NIRS-RSD-42

RADIOACTIVITY SURVEY DATA in Japan

NUMBER 42
Apr. 1977

National Institute of Radiological Sciences
Chiba, Japan

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Contents

Science and Technology Agency

National Institute of Radiological Sciences

1. The 18th Nuclear Explosion Test of the Peoples' Republic of China

(1) On 24 January, 1976, the New China News announced formally that the Peoples' Republic of China has proved a great success in the nuclear explosion test on 23 January. However, there was no announcement on the place and the scale of the test, and other related data.

According to the investigation of the Energy Research and Development Administration (ERDA), U.S.A., on 23 January, it was confirmed that the 18th Chinese nuclear detonation test was conducted in the atmosphere at 1:00 AM (EST) on 23 January at the Lop Nor test site, and its scale was less than 20 kilotons.

(2) The radioactivity surveillance was carried out for the period from 26 January to 4 February. From the results of the surveillance, the effects of this nuclear explosion test were detected in the measurements of rain and dry fallout, airborne dust, and fresh milk samples. However, these radioactivity levels were less than the tentative values established by the Headquarters for Countermeasures against Radiosensitivity.

2. The Results of Investigation in Connection with the 18th Chinese Nuclear Test.

(1) Gross Beta-Radioactivity in Upper Air

(Japan Defence Agency)

Concerning this test, the Research and Development H.Q., Japan Defence Agency, has collected the dust samples in upper atmosphere (at the high altitudes of 8,000 ~ 10,000 meters) of the middle and northern regions of Japan during the period from January 26 to January 30, 1976, and has measured the gross beta-radioactivity of these samples.

Results obtained are shown in Table 1. And, as shown in Table 1, gross beta-radioactivity in samples collected is the same as normal level.

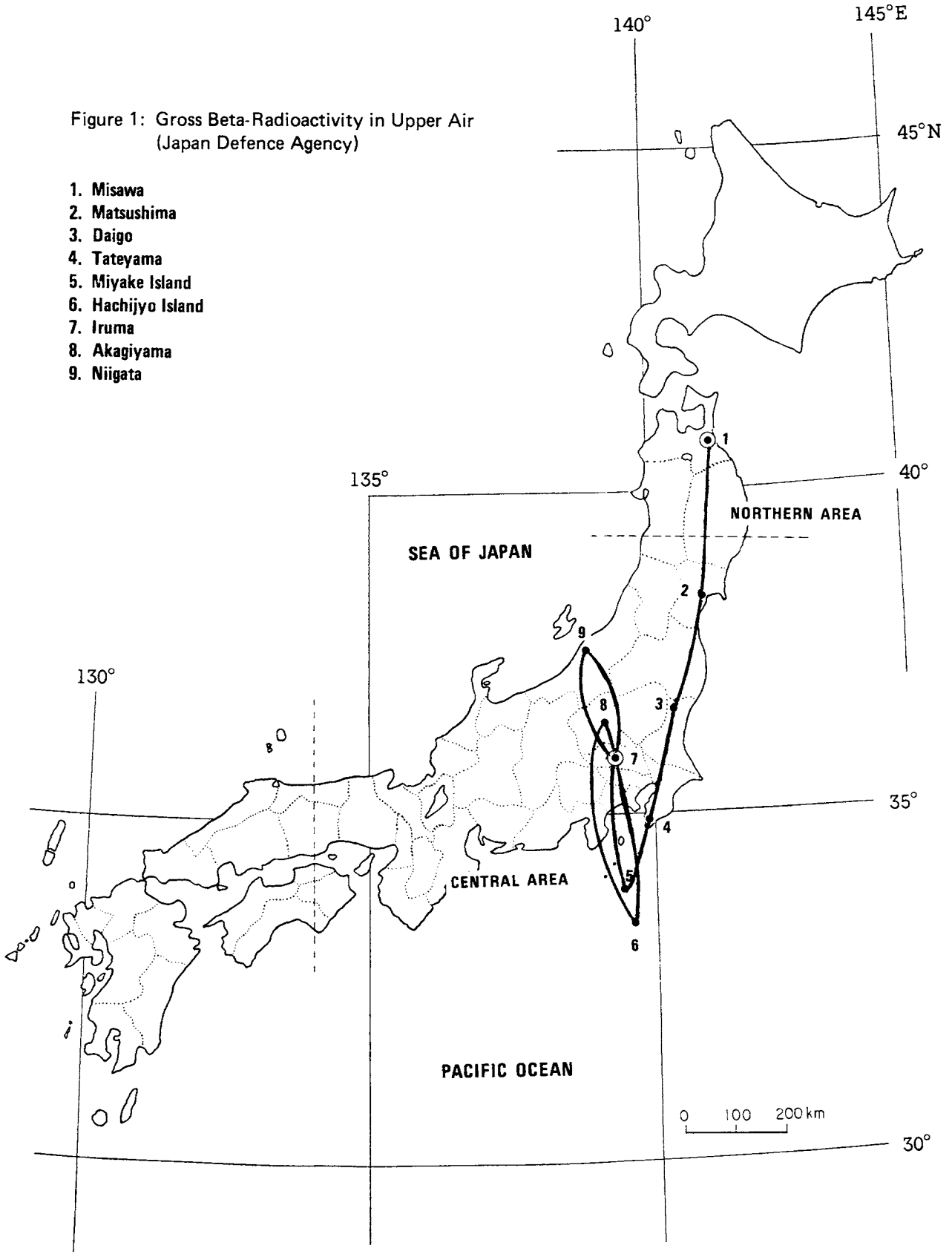
Figure 1 shows two sampling areas and the flight course.

Table 1. Gross Beta-Radioactivity in Upper Air
(Japan Defence Agency)

Area	Take – Off Date	Take – Off Time	Flight Course	Altitude (m)	Activity (pCi/m³)
Central Area (Iruma)	Jan. 26th	09:36 – 10:36	Iruma – Niigata – Iruma	11,000	0.25
	" 28th	09:56 – 11:10	Iruma – Akagiyama – Hachijyo Island – Iruma	8,000	0.04
	" 29th	10:01 – 11:22	Iruma – Akagiyama – Hachijyo Island – Iruma	8,000	0.03
	" 30th	09:55 – 11:10	Iruma – Akagiyama – Hachijyo Island – Iruma	8,000	0.14
Northern Area (Misawa)	Jan. 27th	10:16 – 11:37	Misawa – Matsushima – Daigo – Tateyama – Miyake Island – Iruma	8,000	0.26

Figure 1: Gross Beta-Radioactivity in Upper Air
(Japan Defence Agency)

1. Misawa
2. Matsushima
3. Daigo
4. Tateyama
5. Miyake Island
6. Hachijyo Island
7. Iruma
8. Akagiyama
9. Niigata



(2) Monitoring Posts

(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

Radioactivity in air was measured in two monitoring posts of the Japan Meteorological Agency (Asahikawa and Wajima), and 18 prefectural monitoring ones. However, activity measured showed the same value as normal.

Results obtained and the locations of monitoring posts are shown in Table 2 and Figure 2, respectively.

Table 2. Countring Rate Obtained with the Monitoring Posts
(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

(CPS)

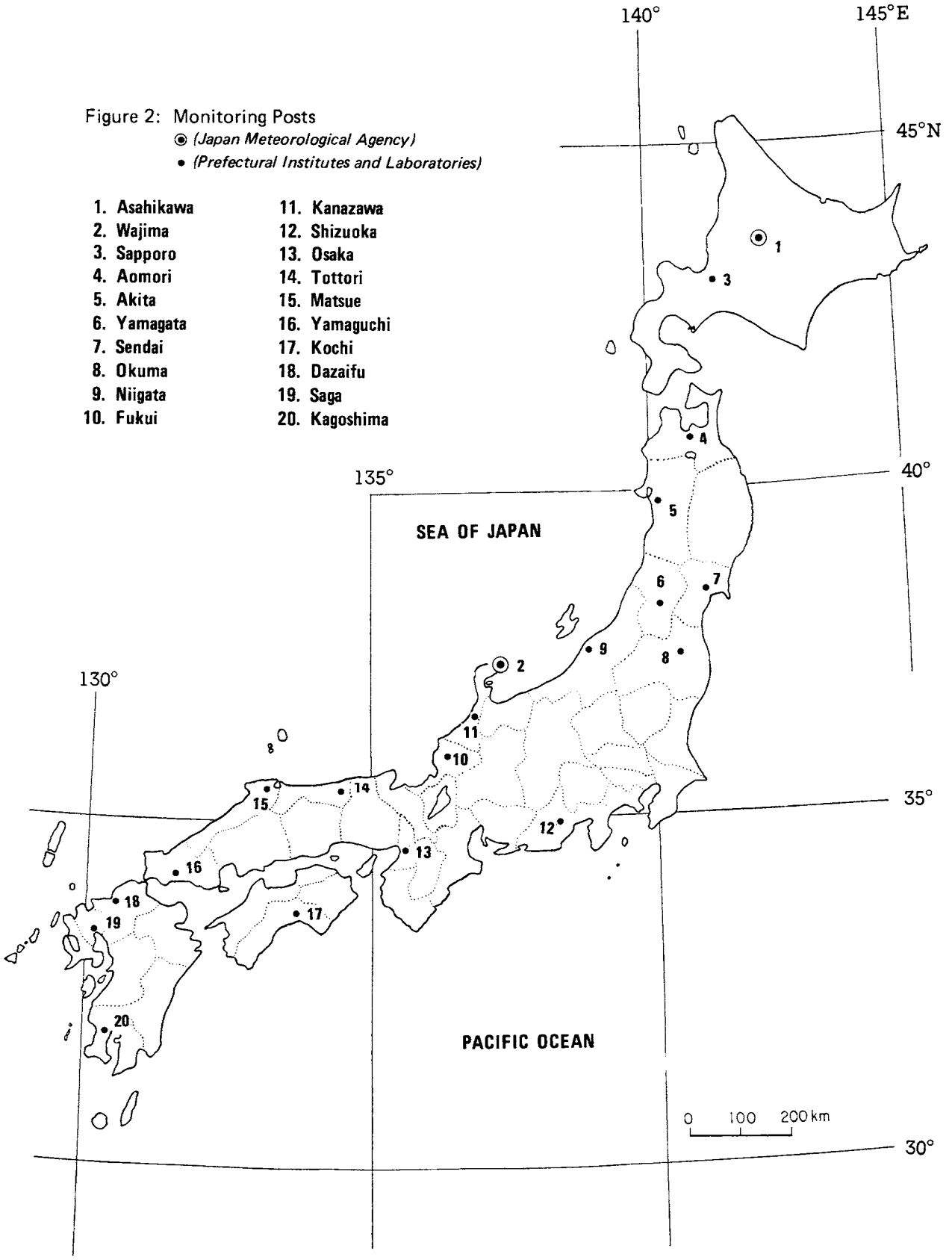
Station	Jan. 25 ~ Feb. 4		Normal State	
	Highest Value	Lowest Value	Highest Value	Lowest Value
Asahikawa	14	8	27	8.0
Wajima	26	10	25	12
Sapporo, HOKKAIDO	12.8	7.2	29.0	7
Aomori, AOMORI	13.6	55	28.2	5
Akita, AKITA	14.5	10.7	29.0	9
Yamagata, YAMAGATA	16.0	10.1	–	–
Sendai, MIYAGI	13.8	9.7	24.8	8.2
Okuma, FUKUSHIMA	15	11.5	20.8	11.3
Niigata, NIIGATA	25	18.0	37.3	18.8
Fukui, FUKUI	20.5	12.5	24.5	11.0
Kanazawa, ISHIKAWA	20.8	15.2	28.9	11.0
Shizuoka, SHIZUOKA	17.9	14.4	28.5	15.0
Osaka, OSAKA	14.2	13.2	17.5	11.4
Tottori, TOTTORI	24.5	14	35.8	13.0
Matsue, SHIMANE	16.9	14.2	39.7	13.0
Yamaguchi, YAMAGUCHI	26	21	43.5	17.0
Kochi, KOCHI	12.6	8.3	14.4	8.1
Dazaifu, FUKUOKA	19	16	28.0	13.5
Saga, SAGA	15.1	13.2	24.2	10.4
Kagoshima, KAGOSHIMA	15.7	13.5	21.5	13.0

Figure 2: Monitoring Posts

◉ *(Japan Meteorological Agency)*

• *(Prefectural Institutes and Laboratories)*

1. Asahikawa
2. Wajima
3. Sapporo
4. Aomori
5. Akita
6. Yamagata
7. Sendai
8. Okuma
9. Niigata
10. Fukui
11. Kanazawa
12. Shizuoka
13. Osaka
14. Tottori
15. Matsue
16. Yamaguchi
17. Kochi
18. Dazaifu
19. Saga
20. Kagoshima



(3) Gross Beta-Radioactivity in Rain and Dry Fallout

(Japan Meteorologica Agency)
(Prefectural Institutes and Laboratories)

Gross beta-radioactivity in rain and dry fallout samples was measured by the Japan Meteorological Agency (13 locations) and 30 prefectural public health laboratories. A relatively high radioactivity 56 pCi/mℓ was detected in the samples collected from Hachijyo-Island on 26 January, and the higher values were continuously observed in many sampling locations from January 29 to February 4.

The results obtained by Japan Meteorological Agency and 30 prefectural public health laboratories are shown in Tables 3 and 4, respectively.

And Figures 3 and 4 show the sampling locations in Japan.

Table 3. Gross Beta-Radioactivity in Rain and Dry Fallout
(Japan Meteorological Agency)

Upper row : Concentration (pCi/cm^3)
(Lower row): Deposition (mCi/km^2)

Station \ Date	Jan. 1976 25	26	27	28	29	30	31	Feb. 1	2	3
Wakkanai					0.5 (4.0)	0.3 (0.9)	0.1 (0.2)	0.1 (0.5)	0.0 (0.0)	0.1 (0.3)
Sapporo	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)					0.0 (0.0)	0.2 (0.9)	0.1 (0.4)
Kushiro	0.0 (0.0)							0.0 (0.0)	0.0 (0.0)	
Sendai										0.0 (0.0)
Akita	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)		2.3 (8.1)			1.0 (3.5)	0.3 (1.0)	
Wajima	0.0 (0.0)		0.0 (0.0)	0.1 (0.2)	1.9 (28.0)		0.5 (0.8)	0.3 (2.0)	1.0 (1.0)	
Yonago		1.0 (2.0)		0.2 (0.2)	0.4 (0.6)	1.2 (1.2)				
Hachijyo Island		56.0 (140.0)			13.0 (91.0)		3.4 (14.0)	1.7 (11.0)		

Notes: 1) Daily rain and dry fallout samples were continuously collected during the period from 9:00 A.M. to the next 9:00 A.M.

2) In the ordinary condition, concentration and deposition of radioactive nuclides in rain and dry fallout samples were the values less than 1 pCi/cm^3 and 2 ~ 3 mCi/km^2, respectively.

Table 4. Gross Beta-Radioactivity in Rain and Dry Fallout

(Prefectural Institutes and Laboratories)

Upper row : Concentration (pCi/cm³)
(Lower row): Deposition (mCi/km²)

Station \ Date	Jan. 24–25	26	27	28	29	30	31	Feb. 1	2	3	4
Sapporo, HOKKAIDO	0.09 (–)	0.08 (–)						1.13 (0.67)	0.97 (1.65)	0.21 (0.49)	
Aomori, AOMORI	0.07 (0.21)	0.08 (0.31)			21.3 (57.0)	0.27 (2.51)			0.65 (2.21)		
Akita, AKITA		0.03 (–)			1.07 (3.76)			0.64 (2.25)	0.26 (1.04)		
Yamagata, YAMAGATA									0.94 (1.47)		
Sendai, MIYAGI								0.15 (0.11)	0.11 (0.05)	0.31 (0.31)	
Okuma, FUKUSHIMA								0.03 (0.12)			
Niigata, NIIGATA	0.03 (0.03)				7.94 (49.2)	1.10 (1.75)	0.18 (0.98)				
Kanazawa, ISHIKAWA	0.16 (1.2)	0.01 (0.05)	0.05 (0.09)		3.96 (13.9)	0.86 (0.90)					
Fukui, FUKUI	0.02 (0.32)	0.04 (0.15)	0.04 (0.08)		9.18 (10.5)	3.28 (4.6)					
Kyoto, KYOTO										0.54 (2.73)	
Tottori, TOTTORI	0.10 (–)	0.99 (4.04)			3.4 (36.9)	3.14 (6.03)					
Hiroshima, HIROSHIMA										1.59 (1.1)	
Kochi, KOCHI										0.55 (2.08)	
Dazaifu, FUKUOKA										1.43 (4.38)	0.05 (–)
Naha, OKINAWA					1.91 (3.93)						

Note: In the ordinary condition, concentration and deposition of radioactivity nuclides in rain and dry fallout samples were the values less than 1 pCi/cm³ and 2 ~ 3 mCi/km², respectively.

Figure 3: Gross Beta-Radioactivity in Rain and Dry Fallout
(Japan Meteorological Agency)

1. **Wakkanai**
2. **Sapporo**
3. **Kushiro**
4. **Sendai**
5. **Akita**
6. **Wajima**
7. **Yonago**
8. **Hachijyo Island**

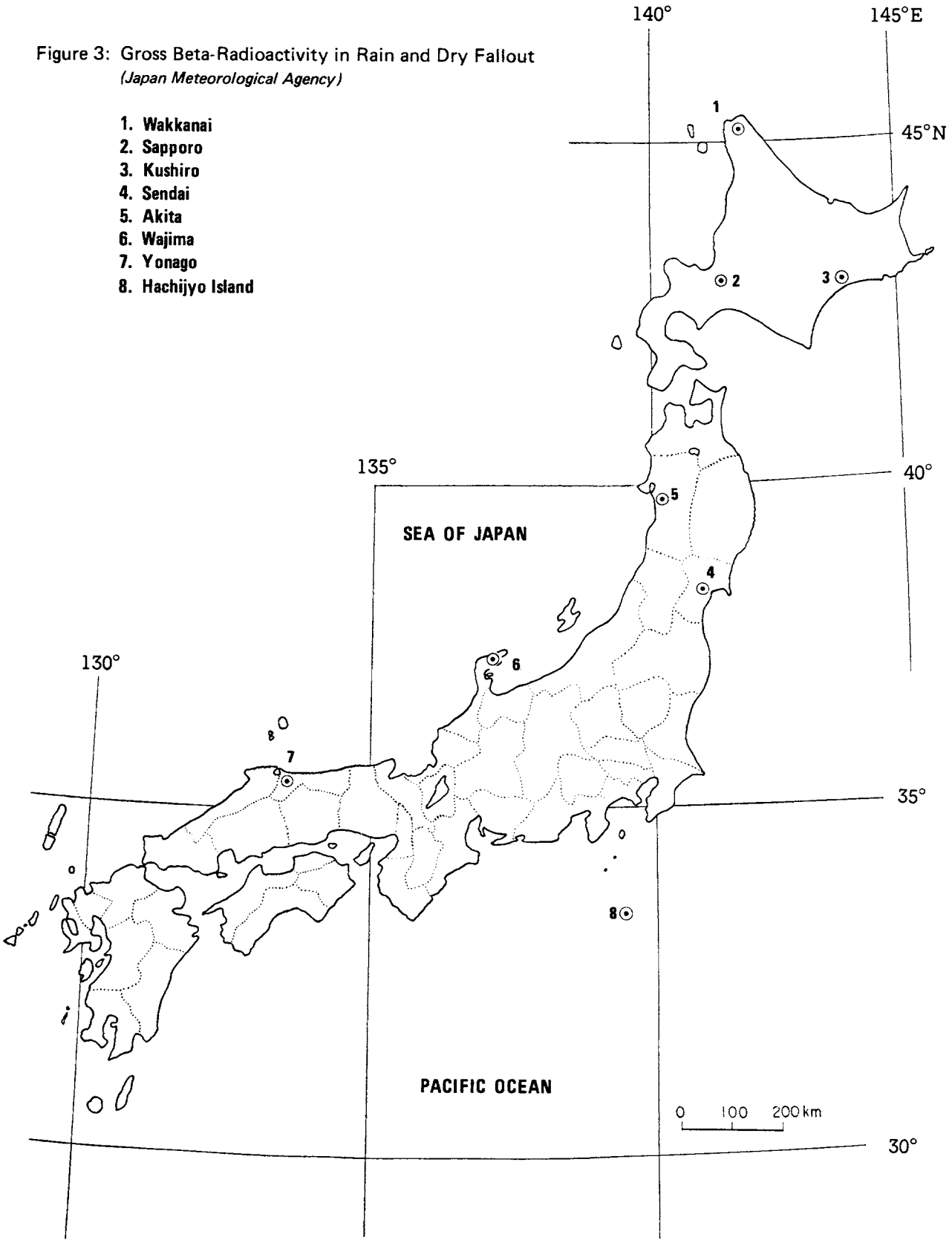
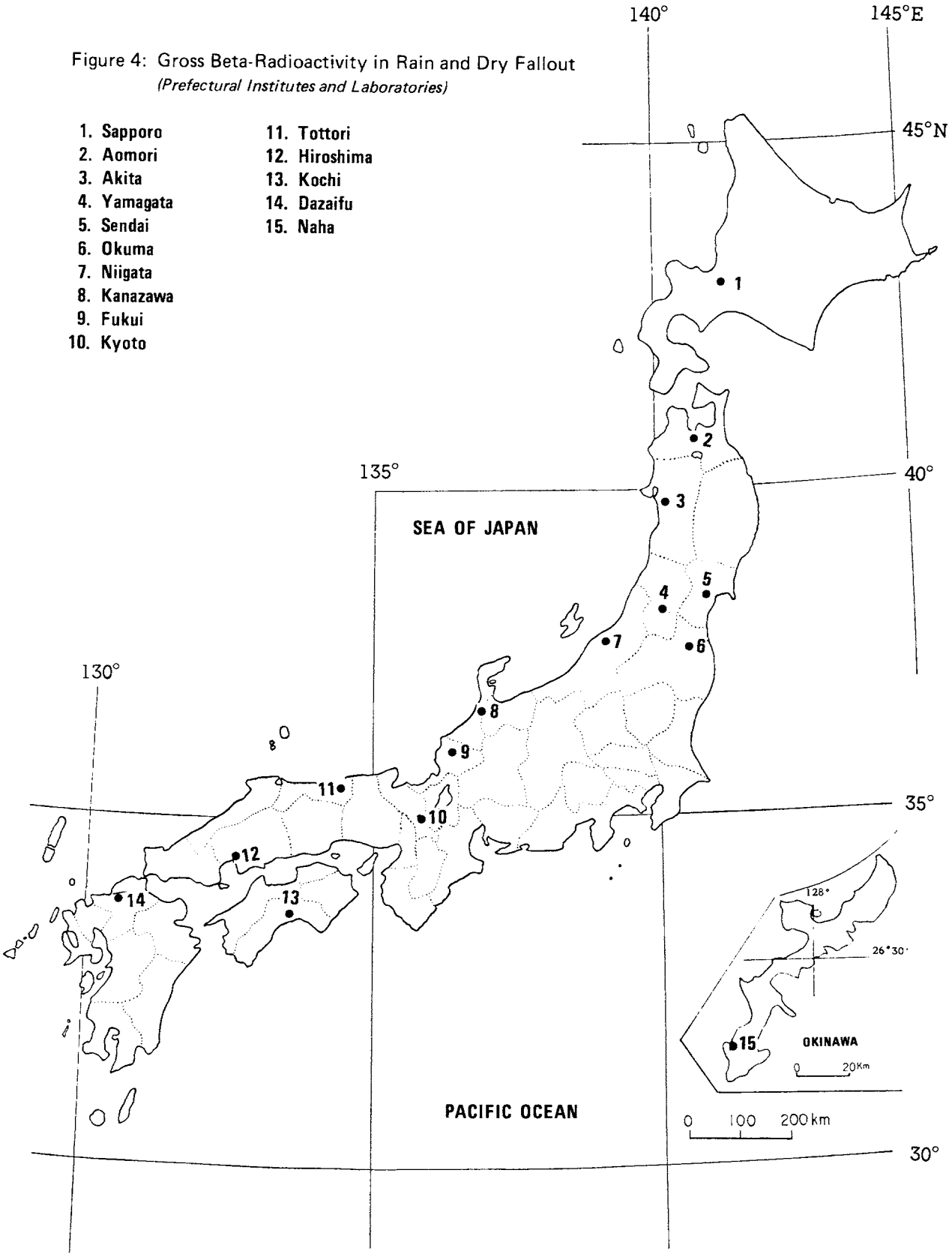


Figure 4: Gross Beta-Radioactivity in Rain and Dry Fallout
(Prefectural Institutes and Laboratories)

1. Sapporo
2. Aomori
3. Akita
4. Yamagata
5. Sendai
6. Okuma
7. Niigata
8. Kanazawa
9. Fukui
10. Kyoto
11. Tottori
12. Hiroshima
13. Kochi
14. Dazaifu
15. Naha



(4) Gross Beta-Radioactivity in Airborne Dust

(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

Gross beta-radioactivity in dust samples was measured by the Japan Meteorological Agency (5 locations) and 7 prefectural public health laboratories. On 29 January, a relatively high radioactivity 6.0 pCi/m^3 was detected in Fukuoka, and the higher levels were also observed in various locations of Japan. However, it reverted to the normal levels on 6th February.

Results obtained by the Japan Meteorological Agency and 7 prefectural public health laboratories are shown in Tables 5 and 6, respectively.

Figures 5 and 6 show the sampling locations in Japan.

Table 5. Gross Beta-Radioactivity in Airborne Dust
(Japan Meteorological Agency)

(pCi/m^3)

Station \ Date	Jan. 26	27	28	29	30	31	Feb. 1	2	3	4	5	6
Sapporo	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.1		
Sendai	0.1	0.1	0.1	0.2	1.4	0.2	0.3	0.4	1.2	0.6		
Tokyo	0.2	0.3	0.3	0.8	1.4	0.5	0.9	0.4	0.9	1.3		
Osaka	0.5	1.2	0.1	1.2	4.7	0.5	1.3	2.3	2.6	2.7	1.7	0.7
Fukuoka	0.7	0.0	0.8	6.0	0.1	0.5	0.4	2.7	4.0	3.7	1.6	0.3

Notes: 1) The figures were obtained 20 hours after the completion of collecting operation, which is from 09:00 to 14:00 (about 5 hours) every day.
2) The normal value is under 1.0 pCi/m^3.

Table 6. Gross Beta-Radioactivity in Airborne Dust
(Prefectural Institues and Laboratories)

(pCi/m^3)

Station \ Date	Jan. 26	27	28	29	30	31	Feb. 1	2	3	4	5	6
Okuma, FUKUSHIMA		0.14	1.67		0.52	1.59	0.95	1.7	1.30	1.6		
Niigata, NIIGATA	0.01		0.20		3.9	0.47	0.40	0.37	1.0	0.59		
Fukui, FUKUI	1.62	1.92	0.86	1.75	2.80	2.85	3.31	1.44	1.47	2.64		
Shizuoka, SHIZUOKA					1.82	0.42	0.13	0.35	0.62			
Osaka, OSAKA			1.55	4.38	16.0	1.3	4.49	4.92	8.55	7.7		
Dazifu, FUKUOKA							5.5	4.26	10.2	12.0	9.8	10.8
Saga, SAGA						1.35	2.31	4.74	7.01			

Note: The normal value is under 1.0 pCi/m^3.

Figure 5: Gross Beta-Radioactivity in Airborne Dust
(Japan Meteorological Agency)

1. **Sapporo**
2. **Sendai**
3. **Tokyo**
4. **Osaka**
5. **Fukuoka**

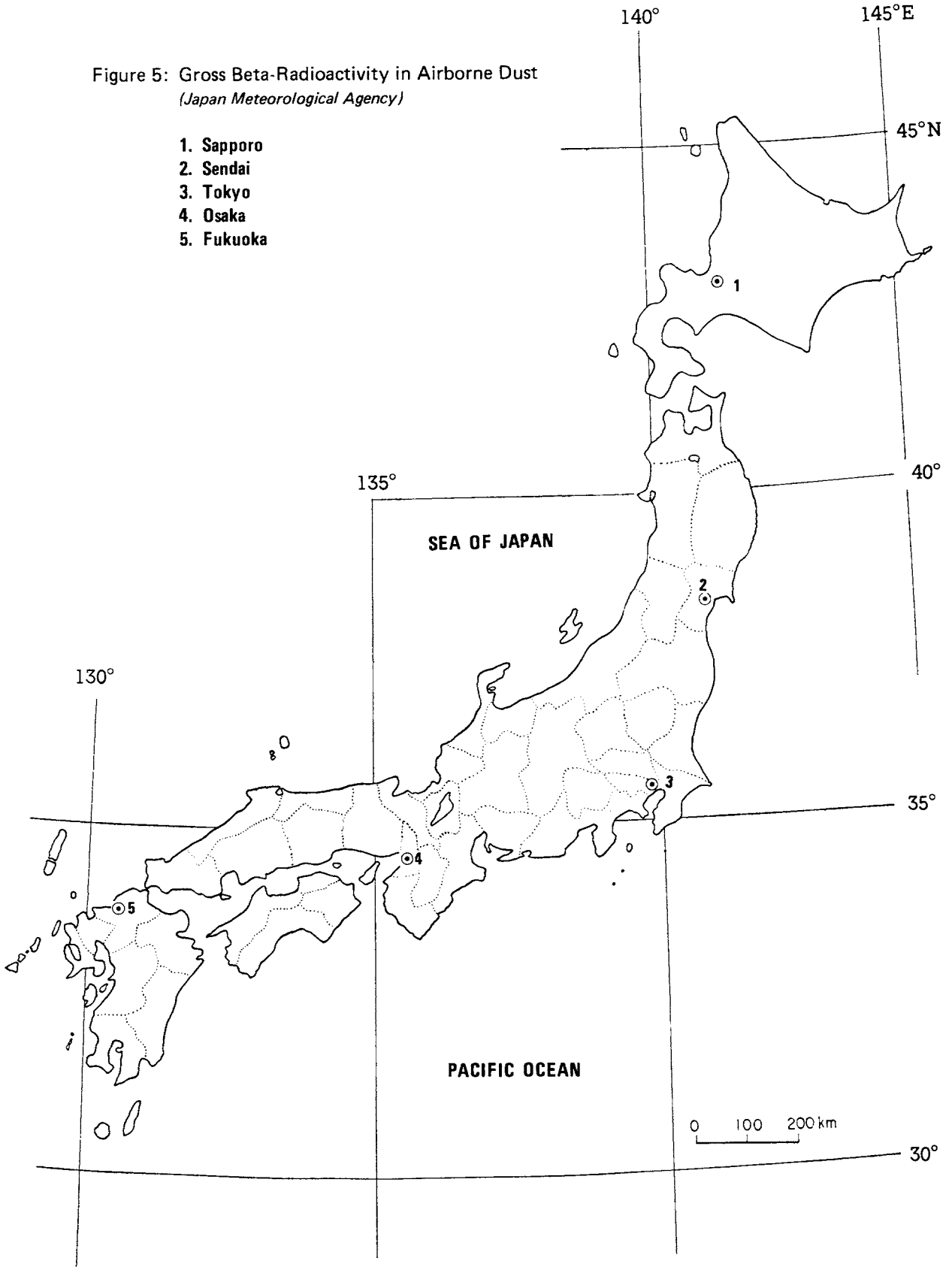
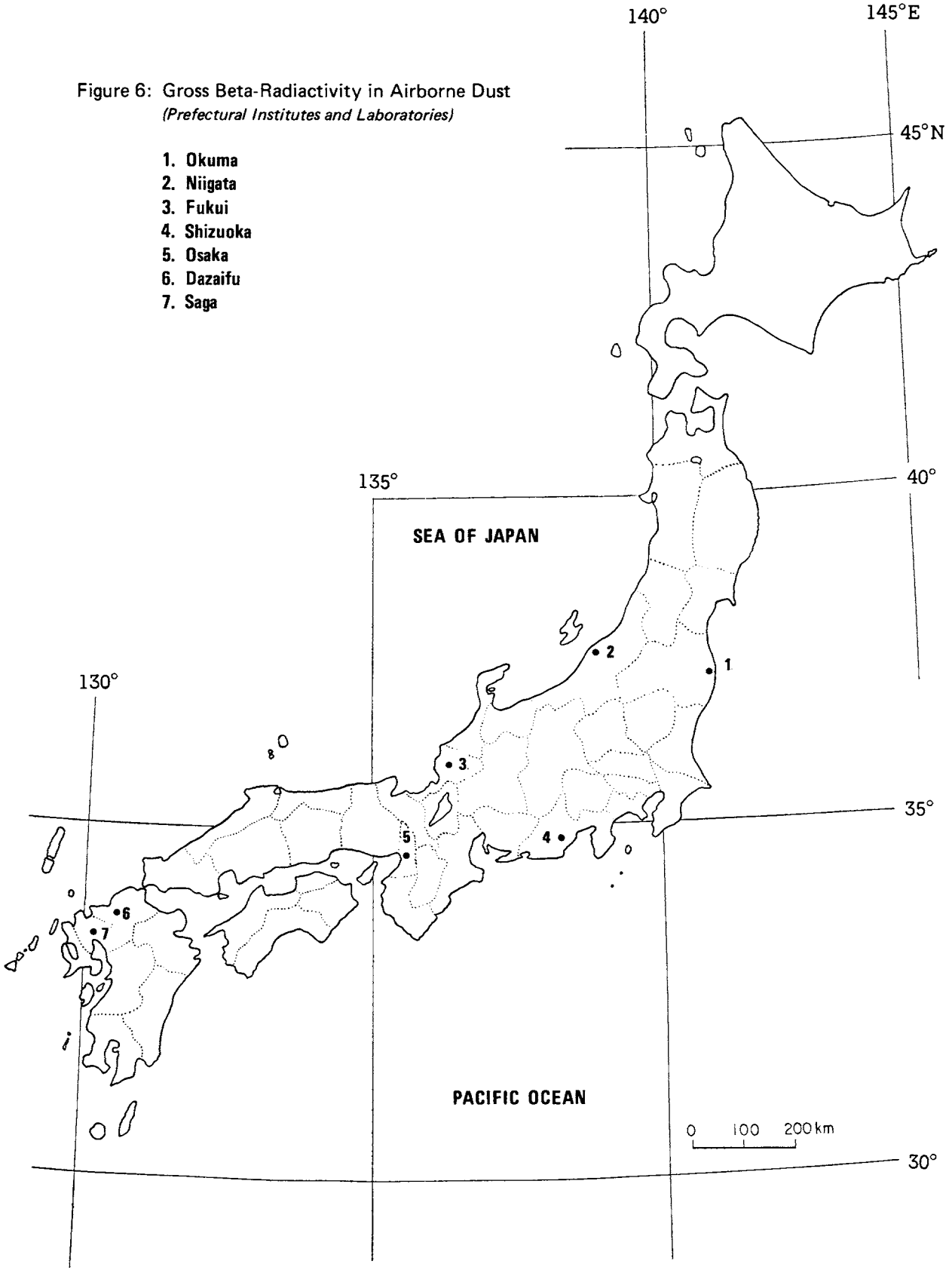


Figure 6: Gross Beta-Radiactivity in Airborne Dust
(Prefectural Institutes and Laboratories)

1. **Okuma**
2. **Niigata**
3. **Fukui**
4. **Shizuoka**
5. **Osaka**
6. **Dazaifu**
7. **Saga**



(5) Gross Beta-Radioactivity in Dry Fallout

Gross beta-radioactivity was measured by the National Institute of Radiological Sciences and prefectural public health laboratories. However, the radioactivity measured showed the same as normal.

(6) Iodine – 131 concentration in Fresh Milk

Concentration of Iodine-131 in fresh milk was determined by the National Institute of Radiological Sciences, the National Institutes under the control of Ministry of Agriculture, and the prefectural public health laboratories. A high radioactivity of 113 pCi/ℓ was detected in milk samples collected from Ishikawa prefecture on 30 January.

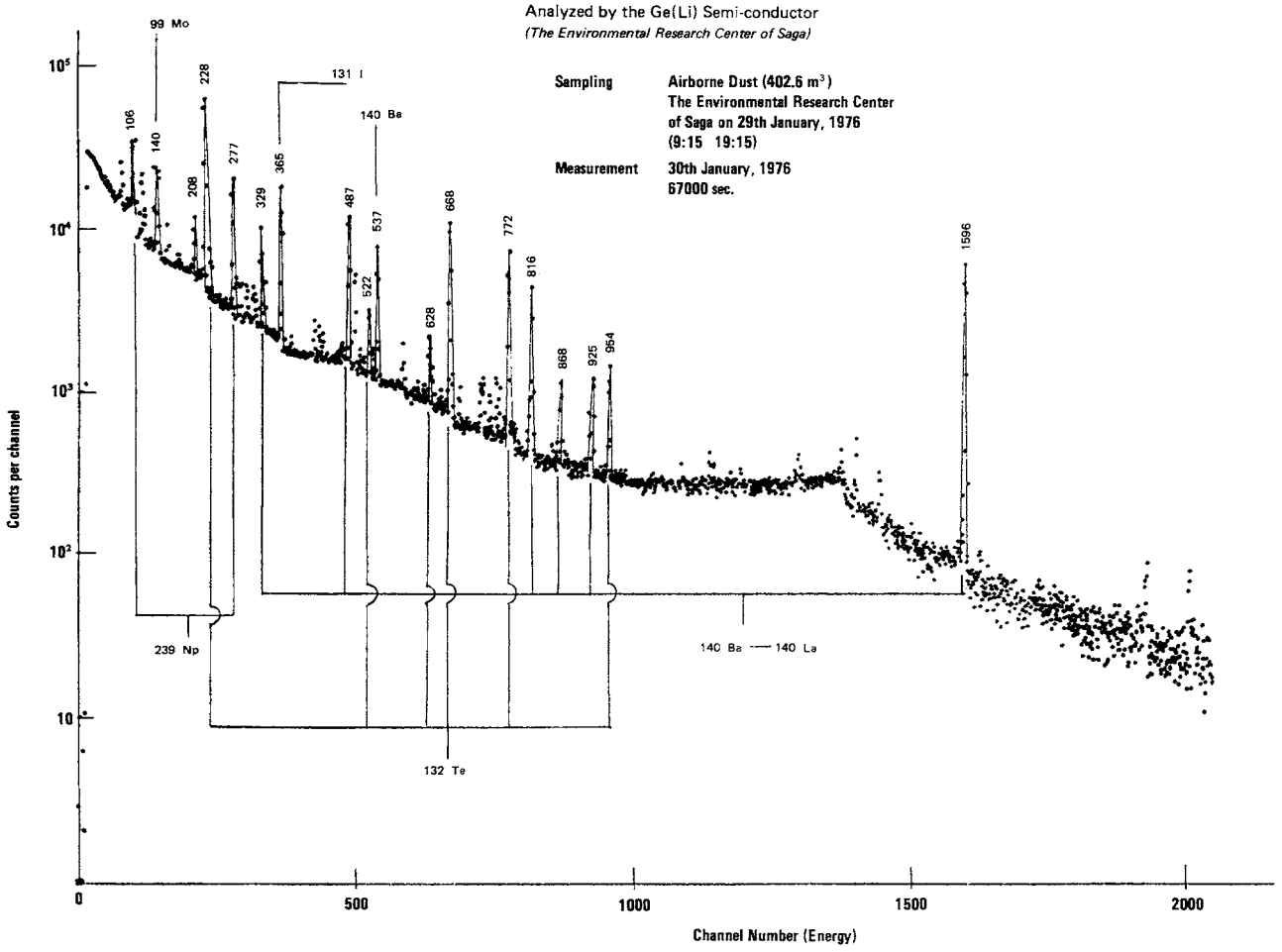
Radioactivity in other samples was less than the detectable limit 70 pCi/ℓ.

(7) Analysis of Radionuclides

Rain and dry fallout and airborne dust collected from Fukushima, Kanagawa, Fukui, Saga, Niigata, and Okinawa prefectures were analysed using Ge(Li) semi-conductor instrument and NaI (T1) scintillation gamma spectrometer. The results showed that this nuclear test had dispersed ^{131}I, ^{133}I, ^{106}Ru, ^{140}Ba, ^{140}La, ^{99}Tc, ^{99}Mo, ^{141}Ce, and others.

Figure 7 shows an example of gamma-spectrum using Ge(Li) semi-conductor instrument for airborne dust samples collected from Saga prefecture.

Figure 7: Spectrum of Radionuclides in Airborne Dust Analyzed by the Ge(Li) Semi-conductor
(The Environmental Research Center of Saga)



3. Data cocerning the radioactivity surveillance.

Figure 8 shows the chart of air stream in upper atmosphere.

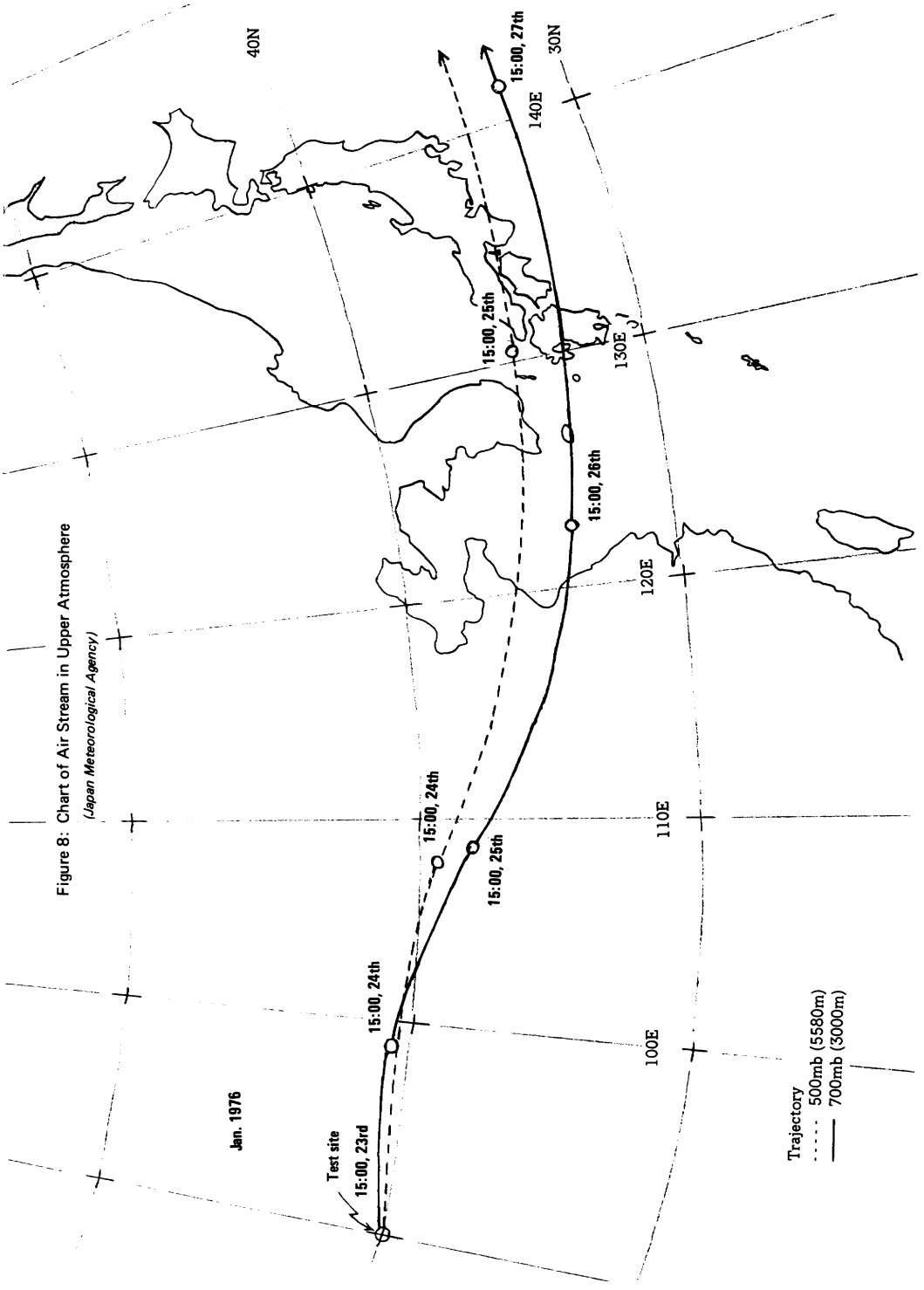


Figure 8: Chart of Air Stream in Upper Atmosphere
(Japan Meteorological Agency)

4. The 19th Nuclear Explosion Test of the Peoples' Republic of China.

(1) The News of Kyodo-Reuter said that on 27 September the Energy Research and Development Administration (ERDA), U.S.A., announced for the 19th nuclear explosion test of the Peoples' Republic of China as follows;

Date of test: 26 September, 1976 (3:00 PM Japanese time)
Scale of test: 200 kilotons (TNT powder)
Place of test: The upper atmospheric level over the Lop Nor district, the Western region of China.

(2) The radioactivity surveillance had been carried out from 27 September to 4 October. The effects caused by this nuclear explosion were detected from the measurements in samples of the airborne dust in upper atmosphere, rainwater, dry fallout, airborne dust, and fresh milk samples. However, the radioactivities detected were less than the tentative values established by the Headquarters for Countermeasures against Radioactivity.

The concentration of iodine-131 in fresh milk was continuously measured until 11 October.

5. The Results of Investigation in Connection with the 19th Chinese Nuclear Test.

(1) Gross Beta-Radioactivity in Upper Air

(Japan Defence Agency)

The Research and Development H.Q., Japan Defence Agency, has collected the dust samples in upper atmosphere of the middle and western areas of Japan during the period from September 28 to September 30, and has measured the gross beta-radioactivity of such samples.

A high radioactivity was measured from the samples collected from the upper atmosphere of the middle area on September 29.

Results obtained are shown in Table 7.

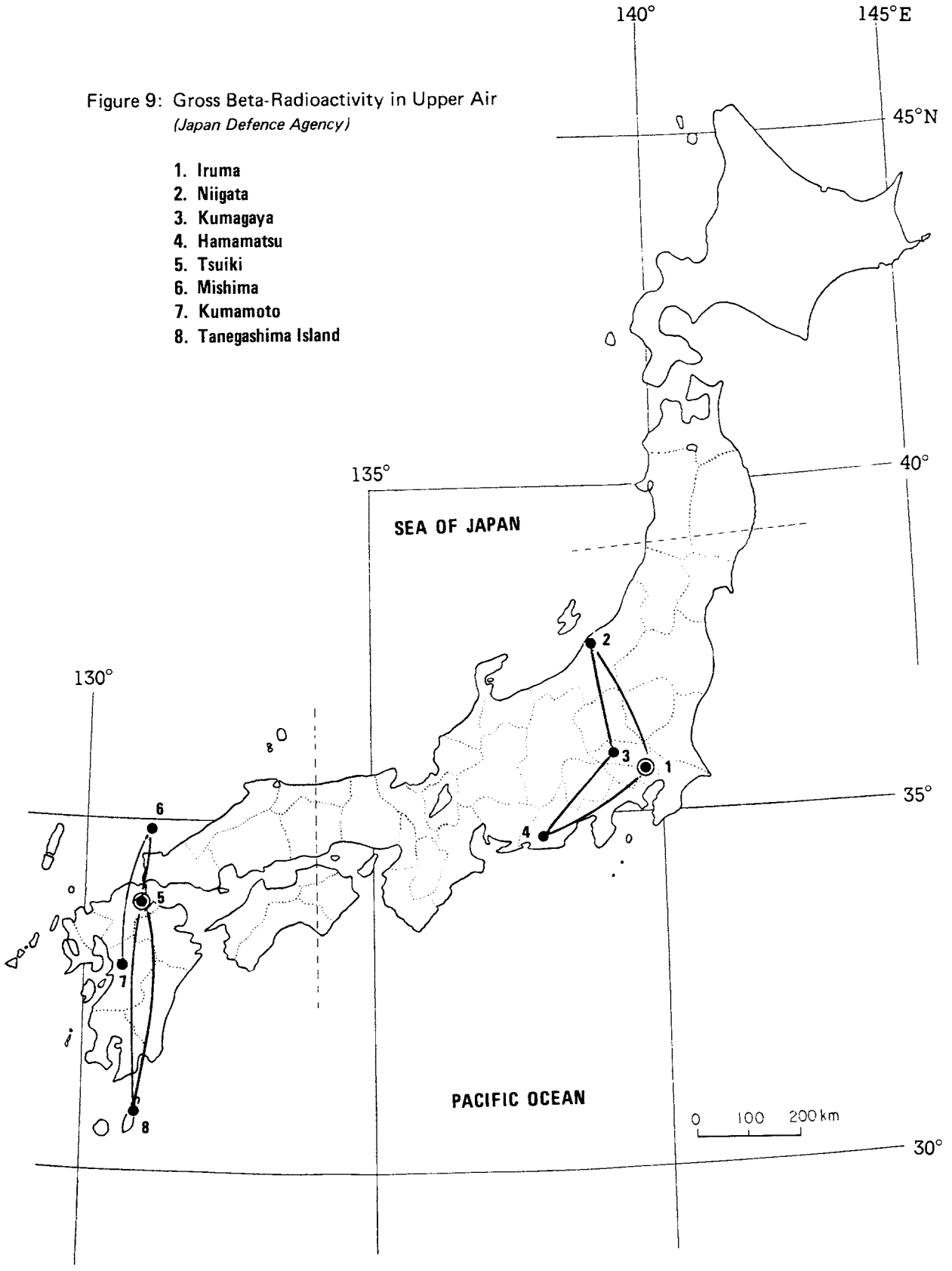
Figure 9 shows the sampling areas and the flight course.

Table 7. Gross Beta-Radioactivity in Upper Air
(Japan Defence Agency)

Area	Take – Off Date	Take – Off Time	Flight Course	Altitude (m)	Activity (pCi/m³)
Central area (Iruma)	September 29th	09:25 – 10:45	Iruma – Niigata – Kumagaya – Hamamatsu – Iruma	8,100 ~ 6,000	19.92
	〃 30th	09:30 – 10:50	Iruma – Niigata – Kumagaya – Hamamatsu – Iruma	7,500 ~ 4,800	0.34
Northern area (Tsuiki)	September 28th	07:02 – 07:42	Tsuiki – Mishima – Kumamoto	9,000	0.12
	〃 29th	14:24 – 15:24	Tsuiki – Tanegashima Island – Tsuiki	6,000	0.04

Figure 9: Gross Beta-Radioactivity in Upper Air
(Japan Defence Agency)

1. Iruma
2. Niigata
3. Kumagaya
4. Hamamatsu
5. Tsuiki
6. Mishima
7. Kumamoto
8. Tanegashima Island



(2) Monitoring Posts

(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

Gross beta-radioactivity in air was measured in 2 monitoring posts of the Japan Meteorological Agency (Asahikawa and Wajima) and 19 prefectural monitoring ones.

The higher radioactivity was detected on the samples collected from Wajima and Akita, and the relatively higher ones were also detected on the samples from Tohoku and Hokuriku districts along the Sea of Japan.

Results obtained are shown in Table 8.

Figure 10 shows the sites of monitoring post.

Table 8. Counting Rate Obtained with the Monitoring Posts

(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

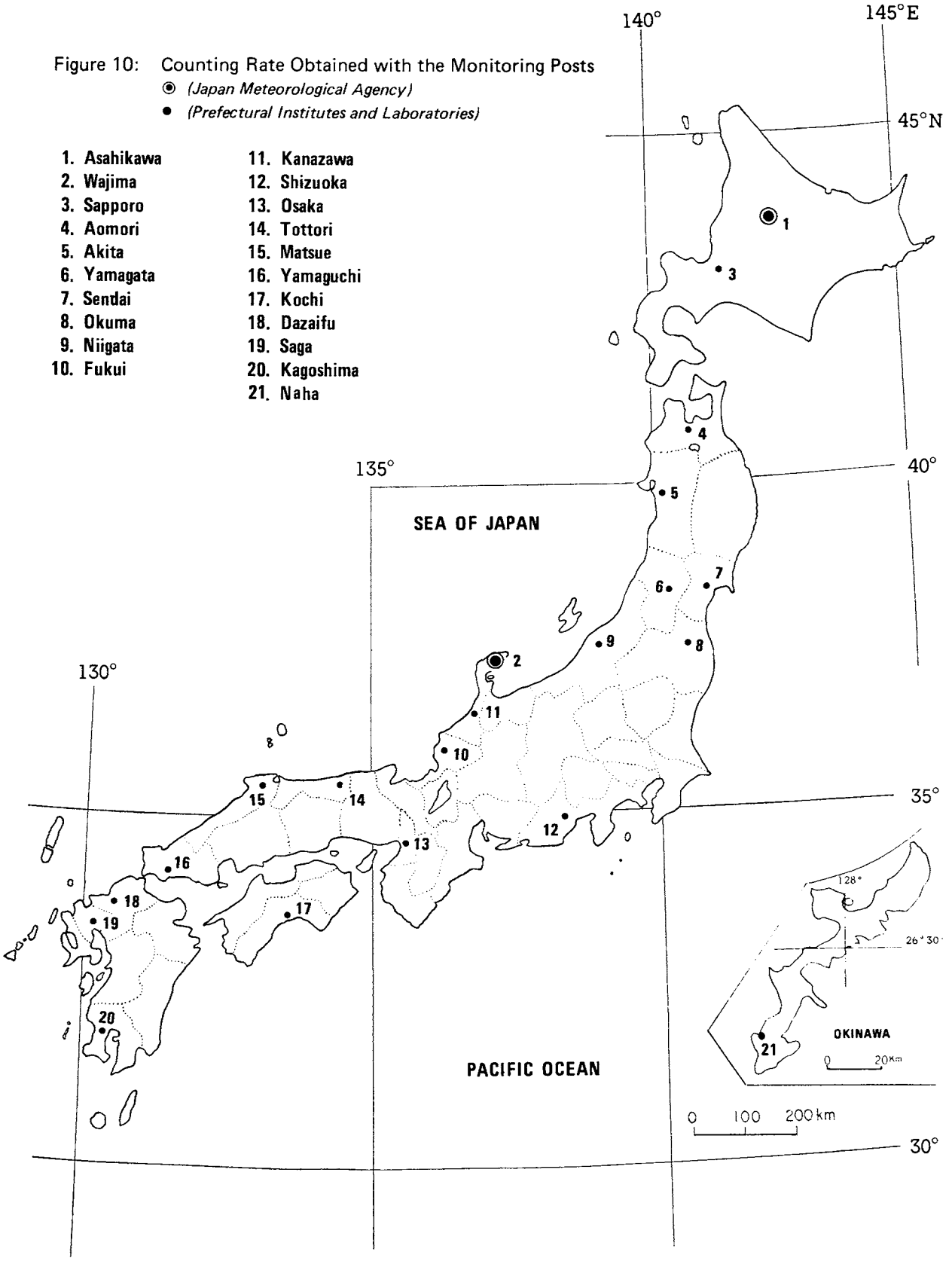
(CPS)

Station	Sept. 26 – Oct. 4		Normal State	
	Highest value	Lowest value	Highest value	Lowest Value
Asahikawa	21.1	12.6	27.0	8.0
Wajima	48.0	13.0	25.0	12.0
Sapporo, HOKKAIDO	12.3	10.0	29.0	7.0
Aomori, AOMORI	15.1	8.0	28.2	5.0
Akita, AKITA	82.0	12.3	29.0	9.0
Yamagata, YAMAGATA	18.5	11.0	18.7	10.0
Sendai, MIYAGI	12.8	9.8	24.8	8.2
Okuma, FUKUSHIMA	16.5	12.5	20.8	11.3
Niigata, NIIGATA	38.5	19.7	37.3	18.8
Fukui, FUKUI	25.5	15.0	24.5	11.0
Kanazawa, ISHIKAWA	19.0	14.7	28.9	11.0
Shizuoka, SHIZUOKA	25.2	14.3	28.5	15.0
Osaka, OSAKA	17.3	13.5	17.5	11.4
Tottori, TOTTORI	25.0	18.4	35.8	13.0
Matsue, SHIMANE	21.0	14.7	39.7	13.0
Yamaguchi, YAMAGUCHI	25.0	20.0	43.5	17.0
Kochi, KOCHI	12.3	8.8	14.4	8.1
Dazaifu, FUKUOKA	20.0	16.0	28.0	13.5
Saga, SAGA	17.2	13.2	24.2	10.4
Kagoshima, KAGOSHIMA	17.5	14.0	21.5	13.0
Naha, OKINAWA	14.6	10.8	12.0	10.0

Figure 10: Counting Rate Obtained with the Monitoring Posts

◉ *(Japan Meteorological Agency)*

● *(Prefectural Institutes and Laboratories)*



(3) Gross Beta-Radioactivity in Rain and Dry Fallout

(Japan Meteorological Agency)
(Prefectural Institutes and Laboratories)

Gross beta-radioactivity in rainwater and dry fallout was measured by the Japan Meteorological Agency (13 locations) and 30 prefectural public health laboratories.

The following higher concentrations and activities were detected on the samples collected at September 28th: 28.9 pCi/mℓ and 83.91 mCi/km² in the samples of Niigata, 52.76 pCi/mℓ and 79.05 mCi/km² in the samples Akita, and the relatively higher levels than that of normal in the samples of many districts.

Tables 9 and 10 show the results obtained by the Japan Meteorological Agency and 30 prefectural public health laboratories, respectively.

And Figures 11 and 12 show the sampling locations in Japan.

Table 9. Gross Beta-Radioactivity in Rain and Dry Fallout
(Japan Meteorological Agency)

Upper row : Concentration (pCi/cm³)
(Lower row): Deposition (mCi/km²)

Station \ Date	Sep. 26–27	27–28	28–29	29–30	Oct. 30–1	1–2	2–3	3–4	4–5
Wakkanai				0.0 (0.0)				0.0 (0.0)	
Sapporo								0.2 (0.6)	0.0 (0.0)
Kushiro			1.3 (3.9)						
Sendai		0.0 (0.0)	0.2 (2.0)						2.6 (22.0)
Akita			29.0 (14.0)						
Tokyo		0.0 (0.0)	0.7 (10.0)				0.9 (5.0)		0.2 (2.0)
Wajima			7.0 (5.0)					0.3 (2.0)	0.0 (0.0)
Osaka									
Yonago		0.0 (0.0)							0.0 (0.0)
Murotomisaki		0.5 (10.0)					1.9 (1.9)		
Fukuoka		0.0 (0.0)						0.0 (0.0)	0.0 (0.0)
Kagoshima		0.0 (0.0)							
Hachijyo Island		0.0 (0.0)	0.2 (0.5)			0.2 (4.0)	0.0 (0.0)		

Notes: 1) In the ordinary condition, concentration and deposition of radioactive nuclides in rain and dry fallout samples were the value less than 1 pCi/cm³ and 2 ~ 3 mCi/km², respectively.
2) Measuring with rain and dry fallout during A.M. 9:00 ~ next A.M. 9:00.

Table 10. Gross Beta-Radioactivity in Rain and Dry Fallout

(Prefectural Institutes and Laboratories)

Upper row : Concentration (pCi/cm^3)
(Lower row): Deposition (mCi/km^2)

Station \ Date	Sep. 26–27	27–28	28–29	29–30	Oct. 30–1	1–2	2–3	3–4
Sapporo, HOKKAIDO								
Aomori, AOMORI			5.93 (16.61)		0.05 (0.10)			
Akita, AKITA			52.76 (79.05)		4.23 (4.23)			
Yamagata, YAMAGATA		– (0.17)	0.65 (12.17)					
Sendai, MIYAGI		0.01 (0.05)	0.08 (1.94)					
Okuma, FUKUSHIMA	– (0.04)	0.02 (0.18)	0.37 (10.58)					
Mito, IBARAKI	0.01 (0.01)		0.44 (–)				0.37 (–)	
Omiya, SAITAMA			(6.36)					
Shinjuku, TOKYO		0.02 (0.83)	0.09 (0.56)				0.10 (0.57)	
Yokohama, KANAGAWA		0.07 (1.2)	2.2 (4.7)					
Niigata, NIIGATA		28.9 (83.91))						
Kanazawa, ISHIKAWA								
Fukui, FUKUI		0.88 (1.41)						
Shizuoka, SHIZUOKA		1.18 (2.96)	2.03 (15.19)				1.46 (2.92)	
Nagoya, AICHI			– (2.27)					
Kyoto, KYOTO			– (45.8)					
Osaka, OSAKA								
Kobe, HYOGO	0.07 (0.12)							
Wakayama, WAKAYAMA	– (0.16)	– (0.47)						
Tottori, TOTTORI								
Matsue, SHIMANE		0.0 (0.0)		– (0.02)				
Okayama, OKAYAMA	– (0.02)							
Hiroshima, HIROSHIMA								
Yamaguchi, YAMAGUCHI	0.0 (0.0)							
Kochi, KOCHI								
Dazaifu, FUKUOKA		0.05 (0.0)						– (0.03)
Saga, SAGA		0.02 (–)						0.11 (0.19)

Station \ Date	Sep. 26–27	27–28	28–29	29–30	Oct. 30–1	1–2	2–3	3–4
Nagasaki, NAGASAKI	0.43 (–)							
Kagoshima, KAGOSHIMA								
Naha, OKINAWA					0.96 (0.26)	0.11 (0.23)	0.22 (0.82)	
Nagano, NAGANO		0.02 (0.08)						

Notes: 1) In the ordinary condition, concentration and deposition of radioactive nuclides in rain and dry fallout samples were the values less than 1 pCi/cm^3 and 2 ~ 3 mCi/km^2, respectively.

2) Measuring with rain and dry fallout during A.M. 9:00 ~ next A.M. 9:00.

Figure 11: Gross Beta-Radioactivity in Rain and Dry Fallout
(Japan Meteorological Agency)

1. Wakkanai
2. Sapporo
3. Kushiro
4. Sendai
5. Akita
6. Tokyo
7. Wajima
8. Osaka
9. Yonago
10. Murotomisaki
11. Fukuoka
12. Kagoshima
13. Hachijyo Island

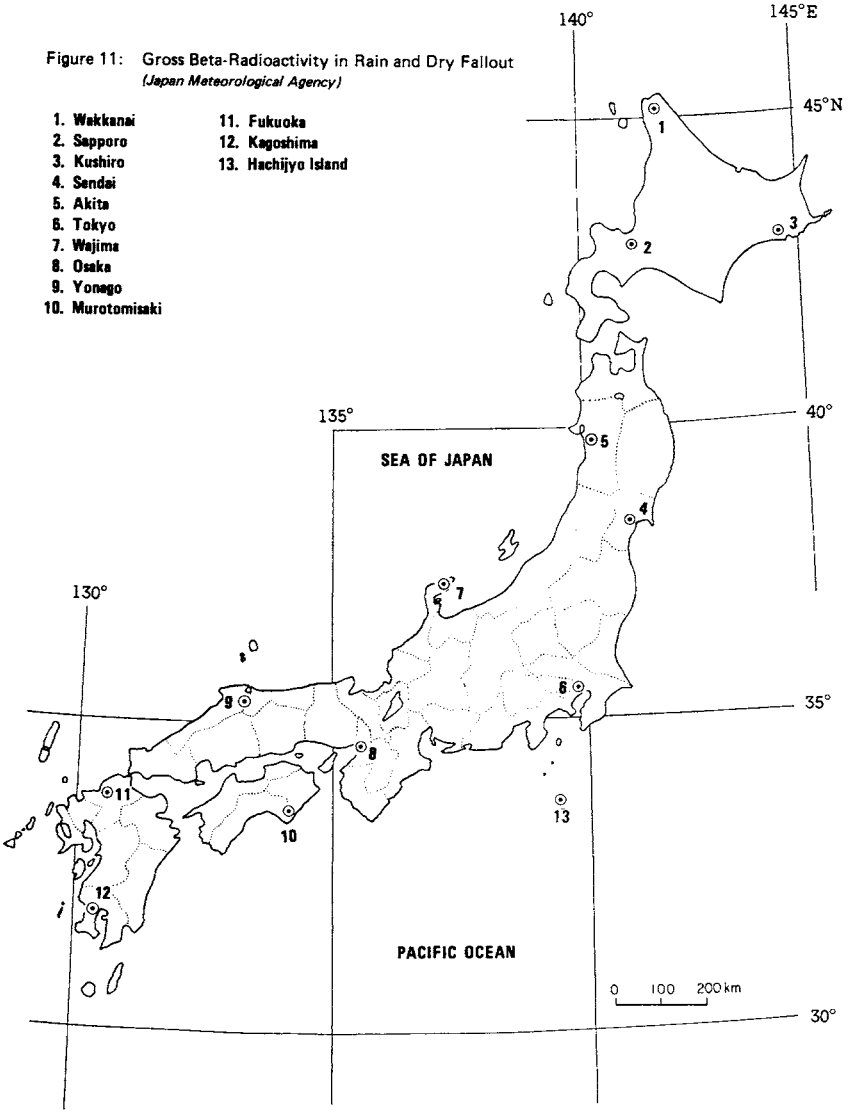
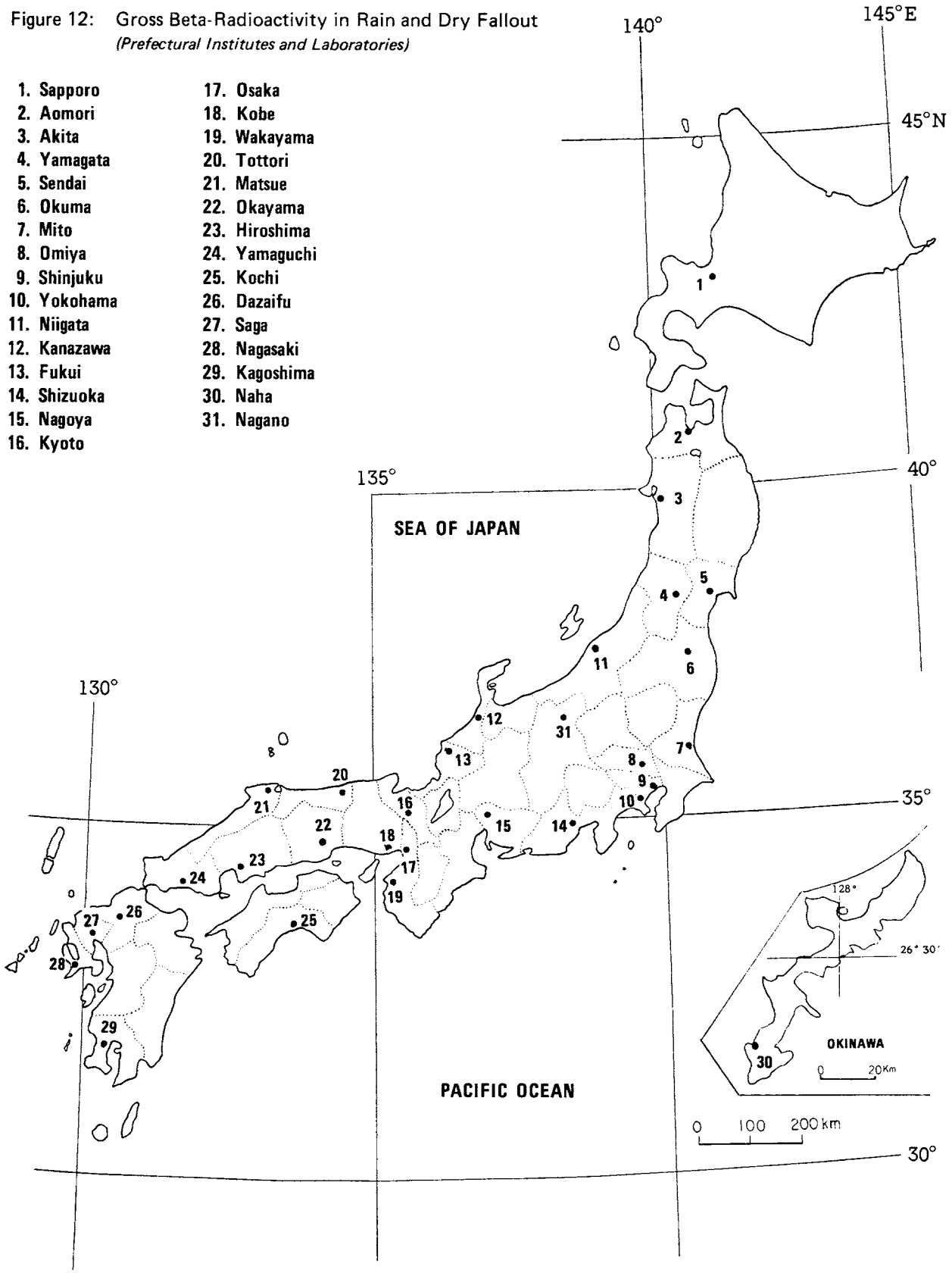


Figure 12: Gross Beta-Radioactivity in Rain and Dry Fallout
(Prefectural Institutes and Laboratories)

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



(4) Gross Beta-Radioactivity in Airborne Dust

(Japan Meteorological Agency)
(National Institute of Radiorological Sciences)
(Prefectural Institutes and Laboratories)

Gross beta-radioactivity in the samples of airborne dust were measured by the Japan Meteorological Agency (5 locations), the National Institute of Radiological Sciences, and the prefectural public health laboratories. The higher activities with compared to that of normal level were measured in the samples collected from Sendai, Chiba, Niigata and Ibaraki regions. And, the relatively higher activities were also observed on the samples collected from various regions in Japan.

Tables 11, 12 and 13 show the results obtained by the Japan Meteorological Agency, the National Institute of Radiological Sciences, and the prefectural public health laboratories, respectively.

And the sampling locations are shown in Figures 13 and 14.

Table 11. Gross Beta-Radioactivity in Airborne Dust
(Japan Meteorological Agency)

(pCi/m³)

Station \ Date	Sep. 27	28	29	30	Oct. 1	2	3	4
Sapporo		0.2	0.2	0.3	0.1	0.2		0.2
Sendai		0.1	49.0	0.4	2.6	0.2		0.9
Tokyo		0.2	11.0	18.0	4.8	4.9		0.8
Osaka	0.3	2.0	0.4	1.1	1.6	1.0		1.4
Fukuoka		0.1	0.2	1.6	1.1	1.6	0.2	0.1

Notes: 1) Normal values is under 1 pCi/m³.
2) The value were obtained 20 hours after the completion of collecting operation, which is from 09:00 to 14:00 (about 5 hours) every day.

Table 12. Gross Beta-Radioactivity in Airborne Dust
(National Institute of Radiological Sciences)

(pCi/m³)

Time after dust sampling \ Date	Sep. 27–28	28–29	29–30	Oct. 30–1	1–2	2–3	3–4	4–5
80 min.	1.4	21.0	22.0	12.3	83.0	4.3	2.89	1.67
24 hr.	0.19	14.1	15.4	7.9	69.0	1.75	0.89	
48 hr.	0.02	10.4	11.5	6.5	57.3	1.33	0.64	

Notes: 1) Normal value 80 min. (1 ~ 10)
24 hr. (0.1 ~ 3)
48 hr. (0.1 ~ 1)
2) The value were obtained 20 hours after the completion of collecting operation, which is from 10:00 to next 10:00 (about 24 hours) every day.

Table 13. Gross Beta-Radioactivity in Airborne Dust
(Prefectural Institutes and Laboratories)

(pCi/m³)

Station \ Date	Sep. 27–28	28–29	29–30	30–1	1–2	2–3	3–4
Niigata, NIIGATA	0.61	66.9	2.4	2.59			3.6
Okuma, FUKUSHIMA		8.84	2.15	3.57	2.34	1.64	
Mito, IBARAKI		6.9	51.9		8.1	2.1	
Shizuoka, SHIZUOKA		0.59			15.68	4.68	
Fukui, FUKUI	2.71	4.76	2.1	3.43	3.89	2.07	2.20
Osaka, OSAKA	58	2.2	3.9	2.4	2.53		
Nagoya, AICHI	3.8	62.9					
Matsue, SHIMANE			3.8~6.8	2.9~11.6			
Hiroshima, HIROSHIMA		1.0	4.2				
Dazaifu, FUKUOKA	2.14		0.49	1.91	1.64	1.69	
Saga, SAGA	0.92			0.31	2.13	1.40	

Note: Normal value is under 1 pCi/m³.

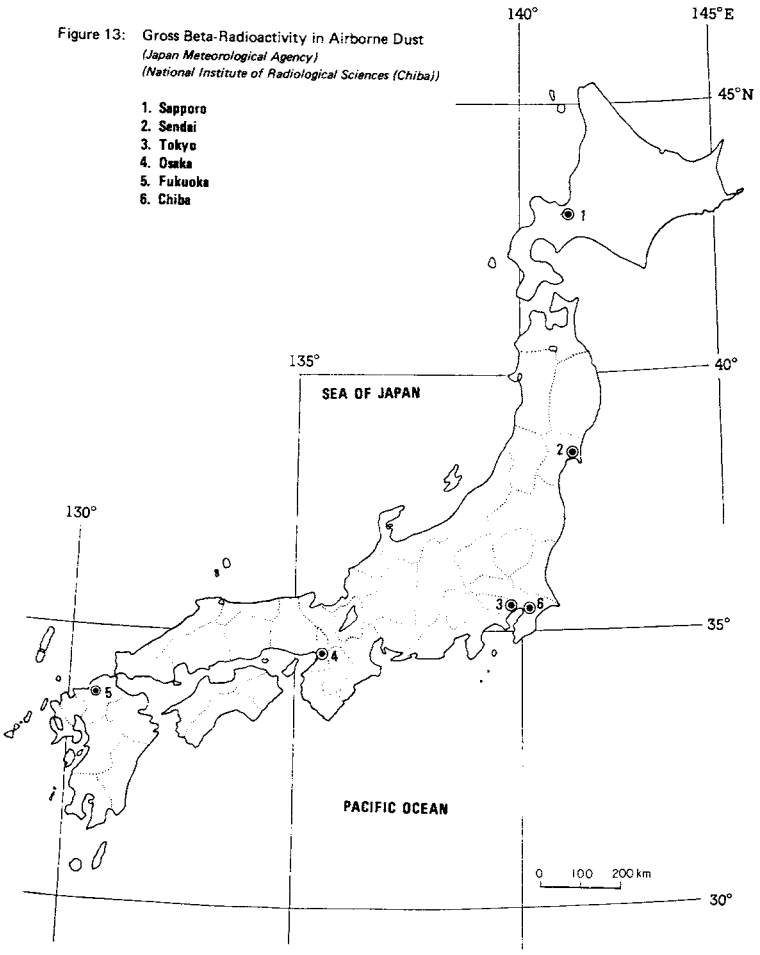
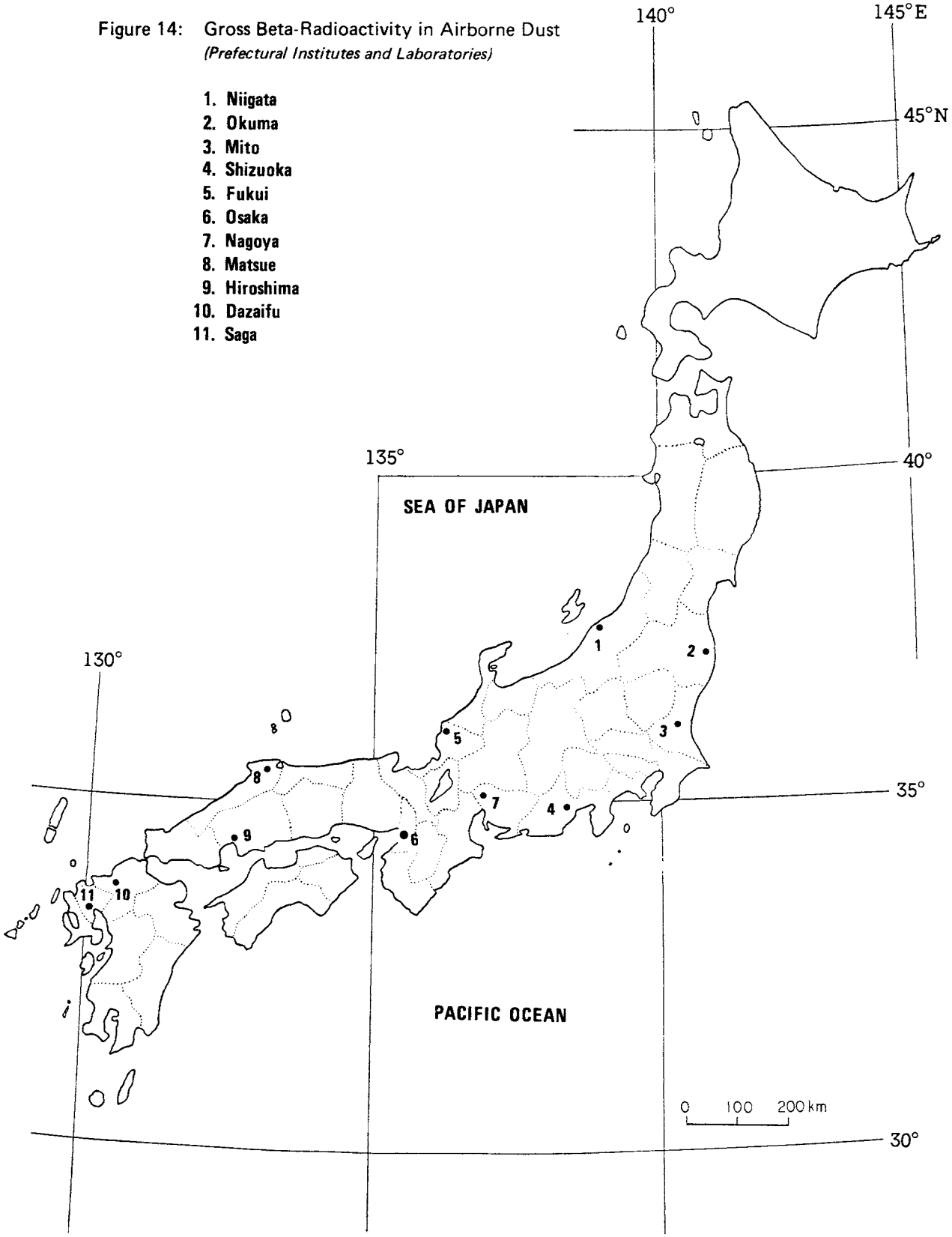


Figure 13: Gross Beta-Radioactivity in Airborne Dust
(Japan Meteorological Agency)
(National Institute of Radiological Sciences (Chiba))

Figure 14: Gross Beta-Radioactivity in Airborne Dust
(Prefectural Institutes and Laboratories)

1. Niigata
2. Okuma
3. Mito
4. Shizuoka
5. Fukui
6. Osaka
7. Nagoya
8. Matsue
9. Hiroshima
10. Dazaifu
11. Saga



(5) Gross Beta-Radioactivity in Dry Fallout

(National Institute of Radiological Sciences)

Gross beta-radioactivity in dry fallout was measured by the National Institute of Radiological Sciences. The fairly high radioactivity, which might be caused from the hot particles, was detected in the samples collected on 28–29 September.

Table 14 shows the results obtained.

And the sampling locations are already shown in Figure 13.

Table 14. Gross Beta-Radioactivity in Dry Fallout

(National Institute of Radiological Sciences)

Date	Sep. 27–28 10:00~ 10:00	28–29 10:00~ 9:30	29–30 9:30~9:30	Oct. 30–1 9:30~9:30	1–2 9:30~9:30	2–3 9:30~9:30	3–4 9:30–9:30	4–5 9:30~9:30
Deposition (mCi/km^2)	0.8	*810	*127	3.7	1.03	2.32	0.23	0.25

Note: *The figures may be caused from the hot particles.

(6) Iodine – 131 Concentration in Fresh Milk

(National Institutes under the control of Ministry of Agriculture)

(National Institute of Radiological Sciences)

(Prefectural Institutes and Laboratories)

Concentrations of iodine-131 in fresh milk were determined by 3 National Institutes under the control of the Ministry of Agriculture, the National Institute of Radiological Sciences, and 13 prefectural public health laboratories. A high concentration of iodine-131 over 9 pCi/ℓ was detected in the samples collected by the Hokkaido Agricultural Experiment Station and the prefectural public health laboratories of Aomori, Akita, Miyagi, and Fukushima. And a high radioactivity more than the detectable limits was also measured from the samples collected in other several prefectures.

Tables 15, 16 and 17 show the results obtained by the National Institutes under the control of the Ministry of Agriculture, the National Institute of Radiological Sciences, and 13 prefectural public health laboratories, respectively.

The sampling locations are shown in Figures 15 and 16.

Table 15. Iodine – 131 in Milk

(National Institutes under the control of Ministry of Agriculture)

(pCi/ℓ)

Station \ Date	Sep. 27(M)	28(M)	29(M)	30(M)	30(E)	Oct. 1(M)	1(E)	2(M)
National Institute of Animal Industry (Chiba)		–	–	91.1±4.5		66.3±4.0		52.1±2.8
Hokkaido National Agricultural Experiment Station (Sapporo)	–	–	–	117±47	120±45	+	+	–
Kyushu Agricultural Experiment Station (Kumamoto)	–	–	–	–		–		–

(pCi/ℓ)

Station \ Date	Oct. 2(E)	3(M)	3(E)	4(M)	5(M)	5(E)	6(M)	7(M)
National Institute of Animal Industry (Chiba)		28.1±2.1		28.0±2.0	23.0±1.9		–	–
Hokkaido National Agricultural Experiment Station (Sapporo)	–	–	–	–	–		–	
Kyushu Agricultural Experiment Station (Kumamoto)		–		–	–	–	–	–

Note: 1) (M) Morning
(E) Evening
2) –: undetectable
+: a little detectable, but not be counted pCi/ℓ.

Table 16. Iodine – 131 in Milk

(National Institute of Radiological Sciences)

(pCi/ℓ)

Date	Sep. 28 8:30	29	30	Oct. 1	2	4	4	5	6	9	10	11	12
Concentration (pCi/ℓ)	ND	ND	89+7	87+7	61+7	69+10	ND	ND	55+7	ND	ND	ND	ND

Note: Detectable limit 50 pCi/ℓ.

Table 17. Iodine -131 in Milk

(Prefectural Institutes and Laboratories)

(pCi/ℓ)

Station \ Date	Sep. 28	29	30	Oct. 1	2	3	4	5	6	7	8	19	10	11	12
Sapporo, HOKKAIDO	ND	ND	ND	ND	ND	ND			ND						
Aomori, AOMORI					95			91.3	ND						
Akita, AKITA		ND	ND	ND	95.1		ND	ND							
Sendai, MIYAGI	ND	ND	80	115	120	113	98	60.7	58.4						
Okuma, FUKUSHIMA			100.5	123.7	117.0	100.5	74.9	74.1	133.4	117.2	109.6	104.8	57.9	63.8	
Mito, Katsuta, Oarai, IBARAKI			(Mito) ND	(Mito) ND		(Mito) ND	(Katsuta) ND		(Oarai) 150			(Oarai) 59			
Shizuoka, SHIZUOKA				ND	51.4		ND								
Fukui, FUKUI (Ge(Li))			23	8	10										
Tottori, TOTTORI			ND	ND	ND		ND								
Matsue, SHIMANE	ND	ND		ND	ND			ND							
Dazaifu, FUKUOKA	ND	ND	ND	ND	ND		82.5	51.4	ND						
Saga, SAGA	ND	ND	ND	ND	ND	ND	ND	ND							
Okayama, OKAYAMA	ND		ND	ND			ND								

Note: Detectable limit 50 pCi/ℓ.

Figure 15: Iodine – 131 in Milk

(National Institutes under the control of Ministry of Agriculture)
(National Institute of Radiological Sciences (Chiba))

1. **Chiba**
2. **Sapporo**
3. **Kumamoto**

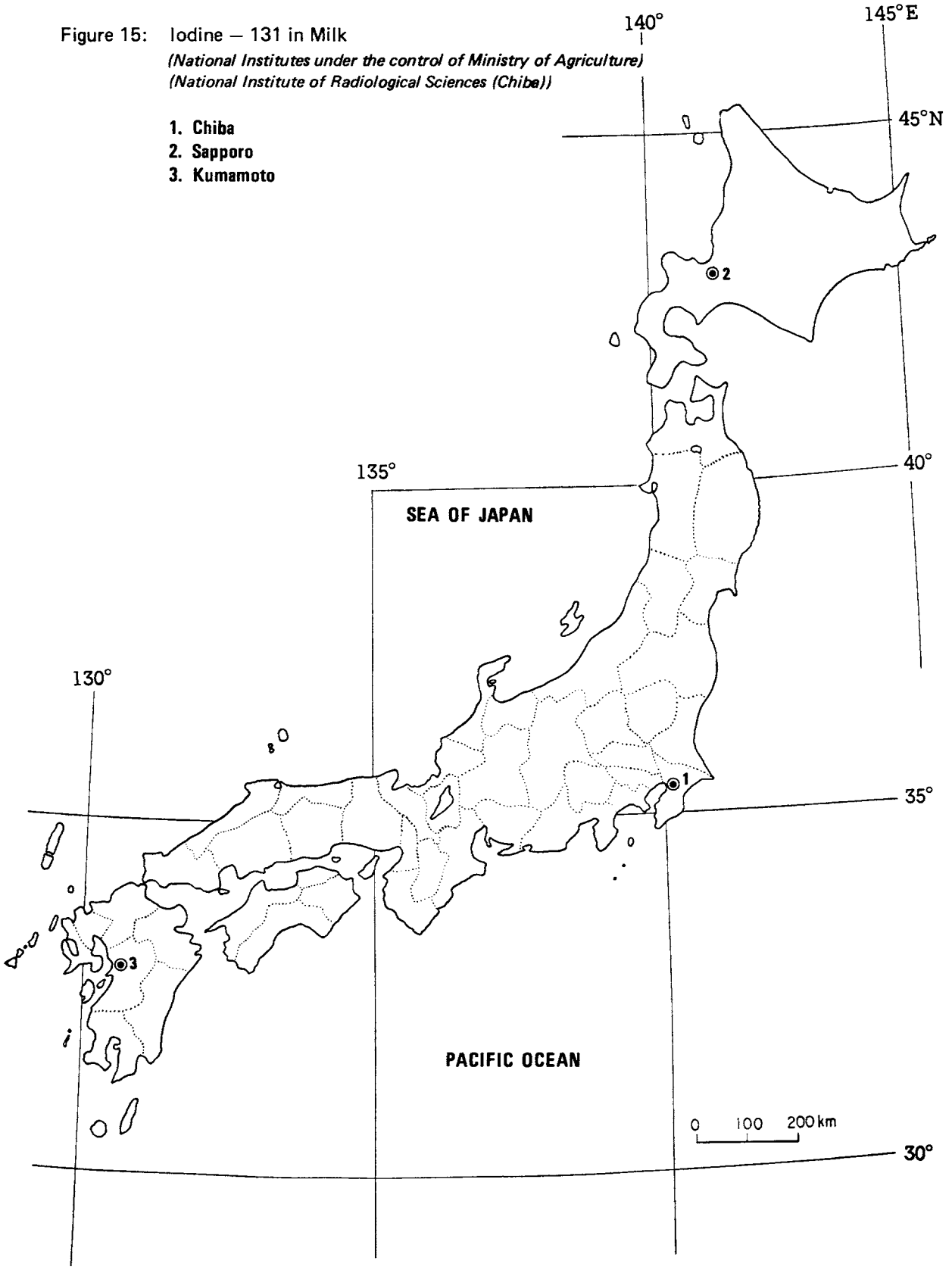
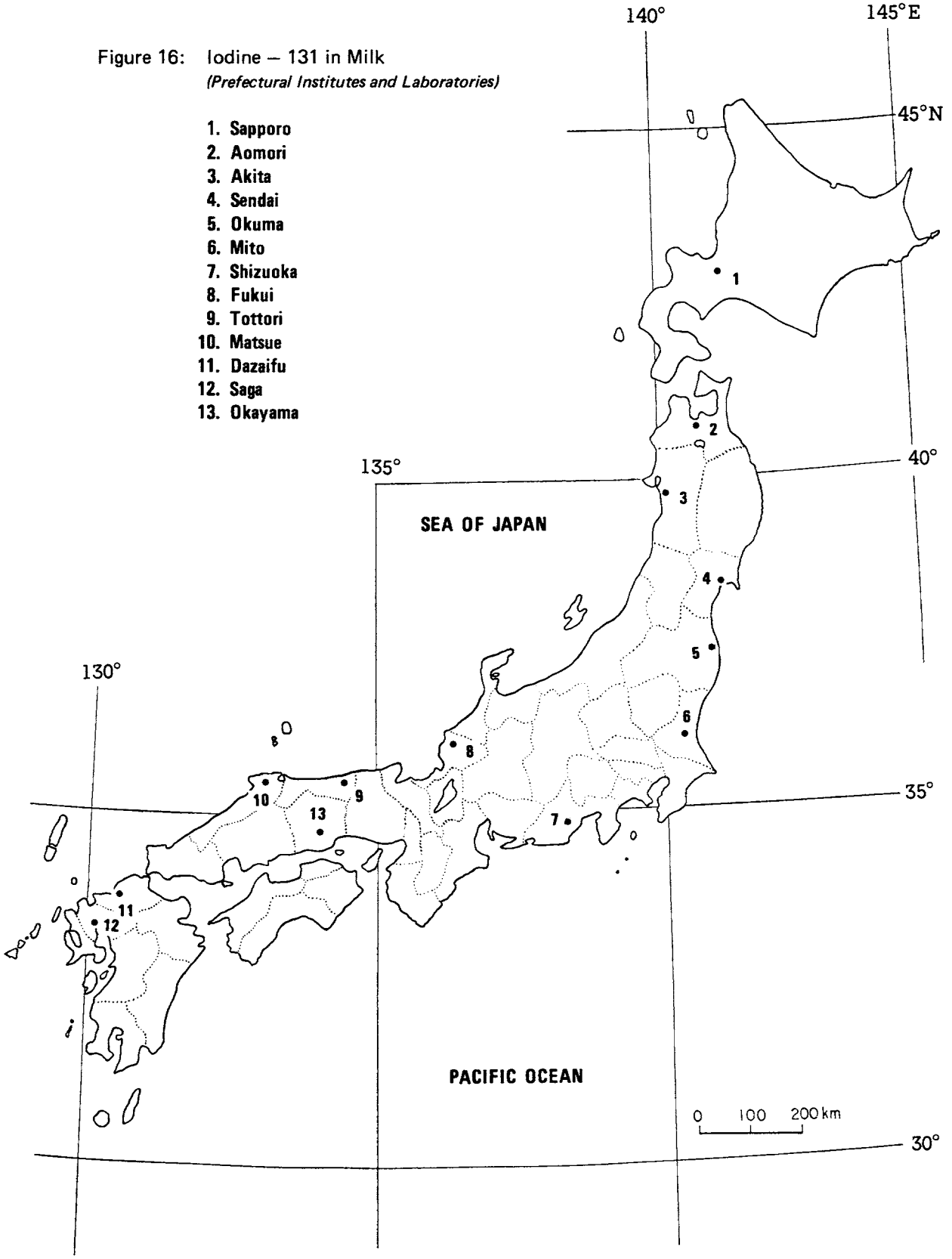


Figure 16: Iodine – 131 in Milk
(Prefectural Institutes and Laboratories)

1. Sapporo
2. Aomori
3. Akita
4. Sendai
5. Okuma
6. Mito
7. Shizuoka
8. Fukui
9. Tottori
10. Matsue
11. Dazaifu
12. Saga
13. Okayama



(7) Hot Particles

Hot particles were found in the samples collected from the prefectural public health laboratories of Osaka, Niigata, Fukui, Kanagawa, Fukushima, Ibaraki, and Aichi, and the National Institute of Radiological Sciences. Its radioactivity per particle was about 30,000~60,000 pCi, and its number in dry fallout was 80 particles per square meters for the samples collected in Niigata.

Results obtained are shown in Table 18.

Figure 17 shows the sampling locations.

Table 18. Hot Particles

(Prefectural Institutes and Laboratories)

(National Institute of Radiological Sciences: NIRS)

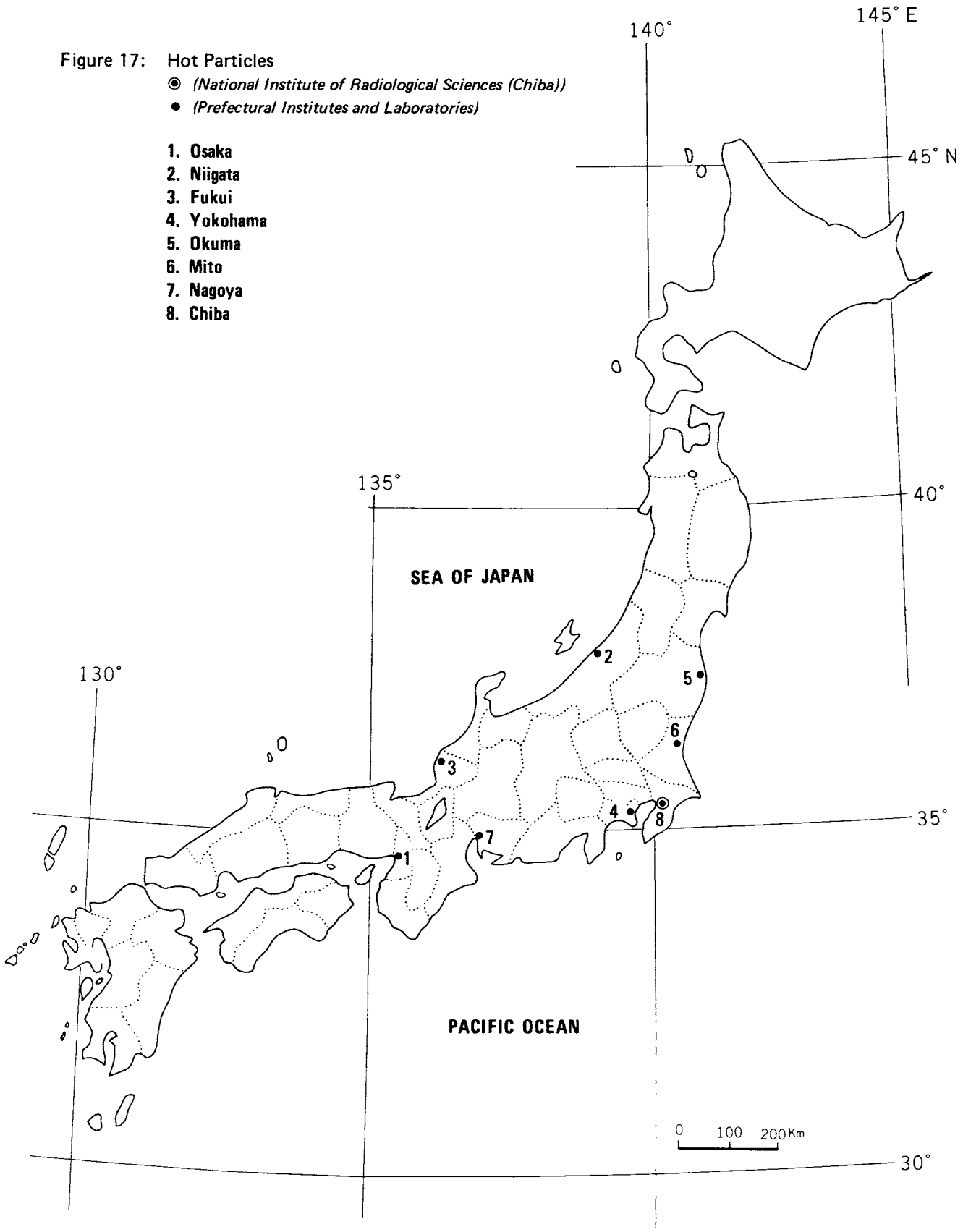
Station \ Date	Sep. 28		29		30		Oct. 1		2		3	
	number (pieces/m²)	highest value	number (pieces/m²)	highest value	number (pieces/m²)	highest value	number (pieces/m²)	highest value	number (pieces/m²)	highest value	number (pieces/m²)	highest value
Osaka, OSAKA	8	60000 pCi	0.8		4							
Niigata, NIIGATA	17	30000 CPM	21	30000 CPM	80							
Fukui, FUKUI	10	36000 pCi	15									
Yokohama, KANAGAWA			10.6						4.4	14000 pCi	1.7	6000 pCi
Okuma, FUKUSHIMA			7.5	45000 pCi								
Mito, IBARAKI			3	2000 pCi								
Nagoya, AICHI			7	39000 pCi								
Chiba, NIRS	1.6	10000 CPM	13		4.0	13000 pCi	2.8	13000 pCi	0.8	4500 pCi		

Figure 17: Hot Particles

◉ *(National Institute of Radiological Sciences (Chiba))*

● *(Prefectural Institutes and Laboratories)*

1. **Osaka**
2. **Niigata**
3. **Fukui**
4. **Yokohama**
5. **Okuma**
6. **Mito**
7. **Nagoya**
8. **Chiba**



(8) Analysis of Radionuclides

Using the Ge(Li) semi-conductor instrument, the analysis of radionuclides was carried out for the hot particles and other dust samples collected in Fukui prefecture, and following radionuclides caused by this nuclear explosion test were detected; ^{97}Zr-^{97}Nb, ^{91}Sr-^{91}Y, ^{147}Nd, ^{143}Ce, ^{132}Te-^{132}I, ^{239}Pu, ^{99}Mo-^{99}Tc, ^{93}Y, etc.

Figure 18 shows an example of spectrum for the airborne dust samples collected from Fukui prefecture.

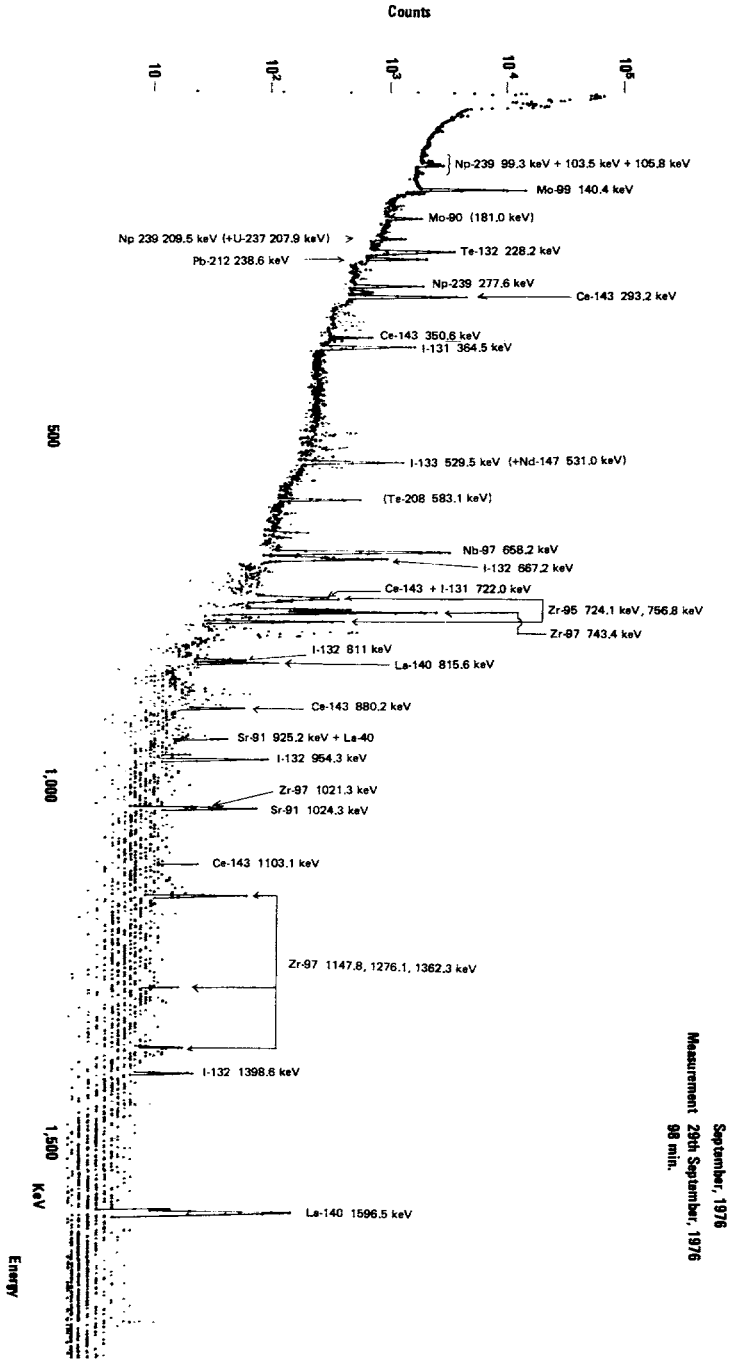


Figure 18-1: Spectrum of Radionuclides in Airborne Dust Analyzed by the Ge(Li) Semi-conductor
(Fukui Prefectural Institute of Public Health)

Figure 18-2: Spectrum of Radionuclides in Airborne Dust Analyzed by the Ge(Li) Semi-conductor (a month after sampling)
(Fukui Prefectural Institute of Public Health)

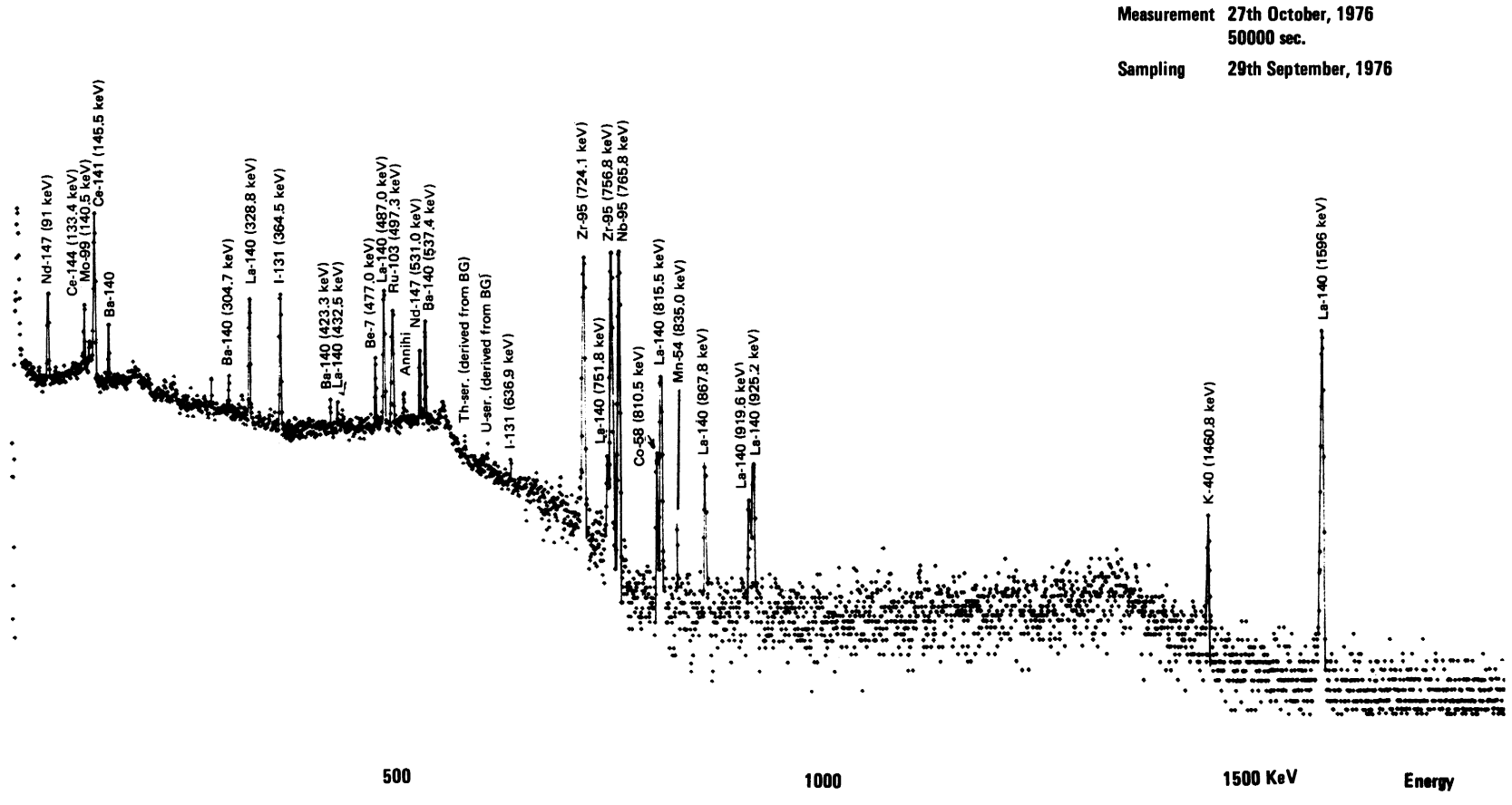
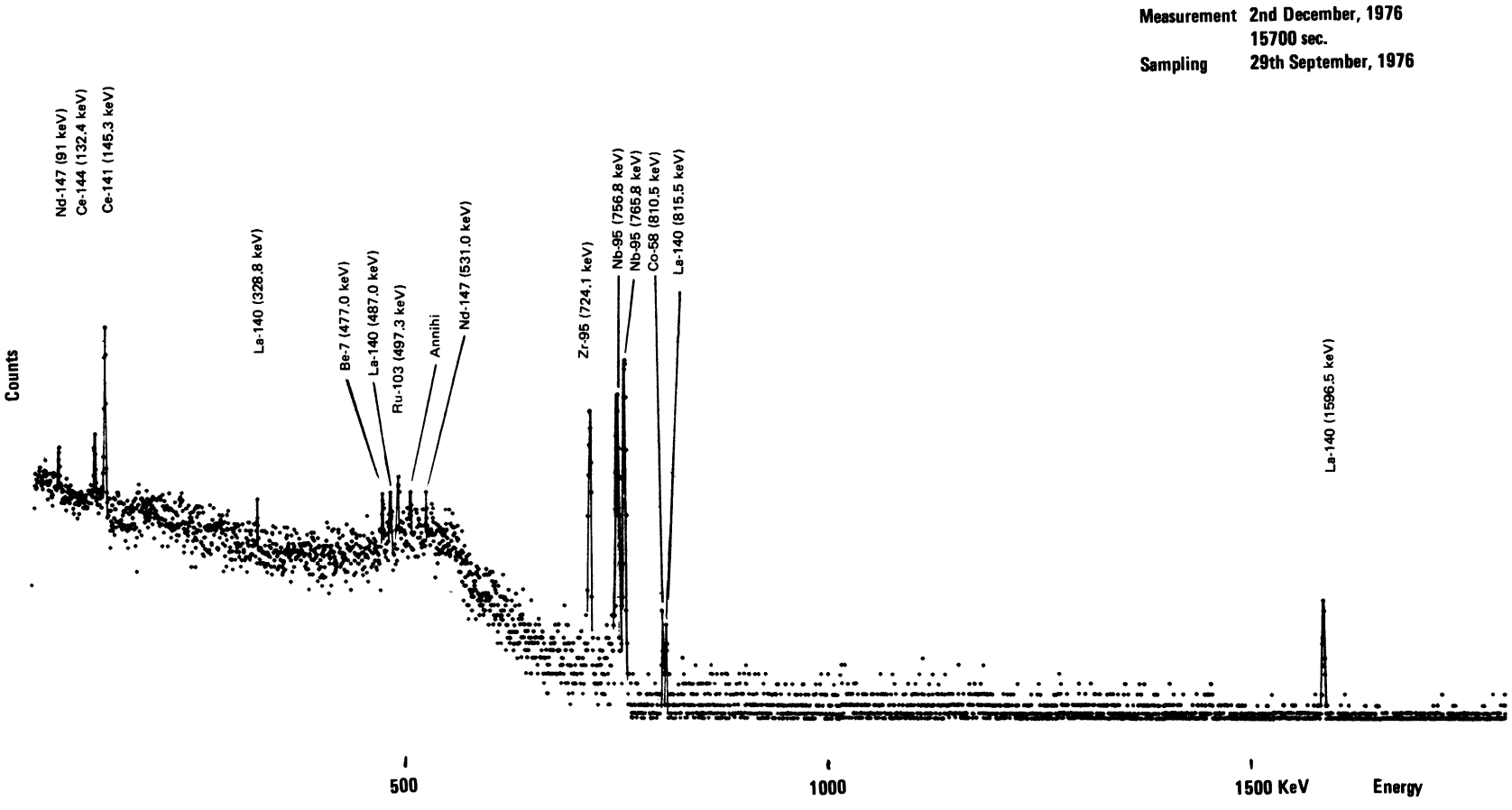


Figure 18-3: Spectrum of Radionuclides in Airborne Dust Analyzed by the Ge(Li) Semi-conductor (two monthes after sampling)
(Fukui Prefectural Institute of Public Health)



6 Data concerning the radioactivity surveillance.

Figures. 19 and 20 show the chart of air stream in upper atmosphere and the chart of radiosensitivity measured at the same time in various monitoring posts.

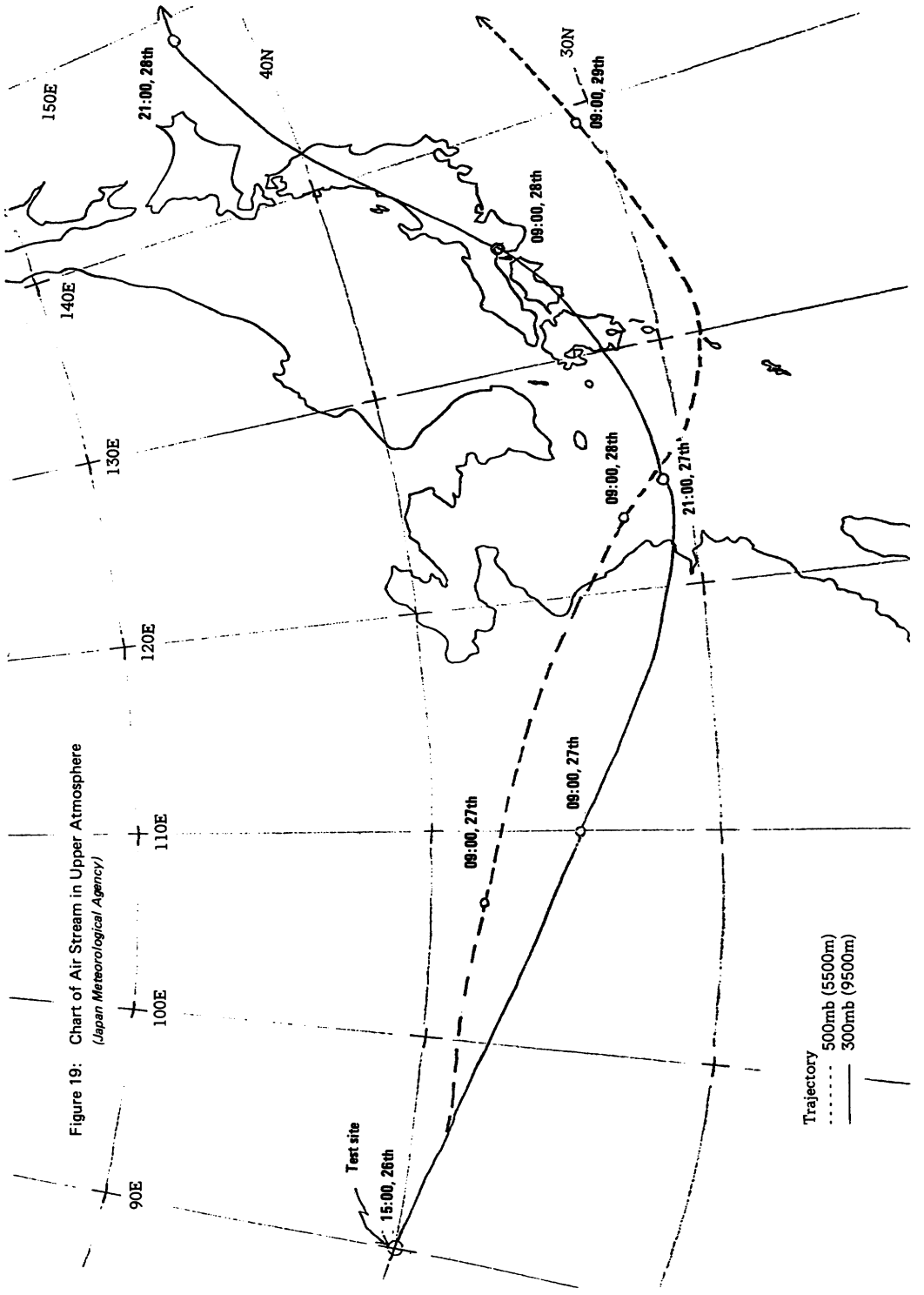
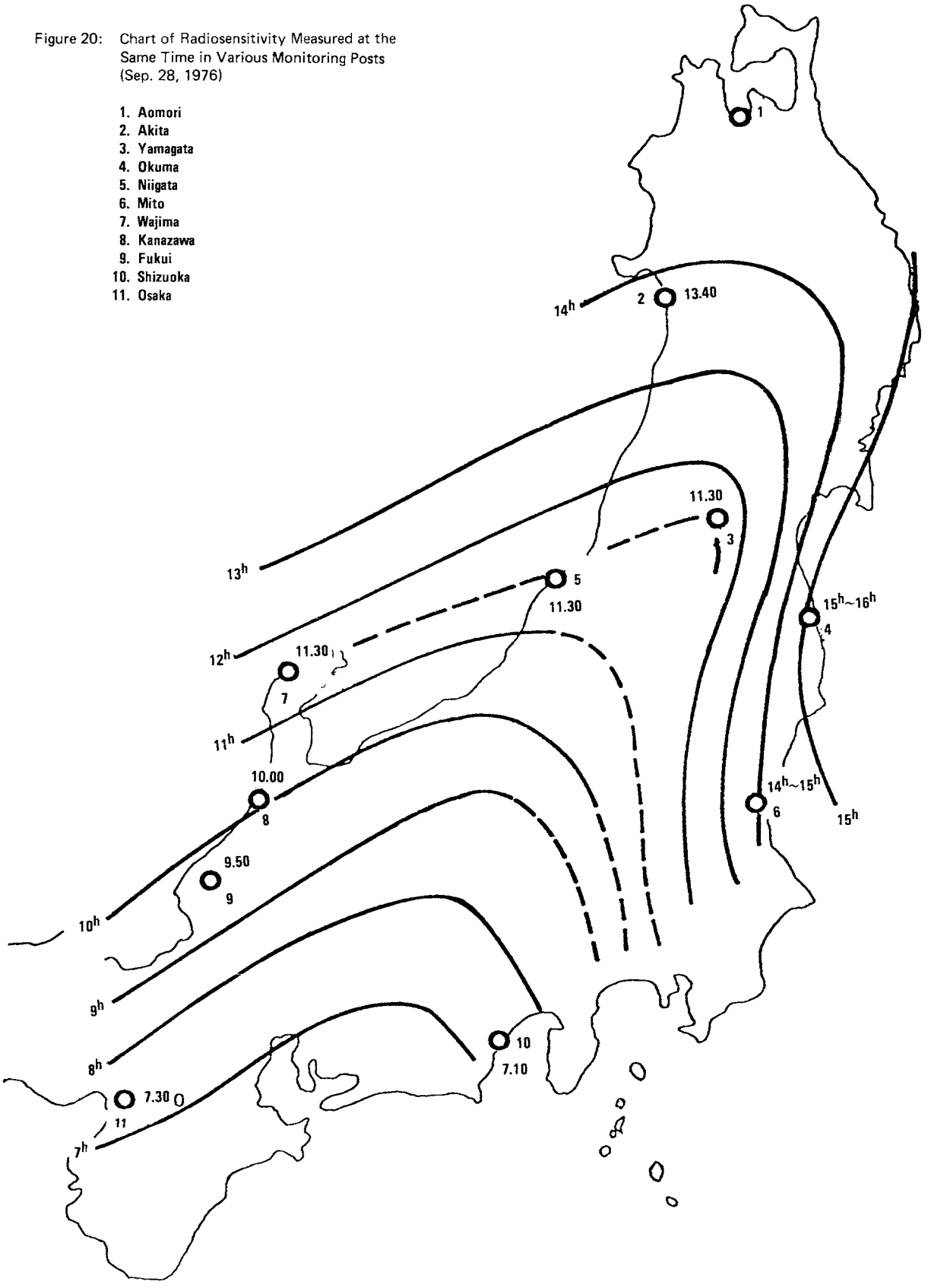


Figure 19: Chart of Air Stream in Upper Atmosphere (*Japan Meteorological Agency*)

Figure 20: Chart of Radiosensitivity Measured at the Same Time in Various Monitoring Posts (Sep. 28, 1976)

1. Aomori
2. Akita
3. Yamagata
4. Okuma
5. Niigata
6. Mito
7. Wajima
8. Kanazawa
9. Fukui
10. Shizuoka
11. Osaka



7. **The 20th Nuclear Explosion Test of the Peoples' Republic of China (underground Nuclear Test).**

(1) The New China News Agency and the Radio Peking announced that China conducted the underground nuclear explosion test on 17 October, 1976. However, no exact data concerning the data, the place and the scale of this test was stated in above announcement.

(2) However, relatively high radioactivity than that of normal level was detected in the rain and dry fallout samples collected from several prefectures.

Table 19 shows the results of the measurement on the gross beta-radioactivity in rain and dry fallout.

The sampleing locations are shown in Figure 21.

Table 19. Gross Beta-Activity in Rain and Dry Fallout

(Prefectural Institutes and Laboratories)

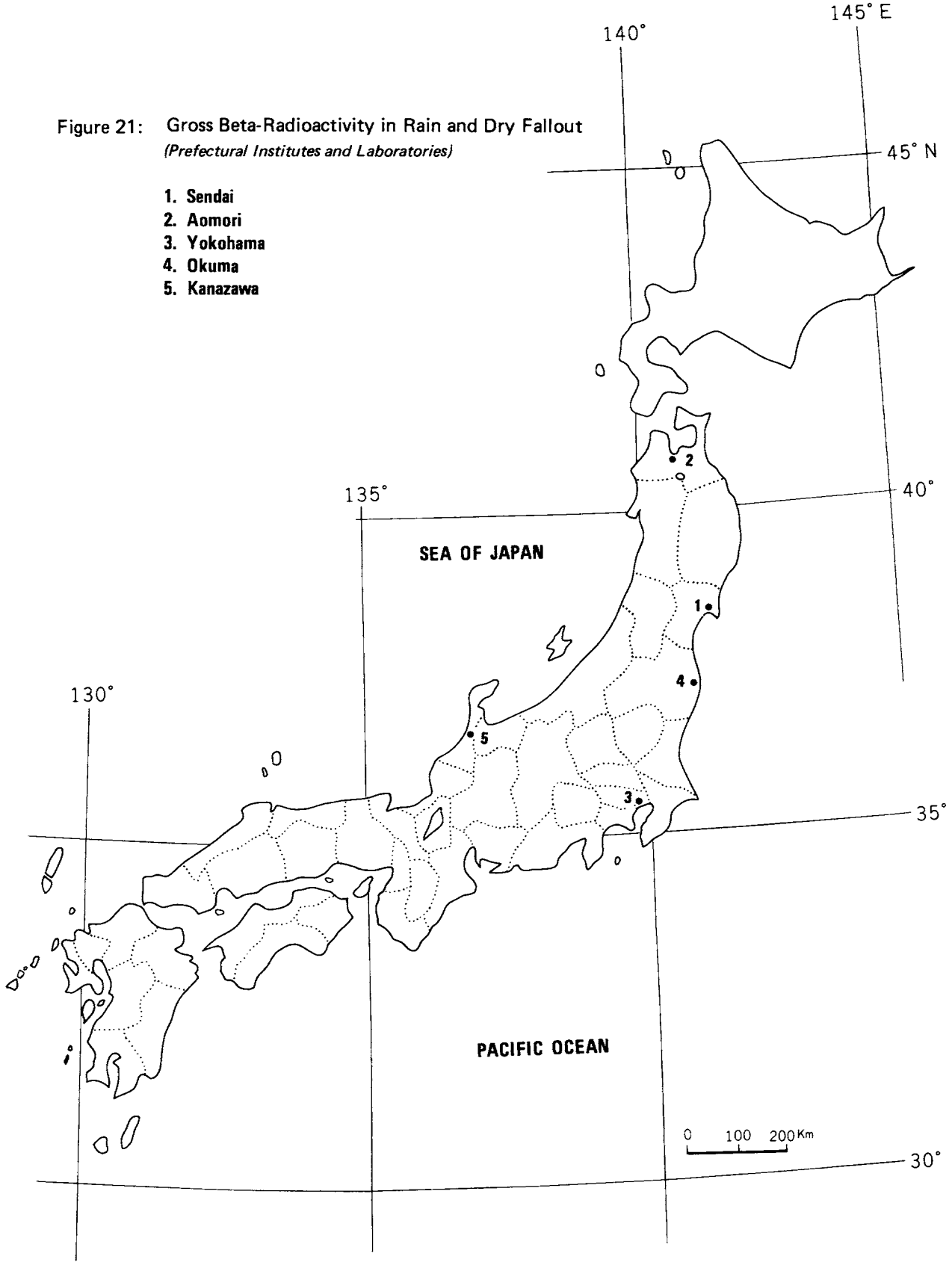
Upper row : Concentration (pCi/cm³)
(Lower row) : Deposition (mCi/km²)

Station \ Date	Sep. 26	28	29	Oct. 9	10	15	16	18	19	20	21	22
Sendai, MIYAGI	0.02	0.04	0.4	0.2	0.02	0.21				(10:00~13:00) 1.06 (13:00~3:00) 0.10		
Aomori, AOMORI						0.35 (5.21)				0.54 (2.9)		
Yokohama, KANAGAWA					(Oct. 14) 0.28 (3.0)	0.25 (2.6)	1.20 (3.7)	0.26 (3.3)		0.18 (4.8)		
Okuma, FUKUSHIMA										0.09 (6.2)		
Kanazawa, ISHIKAWA					(Oct. 14) 0.14 (4.2)	0.21 (4.7)			1.2 (4.2)	0.2 (3.9)	0.14 (1.4)	

Note: In the ordinary condition, concentration and deposition of radioactive nuclides in rain and dry fallout samples were the values less than 1 pCi/cm³ and 2 ~ 3 mCi/km², respectively.

Figure 21: Gross Beta-Radioactivity in Rain and Dry Fallout
(Prefectural Institutes and Laboratories)

1. **Sendai**
2. **Aomori**
3. **Yokohama**
4. **Okuma**
5. **Kanazawa**



ERRATA

1) Survey Data No. 40, page 17

Error

Prefecture	Location	^{137}Cs (pCi/ℓ)
Jul. 1974		
AOMORI	Mutsu bay	0.83±0.02

Right

AOMORI	Mutsu bay	0.38±0.02

2) Survey Data No. 40, page 18

Error	Right
Prefecture	Prefecture
Sep. 1974	Sep. 1974
OSAKA	OSAKA
YAMAGUCHI	YAMAGUCHI
SHIZUOKA	Dec. 1974
SHIZUOKA	SHIZUOKA
	SHIZUOKA

3) Survey Data No. 41, page 26, Institute and Address

Error	
Japan Meteorological Agency	4-35-8, Koenji-Kita, Suginami-ku, Tokyo, 174 Japan
Right	
Japan Meteorological Agency	1-3-4, Otemachi, Chiyoda-ku, Tokyo, 100 Japan