ISSN 0441-2516
NIRS-RSD-55

RADIOACTIVITY SURVEY DATA in Japan

NUMBER 55
Dec. 1980

National Institute of Radiological Sciences
Chiba, Japan

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CONTENTS

I. Materials and Methods

I-1 Instrumental Analysis

Gamma-ray spectrometry by use of Ge(Li) detecter was applied for all samples (ref. Science and Technology Agency, 1976). Artificial Radionuclides ^{137}Cs, ^{54}Mn, ^{60}Co etc. were identified and their concentrations were determined.

A. Samples

Cultured fish, catched fish (important species and indicater species) and marine sediment. Important species were selected in consideration of their importance as ecological indicater and natural resources. Also the indicater species were selected in consideration of their significant characteristics in accumulation of the radionuclides.

B. Treatment of Samples

Fishes were dried in a oven at 105°C, ashed in a furnace at 500°C. Ashed samples were crused and the fraction greater than 0.84 mm in size was removed by a shieve. For sediment sample, after supernatant sea water was siphoned off, gravels and shells were removed. Then the sediment was dried in a oven at 105°C, crushed, and shieved to remove the fraction greater than 2 mm in size.

C. Radioactivity Measurement

Radioactivity of the samples was measured by Ge(Li) detecter for 20 to 24 hours. Radioactive background was measured for 40 to 48 hours with interval of one week. Radionuclides were identified by analysis of observed gamma-ray spectrum. The corresponding peak area of each radionuclide was calculated and radioactive background was subtracted. Amounts of the radionuclide was estimated from this net peak area by correcting it with counting efficiency of the detecter, sample geometry, etc..

D. Apparatus

Detecter: Ge(Li) detecter (ORTEC and CANBERRA)

Pulse Hights Analyzer: 8100-multichannel Analyzer (CANBERRA)

Data Output System: X-Y Plotter, Line Printer

I-2 Precision Criteria of Measurement

A. Calculated values greater than the temporary detection level and those greater than three times of counting error were reported with two significant figures. Otherwise, the results were expressed as **. Precision criterion of each figure was counting error only. The values for ^{54}Mn, ^{60}Co etc. were listed only when their existence was clearly observed.

B. The temporary detection level is as follows:

Sample	Sediment	Biota
Unit	pCi/kg-dry	pCi/kg-raw
^{137}Cs	70	10

II. Results of Analysis

II-1 Samples collected in Dec., 1978 – Aug., 1979

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Tokaiku	1978.12.20	Sakuraebi (Seregestes lucens)	Suruga-wan (off Yaizu)	1979. 5.22	5.1 ± 0.87	a shrimp	a shrimp
Hokkaidoku	1979. 1.30	Alaska pollack (Theragra chalcogramma)	off yoich, the Japan Sea 43°26'N; 140°50'E	1979. 5.22	12 ± 0.8		
Seikaiku	1979. 1.28	Koraiebi (Penaeus orientalis)	East China Sea 35°40'-50'N; 120°20'-30'E	1979. 5.24	8.8 ± 0.52		a shrimp, muscle
Seikaiku	1979. 1.28	Koraiebi (Penaeus orientalis)	East China Sea 35°40'-50'N; 120°20'-30'E	1979. 5.24	4.5 ± 0.89		a shrimp, head, viscera
Nanseikaiku	1979. 2.10	Sardine (Sardinops melanosticta)	Tosa-wan 33°20'N; 133°45'E	1979. 5.23	3.9 ± 0.81		
Nanseikaiku	1979. 2.10	Sardine (Etrumeus micropus)	Tosa-wan 33°20'N; 133°45'E	1979. 5.23	8.6 ± 0.65		
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°15.3'N; 138°03.5'E	1979. 6.20		* *	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°15.3'N; 138°03.5'E	1979. 6.20		160 ± 30	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°23.5'N; 138°11.4'E	1979. 6.21		130 ±12	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°28.2'N; 138°22.4'E	1979. 6.21		220 ± 19	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°28.2'N; 138°22.4'E	1979. 6.21		420 ± 20	^{125}Sb, ^{144}Ce (observed)
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°33.3'N; 138°33.3'E	1979. 6.21		160 ± 20	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°42.5'N; 138°39.1'E	1979. 6.21		140 ± 17	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°42.5'N; 138°39.1'E	1979. 6.21		290 ± 19	
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°51.8'N; 138°41.8'E	1979. 6.21		140 ± 19	

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Nihonkaiku	1978.11.25	Sediment	Japan Sea 37°51.8'N; 138°41.8'E	1979. 6.22		230 ± 14	^{144}Ce (Observed)
Nihonkaiku	1978.11.25	Sediment	Japan Sea 38°59.8'N; 138°49.0'E	1979. 6.22		240 ± 17	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°05.5'N; 138°59.5'E	1979. 6.22		390 ± 19	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°12.2'N; 139°08.5'E	1979. 6.22		280 ± 26	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°21.6'N; 139°13.0'E	1979. 6.22		* *	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°21.6'N; 139°13.0'E	1979. 6.27		310 ± 21	^{144}Ce (observed)
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°32.8'N; 139°14.5'E	1979. 6.27		68 ± 21	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°32.8'N; 139°14.5'E	1979. 6.27		400 ± 30	^{144}Ce (observed)
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°41.2'N; 139°19.0'E	1979. 7. 2		97 ± 21	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°48.0'N; 139°28.4'E	1979. 6.28		140 ± 23	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°58.0'N; 139°32.5'E	1979. 6.28		63 ± 16	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°58.0'N; 139°32.5'E	1979. 7. 2		340 ± 18	^{144}Ce (observed)
Nihonkaiku	1978.11.23	Sediment	Japan Sea 39°05.2'N; 139°38.0'E	1979. 7. 2		120 ± 27	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 39°05.2'N; 139°38.0'E	1979. 7. 2		210 ± 22	
Nihonkaiku	1978.11.23	Sediment	Japan Sea 38°53.4'N; 138°53.4'E	1979. 7. 3		* *	
Nihonkaiku	1978.11.26	Sediment	Japan Sea 38°13.1'N; 138°53.4'E	1979. 7. 3		300 ± 25	
Nihonkaiku	1978.11.26	Sediment	Japan Sea 38°18.3'N; 138°49.6'E	1979. 7. 2		200 ± 19	

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Hokkaidoku	1979. 2. 9	Alaska pollack (Theragra chalcogramma)	Maehama, Iwanai, the Japan Sea 43°01'N; 140°24'E	1979. 6.18	16 1.2		
Nanseikaiku	1978.12.19	Sediment	Tosa-wan 33°19.0'N; 133°31.5'E	1979. 7.23		90 ± 25	DEPTH 100m
Nanseikaiku	1978.12.19	Sediment	Tosa-wan 33°11.2'N; 133°36.0'E	1979. 7.23		* *	DEPTH 200m
Nanseikaiku	1978.12.19	Sediment	Tosa-wan 33°08.6'N; 133°37.0'E	1979. 7.23		* *	DEPTH 400m
Nihonkaiku	1979. 5.17	Sardine (Sardinops melanosticta)	Around Hajikisaki, Sado, the Japan Sea	1979. 6.19	7.5 ± 1.0		
Seikaiku	1979. 6.17	Kiguchi (Pseudosciaena manchurica)	Yellow Sea 32°33'N; 122°55'E	1979. 9. 6	9.7 ± 0.73		a fish muscle
Seikaiku	1979. 6.17	Kiguchi (Pseudosciaena manchurica)	East China Sea 32°30'-40'N; 122°50' -123°00'E	1979. 9. 7	8.3 ± 0.68		a fish viscera
Seikaiku	1979. 6.17	Kiguchi (Pseudosciaena manchurica)	East China Sea 32°30'-40'N; 122°50' -123°00'E	1979. 9. 6	6.5 ± 1.0		a fish bone, head, skin
Seikaiku	1979. 6.18	Mackerel (Pneumatoporus japonicus tapeinocephalus)	East China Sea 25°45'N; 122°15'E	1979. 9. 7	7.9 ± 0.51		muscle
Seikaiku	1979. 6.18	Mackerel (Pneumatoporus japonicus tapeinocephalus)	East China Sea 25°45'N; 122°15'E	1979. 9. 7	12 ± 3.1		viscera
Seikaiku	1979. 6.18	Mackerel (Pneumatoporus japonicus tapeinocephalus)	East China Sea 25°45'N; 122°15'E	1979. 9. 6	5.2 ± 1.7		bone, skin, head
Nihonkaiku	1979. 7.17	Squid (Ommastrephes sloanei pacificus)	Yamato-tai the Japan Sea	1979. 9. 7	2.1 ± 0.30		muscle
Nihonkaiku	1979. 7.17	Squid (Ommastrephes sloanei pacificus)	Yamato-tai the Japan Sea	1979. 9. 7	1.6 ± 0.25		viscera ^{7}Be, ^{60}Co, ^{110}Ag, ^{108}Ag, ^{144}Ce (observed)
Hokkaidoku	1979. 7.12	Sediment	Japan Sea 43°36.5'N; 140°57.0'E	1979. 8.24		87 ± 20	DEPTH 100m
Hokkaidoku	197. 7.12	Sediment	Japan Sea 43°20.0'N; 141°10.0'E	1979. 8.24		90 ± 15	DEPTH 100m

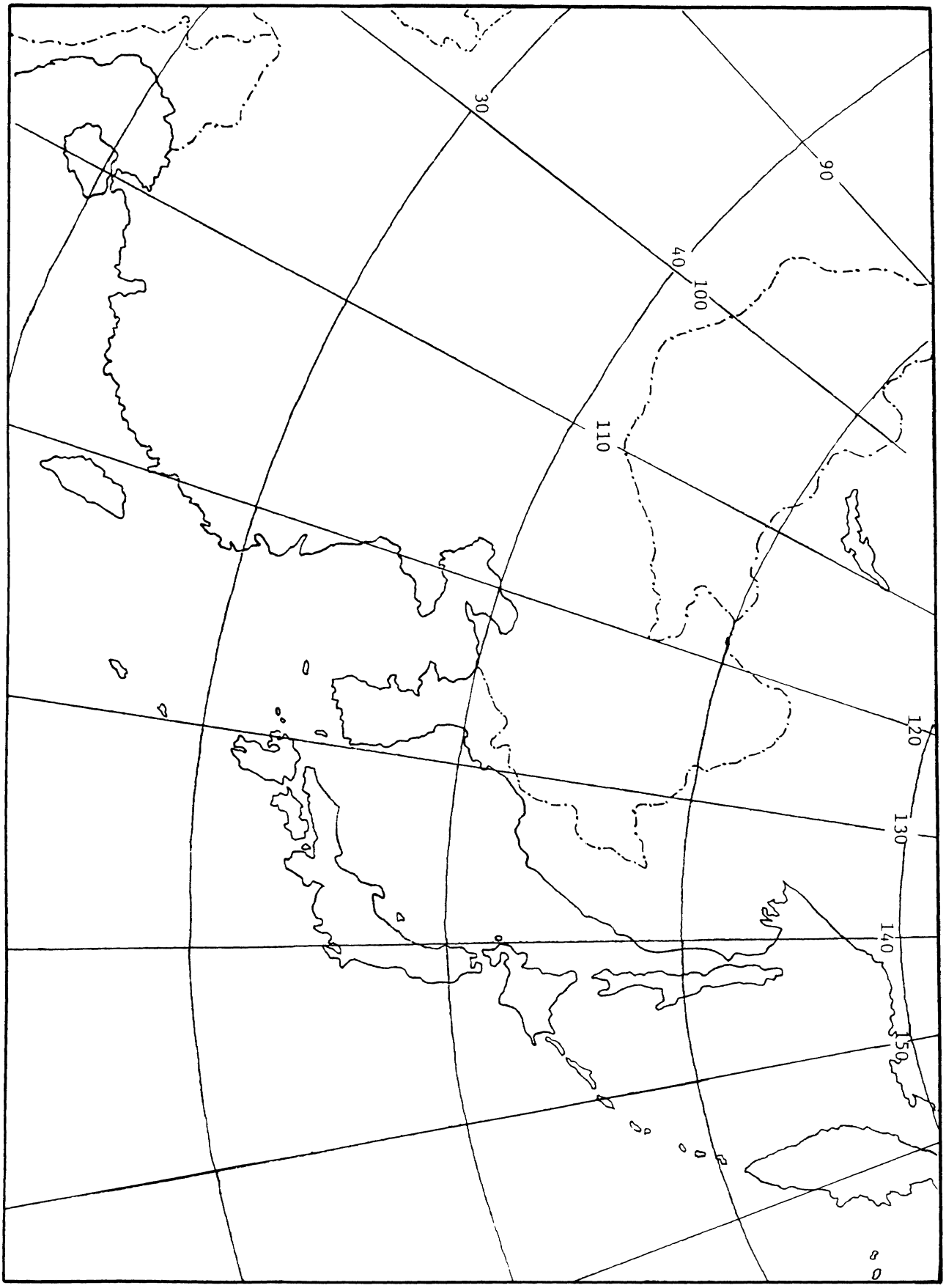
II-2 Samples collected in Oct., 1979 – Feb., 1980

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Seikaiku	1979. 7.19	Sediment	East China Sea 31°30.0'N; 128°01.0'E	1979.10.17		32 ± 10	
Seikaiku	1979. 7.19	Sediment	East China Sea 31°31.2'N; 127°00.0'E	1979.10.17		82 ± 20	
Seikaiku	1979. 7.10	Sediment	East China Sea 31°29.3'N; 126°00.7'E	1979.10.18		150 ± 21	
Seikaiku	1979. 7.10	Sediment	East China Sea 31°29.9'N; 125°01.4'E	1979.10.16		83 ± 15	
Seikaiku	1979. 7.10	Sediment	East China Sea 31°30.0'N; 123°59.3'E	1979.10.16		* *	
Hokkaidoku	1979. 8.21	Sediment	Okhotsk Sea 45°16'N; 143°20'E	1979.10. 2		160 ± 27	DEPTH 143m
Hokkaidoku	1979. 8.26	Sediment	Okhotsk Sea 45°20'N; 142°50'E	1979.10. 2		150 ± 20	DEPTH 120m
Nihonkaiku	1979. 9.14	Yellowtail (Seriola quinqueradiata)	Tayu-hama, Niigata-shi the Japan Sea	1979.10.29	8.2 ± 1.6		
Tokaiku	1979. 7. 5	Hiragashiradara	Mariana Trench 18°09.4'N; 148°27.6'E	1980. 1.29	* *		a deep sea fish ^{60}Co, 2.8 ± 0.34
Tokaiku	1979. 7. 5	Makuhitode	Shikoku Basin 30°50.3'N; 139°55.3'E	1980. 1.29	* *		a deep sea starfish
Nihonkaiku	1979.10.27	Ooechubai	Yahiko-tai the Japan Sea 39°10'N; 138°38'E	1979.11.27	* *		a deep sea shellfish muscle DEPTH 670m
Nihonkaiku	1979.10.27	Ooechubai	Yahiko-tai the Japan Sea 39°10'N; 138°38'E	1979.11.27	* *		a deep sea shellfish viscera DEPTH 670m ^{108}Ag (observed)
Nihonkaiku	1979. 7.31	Sediment	Japan Sea 37°24.5'N; 138°14.0'E	1980. 2.28		200 ± 22	DEPTH 300m <0.037mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°47.0'N 137°35.2'E	1980. 2.28		* *	DEPTH 410m 0.105~ 0.063mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°47.0'N; 137°35.2'E	1980. 2.28		120 ± 23	DEPTH 410 <0.037mm

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°56.5'N; 137°18.0'E	1980. 2.28		* *	DEPTH 265m 0.105~ 0.063mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°56.5'N; 137°18.0'E	1980. 2.27		110 ± 22	DEPTH 265m <0.037mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 38°02.0'N; 136°58.1'E	1980. 2.27		* *	DEPTH 325m 0.105~ 0.063mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 38°02.0'N; 136°58.1'E	1980. 2.27		110 ± 16	DEPTH 325m <0.037mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°52.5'N; 136°44.2'E	1980. 2.27		* *	DEPTH 250m 0.5~0.105mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°57.5'N; 136°44.2'E	1980. 2.27		* *	DEPTH 250m 0.105~ 0.063mm
Nihonkaiku	1979. 8. 1	Sediment	Japan Sea 37°57.5'N; 136°44.2'E	1980. 2.27		170 ± 18	DEPTH 250m <0.037mm ^{144}Ce, 230 ± 78
Nihonkaiku	1979. 8. 2	Sediment	Japan Sea 37°32.0'N; 137°06.2'E	1980. 2.26		* *	DEPTH 80m 0.5~0.105mm
Nihonkaiku	1980. 8. 2	Sediment	Japan Sea 37°32.0'N; 137°35.5'E	1980. 2.26		260 ± 21	DEPTH 80m <0.037mm ^{144}Ce, 290 ± 76
Nihonkaiku	1980. 8. 3	Sediment	Japan Sea 37°23.2'N; 137°35.5'E	1980. 2.26		* *	DEPTH 275m 0.5~0.105mm
Nihonkaiku	1979. 8. 3	Sediment	Japan Sea 37°23.2'N; 137°35.5'E	1980. 2.26		* *	DEPTH 275m 0.105~ 0.063mm
Nihonkaiku	1979. 8. 3	Sediment	Japan Sea 37°23.2'N; 137°35.5'E	1980. 2.26		170 ± 24	DEPTH 275m <0.037mm
Nihonkaiku	1979. 7.26	Sediment	Japan Sea 37°44.3'N; 138°30.0'E	1980. 2.26		260 ± 27	DEPTH 500m <0.037mm
Nihonkaiku	1979. 7.26	Sediment	Japan Sea 37°55.3'N; 138°38.8'E	1980. 2.25		160 ± 20	DEPTH 320m <0.037mm
Nihonkaiku	1979. 7. 7	Sediment	Japan Sea 38°07.2'N; 138°50.2'E	1980. 2.25		* *	DEPTH 108m 1.0~0.5mm
Nihonkaiku	1979. 7. 7	Sediment	Japan Sea 38°07.2'N; 138°50.2'E	1980. 2.25		* *	DEPTH 108m 0.5~0.105mm
Nihonkaiku	1979. 7. 7	Sediment	Japan Sea 38°07.2'N; 138°50.2'E	1980. 2.25		68 ± 19	DEPTH 108m 0.105~ 0.063mm

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Nihonkaiku	1979. 7. 7	Sediment	Japan Sea 38°07.2'N; 138°50.2'E	1980. 2.22		310 ± 19	DEPTH 108m <0.037mm
Nihonkaiku	1979. 7.23	Sediment	Japan Sea 38°42.5'N; 139°17.6'E	1980. 2.22		150 ± 18	DEPTH 310m <0.037mm
Nihonkaiku	1979. 7.24	Sediment	Japan Sea 39°04.5'N; 139°17.6'E	1980. 2.22		140 ± 17	DEPTH 350m <0.037mm
Nihonkaiku	1979. 7.24	Sediment	Japan Sea 39°34.2'N; 139°41.6'E	1980. 2.22		370 ± 29	DEPTH 345m <0.037mm
Nihonkaiku	1979. 7.24	Sediment	Japan Sea 39°23.0'N; 139°30.5'E	1980. 2.22		88 ± 20	DEPTH 270m 0.5~0.105mm
Nihonkaiku	1979. 7.24	Sediment	Japan Sea 39°23.0'N; 139°30.5'E	1980. 2.20		* *	DEPTH 270m 0.105~ 0.063mm
Nihonkaiku	1979. 7.24	Sediment	Japan Sea 39°23.0'N; 139°30.5'E	1980. 2.20		200 ± 23	DEPTH 270m <0.037mm
Nihonkaiku	1979. 7.25	Sediment	Japan Sea 38°38.3'N; 139°08.0'E	1980. 2.22		110 ± 27	DEPTH 370m <0.037mm
Nihonkaiku	1979. 7.25	Sediment	Japan Sea 38°32.5'N; 138°55.5'E	1980. 2.21		220 ± 28	DEPTH 750m <0.037mm
Nihonkaiku	1979. 7.25	Sediment	Japan Sea 38°25.0'N; 138°45.2'E	1980. 2.21		210 ± 26	DEPTH 650m <0.037mm
Nihonkaiku	1979. 7.25	Sediment	Japan Sea 38°15'N; 138°38'E	1980. 2.20		260 ± 24	DEPTH 660m <0.037mm
Nihonkaiku	1979. 7.26	Sediment	Japan Sea 38°26'N; 138°21.2'E	1980. 2.20		140 ± 23	DEPTH 620m <0.037mm
Nihonkaiku	1979. 7.26	Sediment	Japan Sea 38°30'N; 138°13'E	1980. 2.21		* *	DEPTH 600m <0.037mm
Tohokuku	1979. 9.16 ~ 1979. 9.19	Bonito (Katsuwonus pelamis)	Sanriku-oki 36°55' -38°19'N; 145°33' -146°57'E	1980. 2.21	11 ± 0.9		
Tohokuku	1979. 9.16 ~ 1979. 9.19	Bonito (Katsuwonus pelamis)	Sanriku-oki 36°55' -38°19'N; 145°33' -146°57'E	1980. 2.21	13 ± 0.5		muscle

Participating Regional Fisheries Research Institute	Date of Collection	Sample	Location	Date of Measurement	^{137}Cs in Biota (pCi/kg)	^{137}Cs in Sediment (pCi/kg)	Remarks
Tohokuku	1979. 9.16 ~ 1979. 9.19	Bonito (Katsuwonus pelamis)	Sanriku-oki 36°55' -38°19'N; 145°33' -146°57'E	1980. 2.20	12 ± 0.6		viscera
Hokkaidoku	1979.11. 5	Atka mackerel (Pleurogrammus azonus)	Kamui-saki the Japan Sea 43°20'N; 140°22'E	1980. 2. 4	22 ± 1.7		
Hokkaidoku	1979.11. 5	Atka mackerel (Pleurogrammus azonus)	Kamui-saki the Japan Sea 43°20'N; 140°22'E	1980. 1.31	4.0 ± 0.30		viscera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