0.004	0.029±0.004	0.003±0.004	0.002±0.003
Hino-machi, SHIGA	7.40	1.20	1.69	0.030±0.004	0.025±0.004	0.003±0.006	0.002±0.004
Mihara-machi, HYOGO	7.31	1.13	1.65	0.014±0.007	0.012±0.006	0.008±0.008	0.005±0.005
Oouda-machi, NARA	7.00	1.16	1.56	0.046±0.008	0.040±0.007	0.002±0.003	0.001±0.002
Matsuyama, EHIME	7.13	1.10	1.59	0.012±0.004	0.011±0.003	0.010±0.005	0.006±0.003
Kamiita-machi, TOKUSHIMA	7.04	1.07	1.73	0.030±0.010	0.028±0.009	0.015±0.008	0.009±0.005
Takasa-machi, KAGAWA	7.32	1.13	1.70	0.030±0.009	0.026±0.008	0.011±0.005	0.006±0.003
Koushi-machi, KUMAMOTO	6.92	1.06	1.66	0.023±0.007	0.021±0.007	0.012±0.005	0.007±0.003
Takahara-machi, MIYAZAKI	7.38	1.12	1.73	0.049±0.009	0.044±0.008	0.18 ±0.011	0.10 ±0.007
September, 1990							
Kujuu-machi, OOITA	7.22	1.06	1.73	0.044±0.009	0.041±0.008	0.18 ±0.011	0.10 ±0.006
October, 1990							
Yamato-machi, SAGA	7.30	1.16	1.63	0.038±0.006	0.033±0.005	0.015±0.004	0.009±0.002
December, 1990							
Akita, AKITA	6.33	0.954	1.37	0.027±0.007	0.028±0.007	0.056±0.007	0.041±0.005

(3)-2 Strontium-90 and Cesium-137 in Milk(producing districts for WHO program)
(from May 1990 to Nov. 1990)

-continued from NO. 93 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, 1990							
Nishikawa-machi, NIIGATA	7.32	1.12	1.68	0.040±0.008	0.036±0.007	0.097±0.009	0.058±0.005
Hikawa-machi, SHIMANE	7.54	1.21	1.76	0.077±0.011	0.063±0.009	0.12 ±0.010	0.067±0.006
June, 1990							
Kajiki-machi, KAGOSHIMA	7.27	1.14	1.64	0.032±0.008	0.028±0.007	0.031±0.005	0.019±0.003
July, 1990							
Takamiya-machi, HIROSHIMA	5.83	0.883	1.42	0.021±0.008	0.024±0.009	0.004±0.008	0.003±0.006
August, 1990							
Hokudainoujou, HOKKAIDO	7.27	1.13	1.63	0.086±0.009	0.076±0.008	0.12 ±0.010	0.076±0.006
Hachijo-Island, TOKYO	6.73	0.995	1.44	0.083±0.011	0.084±0.011	0.22 ±0.011	0.16 ±0.008
Nishikawa-machi, NIIGATA	7.64	1.19	1.78	0.025±0.009	0.021±0.007	0.015±0.008	0.008±0.005
Katsuyama, FUKUI	7.36	1.16	1.69	0.018±0.005	0.016±0.004	0.067±0.008	0.040±0.005
Nose-machi, OSAKA	7.56	1.11	1.69	0.013±0.007	0.012±0.006	0.011±0.007	0.007±0.004
Kochi, KOCHI	7.55	1.18	1.58	0.061±0.010	0.052±0.008	0.015±0.005	0.009±0.003
Fukuma-machi, FUKUOKA	7.19	1.02	1.74	0.020±0.004	0.019±0.004	0.035±0.006	0.020±0.003
Kajiki-machi, KAGOSHIMA	7.38	1.11	1.65	0.030±0.004	0.027±0.004	0.048±0.006	0.029±0.004
November, 1990							
Hachijo-Island, TOKYO	6.74	0.994	1.43	0.11 ±0.007	0.11 ±0.007	0.12 ±0.009	0.085±0.006
Nishikawa-machi, NIIGATA	7.78	1.09	1.61	0.023±0.009	0.021±0.008	0.017±0.007	0.011±0.004
Katsuyama, FUKUI	7.51	1.22	1.68	0.030±0.004	0.024±0.004	0.039±0.006	0.023±0.004
Nose-machi, OSAKA	7.69	1.17	1.57	0.021±0.004	0.018±0.003	0.027±0.006	0.017±0.004
Takamiya-machi, HIROSHIMA	7.00	1.09	1.58	0.015±0.007	0.014±0.007	0.019±0.004	0.012±0.003
Kochi, KOCHI	7.69	1.15	1.74	0.056±0.010	0.049±0.009	0.024±0.005	0.014±0.003
Fukuma-machi, FUKUOKA	7.80	1.03	1.60	0.021±0.004	0.020±0.004	0.073±0.008	0.045±0.005

(3)-3 Strontium-90 and Cesium-137 in Milk(consuming districts)
(from Aug. 1989 to Oct. 1990)

-continued from NO. 93 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
August, 1989							
Nagoya, AICHI	7.39	1.14	1.63	0.032±0.006	0.028±0.005	0.036±0.007	0.022±0.004
Shinguu, WAKAYAMA	6.63	1.00	1.51	0.041±0.005	0.041±0.005	0.024±0.005	0.016±0.003
September, 1989							
Yokohama, KANAGAWA	7.24	1.14	1.60	0.020±0.004	0.018±0.003	0.031±0.005	0.019±0.003
December, 1989							
Yonagusuku-mura, OKINAWA	7.27	1.16	1.67	0.018±0.004	0.015±0.003	0.011±0.004	0.007±0.002
July, 1990							
Fukushima, FUKUSHIMA	7.22	1.09	1.65	0.031±0.009	0.028±0.008	0.019±0.005	0.011±0.003
Shinguu, WAKAYAMA	6.41	1.01	1.45	0.026±0.007	0.025±0.007	0.022±0.004	0.015±0.003
Hiroshima, HIROSHIMA	7.24	1.10	1.69	0.042±0.008	0.038±0.008	0.011±0.006	0.006±0.004
August, 1990							
Sapporo, HOKKAIDO	7.23	1.11	1.61	0.045±0.008	0.040±0.007	0.054±0.007	0.034±0.005
Yamagata, YAMAGATA	7.32	1.19	1.65	0.036±0.009	0.030±0.008	0.035±0.005	0.022±0.003
Shinjuku, TOKYO	7.04	1.07	1.62	0.034±0.005	0.032±0.005	0.038±0.007	0.023±0.004
Yokohama, KANAGAWA	7.31	1.14	1.68	0.027±0.009	0.024±0.008	0.028±0.005	0.017±0.003
Niigata, NIIGATA	7.83	1.13	1.70	0.051±0.010	0.045±0.009	0.10 ±0.009	0.061±0.006
Fukui, FUKUI	6.99	1.04	1.68	0.066±0.008	0.064±0.008	0.050±0.007	0.030±0.004
Nagano, NAGANO	7.06	1.02	1.57	0.026±0.004	0.025±0.004	0.015±0.005	0.009±0.003
Shizuoka, SHIZUOKA	7.23	1.12	1.61	0.023±0.005	0.021±0.005	0.019±0.006	0.012±0.004
Nagoya, AICHI	7.23	1.09	1.67	0.034±0.004	0.031±0.004	0.014±0.005	0.008±0.003
Osaka, OSAKA	7.29	1.09	1.67	0.028±0.008	0.025±0.008	0.032±0.006	0.019±0.004
Yonago, TOTTORI	7.62	1.14	1.71	0.038±0.005	0.034±0.005	0.018±0.006	0.011±0.003
Matsuyama, EHIME	7.08	1.09	1.60	0.030±0.005	0.028±0.004	0.043±0.007	0.027±0.004
Kochi, KOCHI	7.29	1.08	1.70	0.051±0.009	0.047±0.009	0.053±0.006	0.031±0.004
Chikushino, FUKUOKA	7.40	1.14	1.69	0.045±0.010	0.040±0.009	0.029±0.006	0.017±0.003
Nagasaki, NAGASAKI	6.66	1.04	1.55	0.012±0.008	0.011±0.008	0.015±0.007	0.010±0.004
Kagoshima, KAGOSHIMA	7.35	1.10	1.68	0.035±0.005	0.032±0.004	0.030±0.006	0.018±0.003
Yonagusuku-mura, OKINAWA	7.03	1.07	1.60	0.018±0.005	0.016±0.004	0.013±0.006	0.008±0.004
September, 1990							
Sendai, MIYAGI	7.18	1.07	1.68	0.031±0.005	0.029±0.004	0.019±0.005	0.011±0.003
Okayama, OKAYAMA	7.16	1.15	1.59	0.021±0.005	0.018±0.004	0.046±0.007	0.029±0.005

Location	Component			^{90}Sr		^{137}Cs	
	Ash(g/ℓ)	Ca(g/ℓ)	K(g/ℓ)	Bq/ℓ	Bq/gCa	Bq/ℓ	Bq/gK
Yamaguchi, YAMAGUCHI	6.97	1.02	1.60	0.030±0.008	0.030±0.007	0.016±0.004	0.010±0.003
October, 1990 Kyoto, KYOTO	7.32	1.11	1.63	0.035±0.005	0.032±0.004	0.022±0.005	0.014±0.003

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

-continued from NO. 93 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, 1990							
Sample A	8.11	12.7	18.2	0.48 ± 0.022	0.038 ± 0.0018	0.70 ± 0.032	0.039 ± 0.0018
Sample B	2.48	3.37	5.98	0.037 ± 0.006	0.011 ± 0.0018	0.22 ± 0.015	0.037 ± 0.0025
Sample C	2.49	3.91	5.53	0.074 ± 0.007	0.019 ± 0.0019	0.22 ± 0.015	0.040 ± 0.0026
Sample D	8.04	12.4	18.2	0.76 ± 0.026	0.061 ± 0.0021	2.2 ± 0.05	0.12 ± 0.003
Sample E	2.56	4.04	5.53	0.13 ± 0.010	0.033 ± 0.0025	0.78 ± 0.025	0.14 ± 0.005
Sample F	2.62	3.93	5.74	0.060 ± 0.007	0.015 ± 0.0019	0.40 ± 0.019	0.069 ± 0.0033

*Skim milk

(4)-1 Strontium-90 and Cesium-137 in Vegetables(producing districts)
(from Oct. 1989 to Feb. 1990)

-continued from NO. 93 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)							
October, 1989							
Tamayama-mura, IWATE	0.546	0.323	1.97	0.060±0.005	0.19 ±0.015	0.009±0.005	0.0048±0.0023
Takamatsu, KAGAWA	0.533	0.249	2.34	0.025±0.007	0.10 ±0.030	0.009±0.006	0.0038±0.0025
November, 1989							
Utsunomiya, TOCHIGI	0.618	0.241	2.68	0.071±0.006	0.29 ±0.024	0.009±0.005	0.0034±0.0019
Takane-machi, YAMANASHI	0.553	0.301	2.45	0.23 ±0.010	0.75 ±0.032	0.000±0.005	0.000 ±0.0021
Meiwa-machi, MIE	0.784	0.456	3.40	0.050±0.006	0.11 ±0.012	0.000±0.006	0.000 ±0.0017
Kasai, HYOGO	0.605	0.164	2.61	0.13 ±0.008	0.77 ±0.049	0.000±0.006	0.000 ±0.0022
December, 1989							
Takanabe-machi, MIYAZAKI	0.606	0.260	2.68	0.21 ±0.013	0.79 ±0.052	0.062±0.008	0.023 ±0.0029
(Spinach)							
October, 1989							
Saku, NAGANO	2.19	0.594	9.97	0.095±0.008	0.16 ±0.014	0.010±0.008	0.0010±0.0008
November, 1989							
Toyama, TOYAMA	1.47	0.603	6.33	0.52 ±0.017	0.86 ±0.028	0.078±0.011	0.012 ±0.0017
December, 1989							
Usa, OOITA	2.16	0.483	9.43	0.084±0.013	0.17 ±0.027	0.008±0.009	0.0008±0.0009
January, 1990							
Yuya-machi, YAMAGUCHI	1.40	0.480	6.06	0.16 ±0.010	0.32 ±0.021	0.006±0.008	0.0011±0.0014
February, 1990							
Hiroshima, HIROSHIMA	1.26	0.540	5.12	0.032±0.006	0.060±0.010	0.010±0.008	0.0020±0.0016

(4)-2 Strontium-90 and Cesium-137 in Vegetables(consuming districts)
(from Nov. 1989 to Dec. 1989)

-continued from NO. 93 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)							
November, 1989 Osaka, OSAKA	0.482	0.153	2.19	0.031 ± 0.004	0.21 ± 0.025	0.003 ± 0.004	0.0013 ± 0.0020
(Spinach)							
December, 1989 Yonagusuku-mura, OKINAWA	1.90	0.678	7.47	0.028 ± 0.010	0.042 ± 0.015	0.000 ± 0.008	0.000 ± 0.0010

(5) Strontium-90 and Cesium-137 in Tea(Japanese Tea)
(from May 1989 to Jun. 1990)

-continued from NO. 93 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, 1989							
Mihune-machi, KUMAMOTO	5.11	1.83	17.5	0.59 ± 0.05	0.32 ± 0.026	1.1 ± 0.08	0.062 ± 0.0045
Ue-mura, KUMAMOTO	4.94	2.04	18.0	0.46 ± 0.04	0.23 ± 0.021	0.96 ± 0.07	0.054 ± 0.0041
July, 1989							
Nara, NARA	4.61	2.54	14.9	0.67 ± 0.05	0.26 ± 0.019	0.42 ± 0.05	0.028 ± 0.0036
April, 1990							
Oodai-machi, MIE	4.48	1.94	14.8	0.82 ± 0.07	0.42 ± 0.037	0.32 ± 0.04	0.021 ± 0.0030
May, 1990							
Shuzenji-machi, SHIZUOKA	4.76	2.43	16.5	3.4 ± 0.13	1.4 ± 0.05	0.88 ± 0.07	0.053 ± 0.0043
Iwata, SHIZUOKA	4.86	2.42	17.0	0.42 ± 0.06	0.17 ± 0.024	0.22 ± 0.05	0.013 ± 0.0028
Kameyama, MIE	6.39	3.15	19.9	1.4 ± 0.11	0.46 ± 0.036	0.26 ± 0.05	0.013 ± 0.0027
Kawaminami-machi, MIYAZAKI	5.42	1.92	20.5	0.76 ± 0.08	0.40 ± 0.043	3.7 ± 0.15	0.18 ± 0.007
June, 1990							
Uji, KYOTO	4.80	2.37	17.9	0.75 ± 0.08	0.31 ± 0.032	0.13 ± 0.04	0.007 ± 0.0023
Kaya-machi, KYOTO	4.71	2.98	16.6	1.3 ± 0.09	0.42 ± 0.032	0.57 ± 0.06	0.034 ± 0.0038
Miyakonojou, MIYAZAKI	4.94	1.58	17.1	0.19 ± 0.06	0.12 ± 0.038	1.0 ± 0.08	0.061 ± 0.0046

(6) Strontium-90 and Cesium-137 in Sea Fish
(from Nov. 1989 to Mar. 1990)

-continued from NO. 93 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
(Trachurus japonicus)							
December, 1989							
Odawara, KANAGAWA	1.55	0.321	3.49	0.032±0.011	0.10 ±0.035	0.19 ±0.014	0.056 ±0.0040
March, 1990							
Shinguu, WAKAYAMA	3.57	8.28	3.48	0.017±0.009	0.0021±0.0011	0.15 ±0.013	0.043 ±0.0036
(Sardinops melanosticta)							
December, 1989							
Nagano, NAGANO	2.74	6.69	2.70	0.003±0.008	0.0005±0.001	0.10 ±0.011	0.039 ±0.0041
(Limanda herzensteini)							
November, 1989							
Niigata, NIIGATA	1.40	0.539	4.11	0.004±0.010	0.008 ±0.018	0.14 ±0.012	0.034 ±0.0029
Aji-machi, KAGAWA	1.25	0.154	3.62	0.018±0.013	0.12 ±0.084	0.13 ±0.013	0.036 ±0.0037
February, 1990							
Ootake, HIROSHIMA	3.43	7.12	4.00	0.032±0.009	0.0046±0.0013	0.11 ±0.011	0.027 ±0.0027
(Caesio chrysozonus cuvier)							
November, 1989							
Yonagusuku-mura, OKINAWA	3.17	7.93	3.85	0.035±0.010	0.0044±0.0012	0.16 ±0.013	0.040 ±0.0034
(Sebastes inermis)							
March, 1990							
Yamaguchi, YAMAGUCHI	5.11	14.2	3.58	0.029±0.009	0.0020±0.0007	0.14 ±0.012	0.039 ±0.0034

Sea Fish

Japanese name	English name	Scientific name
Aji	Horse mackerel	Trachurus japonicus
Iwashi	Sardine	Sardinops melanosticta
Karei	Flatfish	Limanda herzensteini
Takasago	Black-tipped fusilier	Caesio chrysozonus cuvier
Mebaru	Black Rockfish	Sebastes inermis

(7) Strontium-90 and Cesium-137 in Freshwater Fish
(from Nov. 1989 to Dec. 1989)

-continued from NO. 93 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
(Carassius auratus)							
November, 1989							
Toyanogata, NIIGATA	1.21	0.786	3.45	0.086 ± 0.013	0.11 ± 0.016	0.23 ± 0.017	0.068 ± 0.0049
(Hypomesus transpacificus nipponensis)							
December, 1989							
Suwa-lake, NAGANO	2.43	5.73	3.14	0.11 ± 0.012	0.020 ± 0.0022	0.13 ± 0.011	0.041 ± 0.0036

Freshwater Fish

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

(8) Strontium-90 and Cesium-137 in Shellfish
(from May 1989 to Feb. 1990)

-continued from NO. 93 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
(Ostrea gigas) February, 1990 Hatukaichi-machi, HIROSHIMA	1.95	0.758	2.59	0.005 ± 0.013	0.006 ± 0.017	0.027 ± 0.010	0.010 ± 0.0038
(Turbo cornutus) May, 1989 Ryotsu, NIIGATA	2.45	0.990	3.68	0.004 ± 0.023	0.004 ± 0.024	0.035 ± 0.013	0.0095 ± 0.0034
(Pecter Yessoensis) February, 1990 Yamada-machi, IWATE	2.22	0.325	3.42	0.000 ± 0.010	0.000 ± 0.031	0.044 ± 0.009	0.013 ± 0.0025

Shellfish

Japanese name	English name	Scientific name
Kaki	Oyster	Ostrea gigas
Sazae	Wreath shell	Turbo cornutus
Hotategai	Scallop	Pecter Yessoensis

(9) Strontium-90 and Cesium-137 in Seaweeds
(from May 1989 to Feb. 1990)

-continued from NO. 93 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
(Undaria pinnatifida)							
May, 1989							
Ryotsu, NIIGATA	3.65	1.11	6.05	0.038±0.010	0.034 ±0.0093	0.027±0.006	0.0044±0.0011
January, 1990							
Shimabara, NAGASAKI	3.04	0.702	10.1	0.023±0.009	0.033 ±0.013	0.041±0.008	0.0040±0.0008
February, 1990							
Minamichita-machi, AICHI	3.07	0.784	9.36	0.023±0.010	0.029 ±0.013	0.025±0.007	0.0026±0.0008
Hiroshima, HIROSHIMA	1.90	0.405	5.30	0.016±0.009	0.038 ±0.021	0.030±0.008	0.0057±0.0014

Seaweeds

Japanese name	English name	Scientific name
Wakame	Wakame seaweed	Undaria pinnatifida

* * * Total Diet * * *

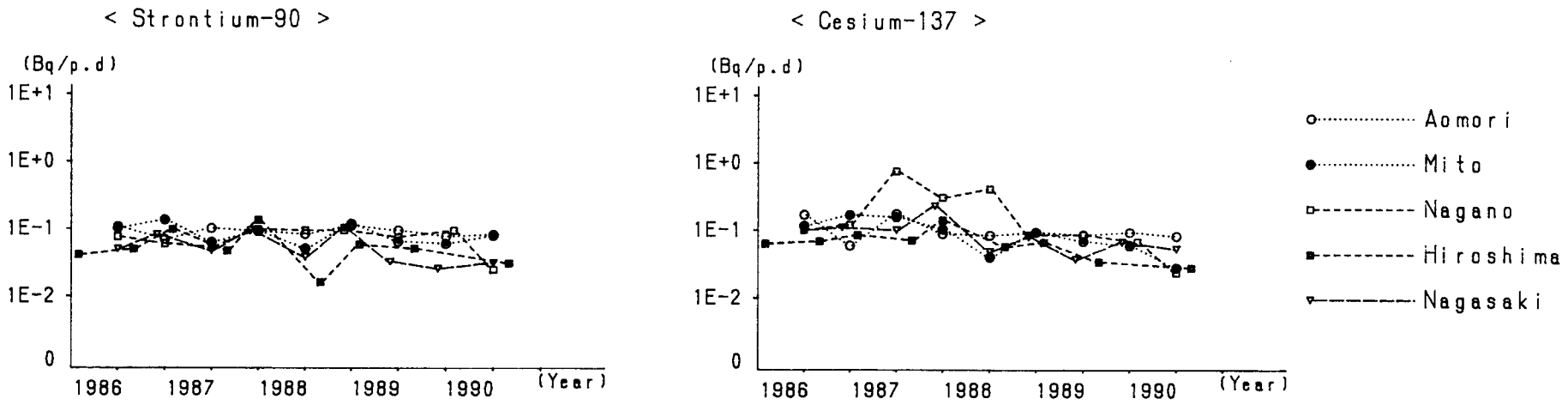

Fig. 1

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

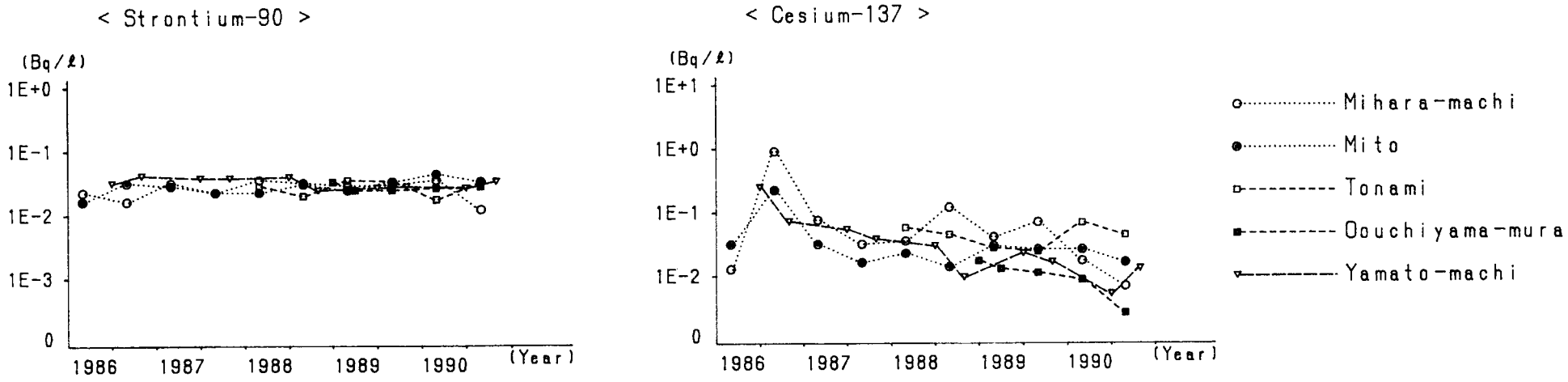

Fig. 2-1

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

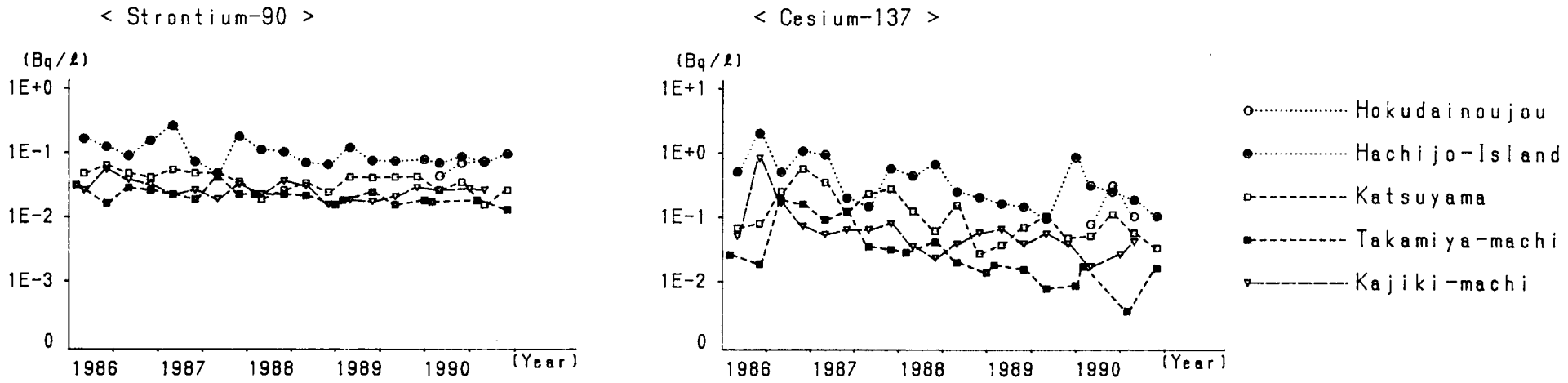

Fig.2-2

* * * Milk(consuming districts) * * *

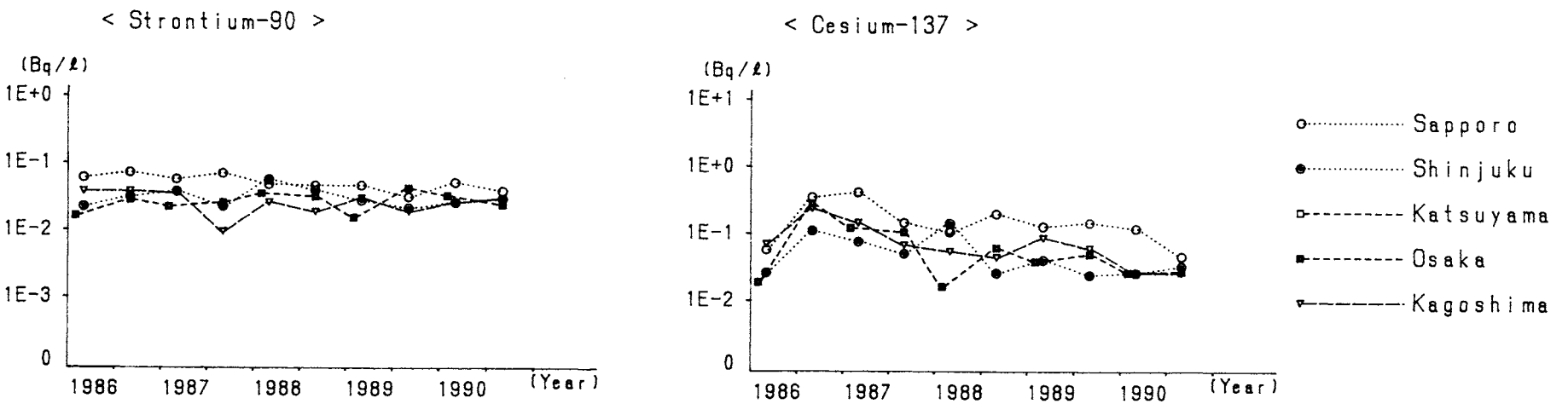

Fig.2-3

* * * Vegetables(producing districts) * * *

[Spinach]

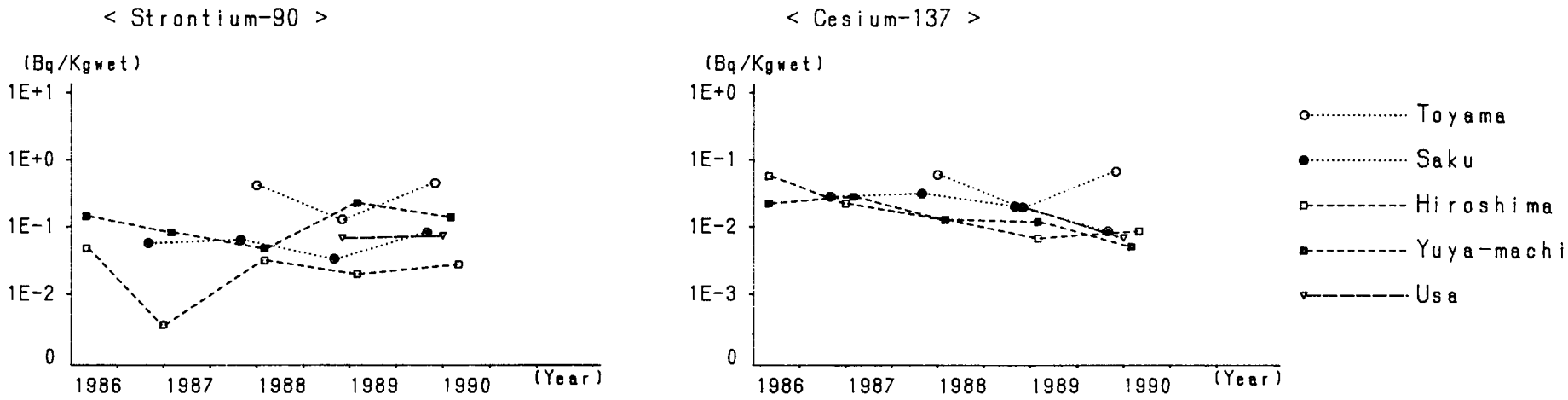

Fig.3-1

* * * Vegetables(consuming districts) * * *

[Spinach]

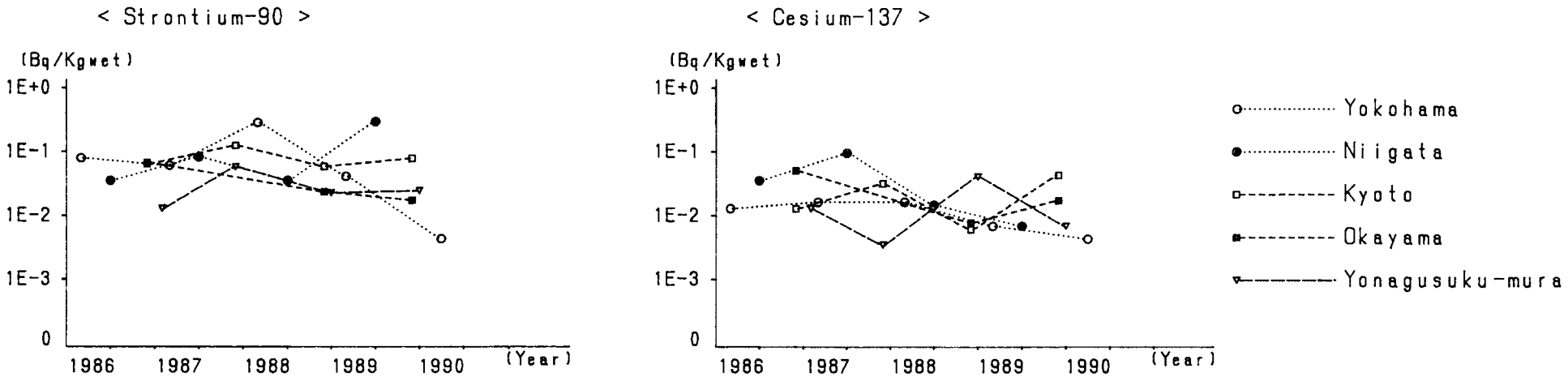

Fig.3-2

* * * Sea Fish * * *

[Limanda herzensteini]

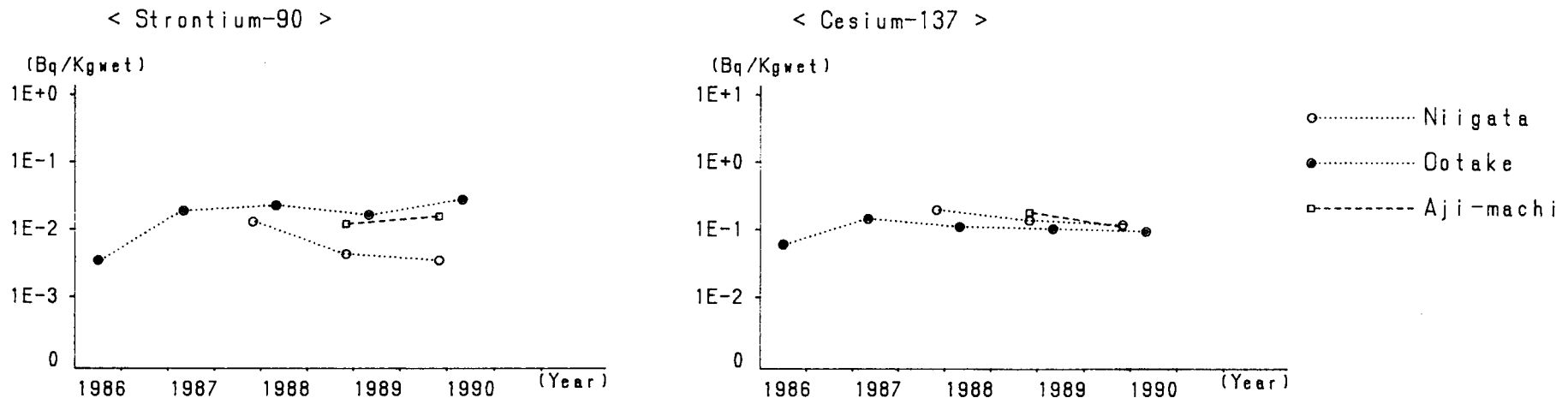

Fig. 4

* * * Shellfish * * *

[Turbo cornutus]

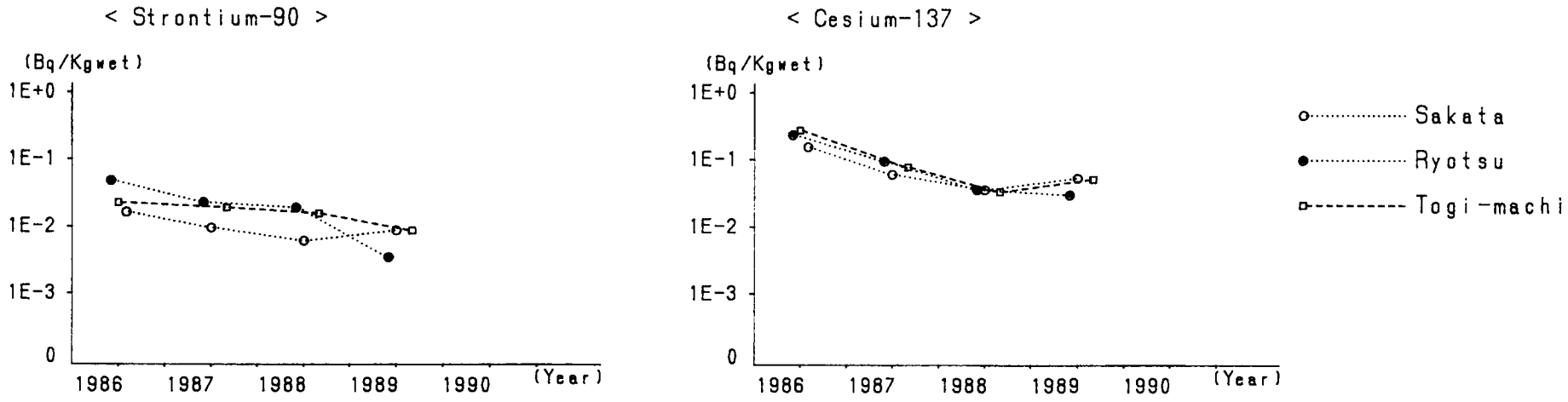

Fig.5

* * * Seaweeds * * *

[Undaria pinnatifida]

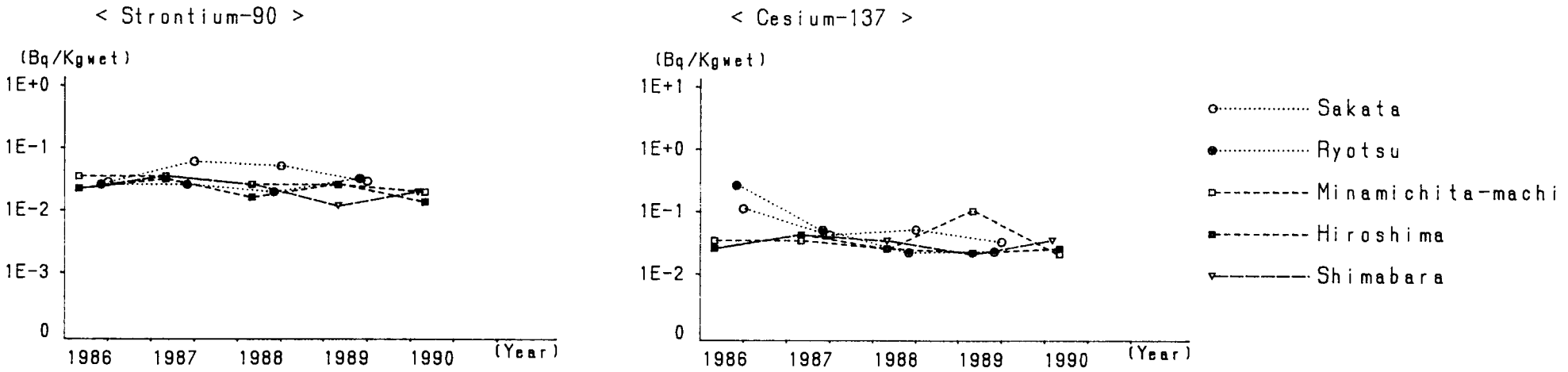

Fig.6

** Sampling Locations in Japan **

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