

# Report on the $\gamma$ -ray measurement after the accident of Fukushima I Nuclear Power Plant

## Part I

### Radioactivity concentration in the air at RIKEN Wako Institute



**RIKEN Nishina Center**  
Wako, Saitama 351-0198, Japan  
April 25, 2011



# Procedures

## 1. Collection of atmospheric suspended dust

Air sampler: M&F Enterprise SP-30 (30 L/min)

Period: March 15, 2011, 11:15 – April 21, 2011, 10:00

Location: Nishina building 2F (open air), RIKEN Wako Institute  
2-1 Hirosawa, Wako, Saitama 351-0198, Japan

Latitude: 35° 46' 32" north

Longitude: 139° 37' 04" east

Altitude: 35 m

Filter: ADVANTEC HE-40T (without an activated carbon filter)

## 2. $\gamma$ -ray spectrometry

High-pure Ge detector: ORTEC GEM type

Location: Nishina building BF2, RIKEN Wako Institute

# Results

## 1. Nuclides identified in the $\gamma$ -ray spectra

**Table 1.** List of nuclides identified in the  $\gamma$ -ray spectra.

Nuclide	Half-life	$\gamma$ -ray energy (keV)	$\gamma$ intensity
La-140	1.68 d	1596.2	0.954
Ba-140	12.8 d	537.3	0.2439
Cs-137	30.1 y	661.7	0.851
Cs-136g	13.2 d	818.5	1.00
Cs-134g	2.06 y	604.7	0.9762
I-133g	20.8 h	529.9	0.87
I-132g	2.30 h	667.7	0.987
Te-132	3.20 d	228.2	0.88
I-131	8.02 d	364.5	0.817
Te-131m	30 h	773.7&774.1	0.506
Te-131g	25.0 min	149.7	0.6875
Ag-110m	249.8 d	884.7	72.2
Tc-99m	6.01 h	140.5	0.8906
Mo-99	65.9 h	739.5	0.1213
Nb-95	35.0 d	765.8	0.9981

## 2. $\gamma$ -ray spectrum

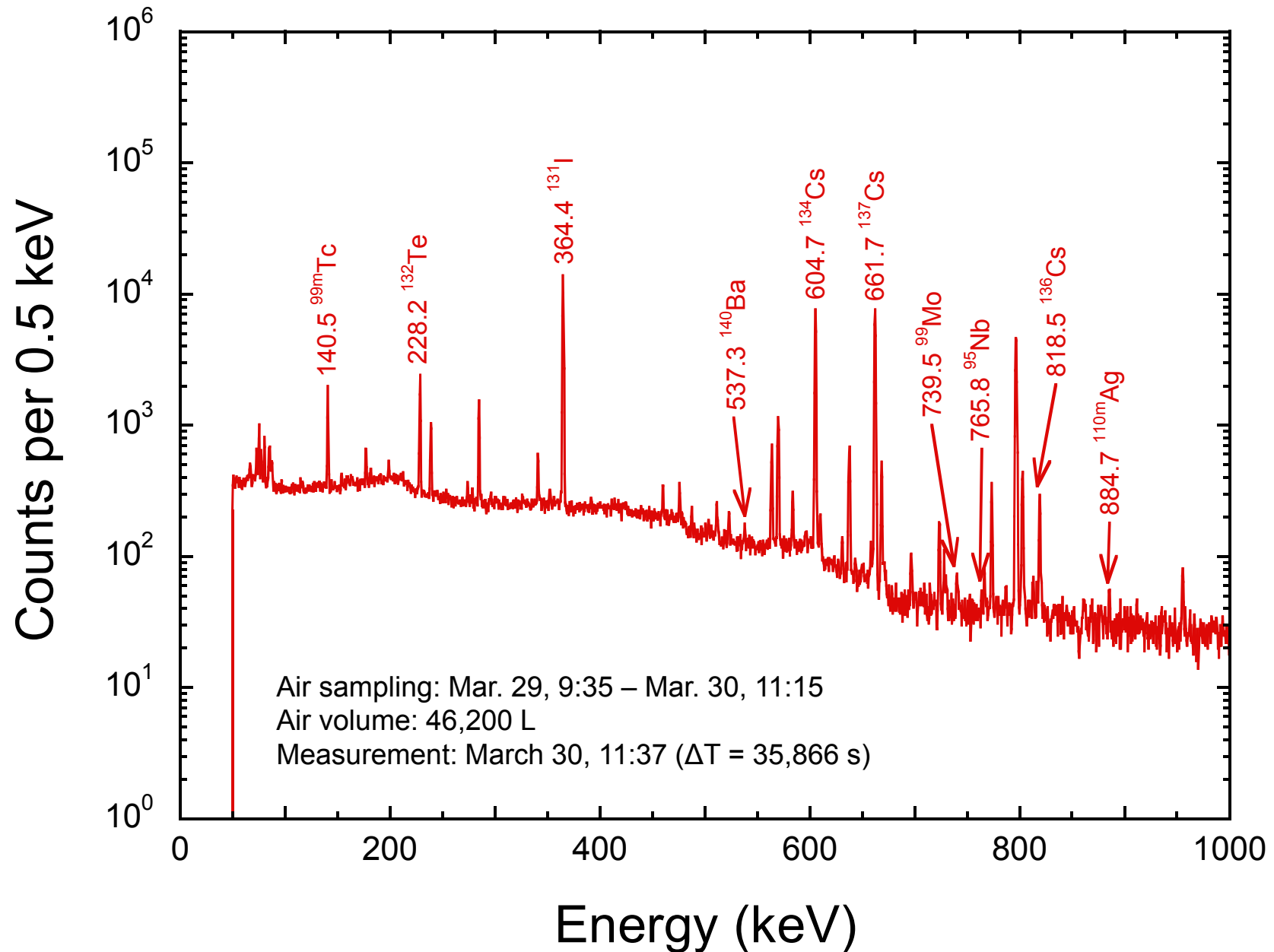


Fig. 1. Typical  $\gamma$ -ray spectrum at  $E_\gamma = 0 - 1000$  keV.

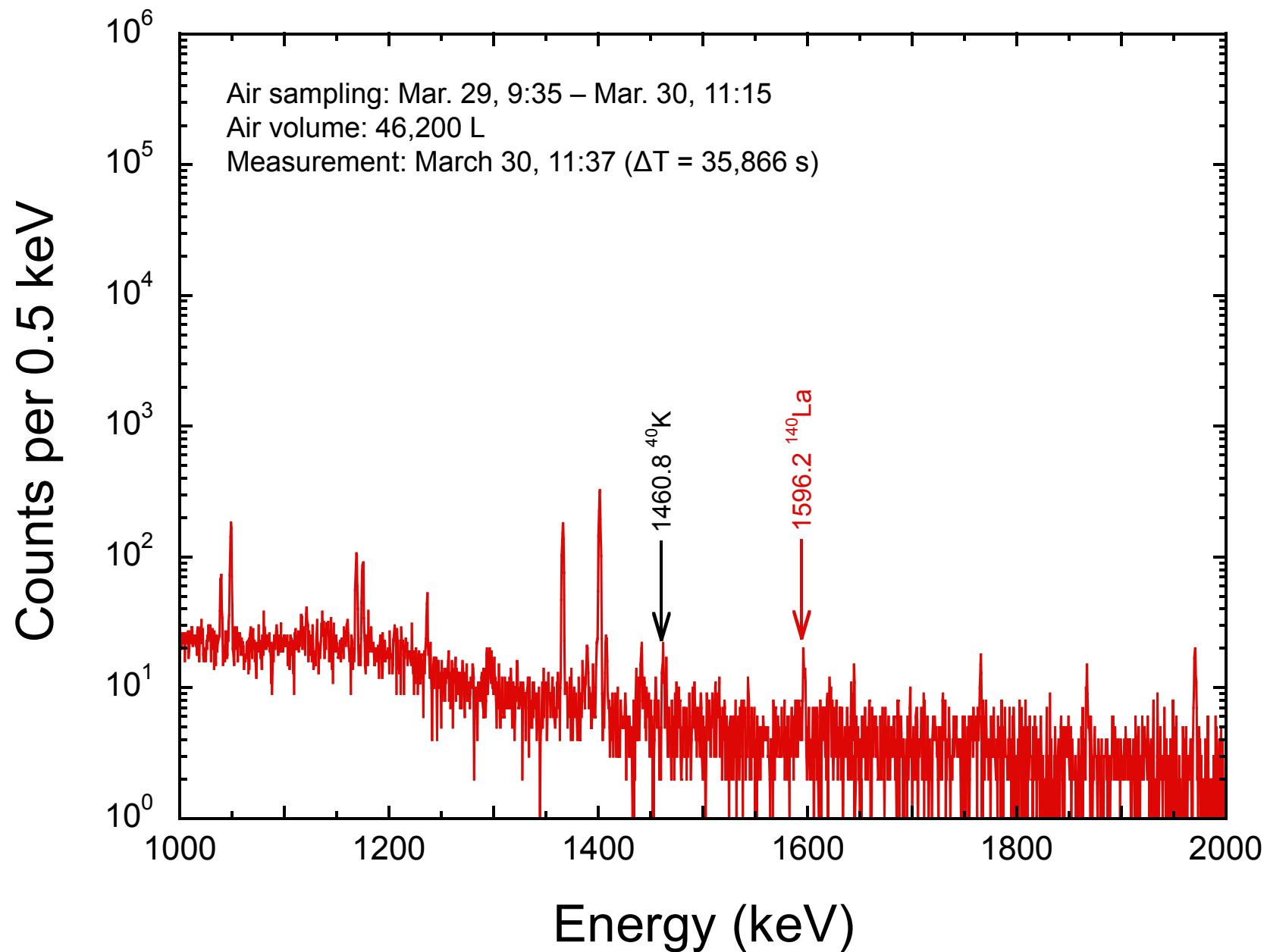


Fig. 1. (continued) Typical  $\gamma$ -ray spectrum at  $E_\gamma = 1000 - 2000$  keV.

### 3. Radioactivity concentrations

#### (a) Evaluated nuclides

$^{131}\text{I}$ ,  $^{132}\text{Te}$ ,  $^{137,136,134}\text{Cs}$ ,  $^{99}\text{Mo}$ ,  $^{140}\text{La}$ ,  $^{140}\text{Ba}$ ,  $^{95}\text{Nb}$ , and  $^{110\text{m}}\text{Ag}$

#### (b) Radioactivity

Radioactivities at the end time of sampling, corrected for decay loss during the measurement

#### (c) Comparison with some literatures

i) High Energy Accelerator Research Organization (KEK)

Air collection: National Institute for Environmental Studies (NIES)

16-2 Onogawa, Tsukuba, Ibaraki, 305-8506 Japan

Data source: <http://www.kek.jp/quake/radmonitor/>

ii) Japan Chemical Analysis Center (JCAC)

Air collection: JCAC

295-3 Sannou, Inage, Chiba, 263-0002, Japan

Data source: <http://www.jcac.or.jp/fukushima.html>

**Table 2.** Radioactivity concentrations of <sup>131</sup>I, <sup>132</sup>Te, and <sup>137</sup>Cs.

Air sampling		Air	<sup>131</sup> I	<sup>132</sup> Te	<sup>137</sup> Cs				
Start	Stop	[h]	[L]	[Bq/cm <sup>3</sup> ]	[Bq/cm <sup>3</sup> ]				
2011/3/15 11:15	2011/3/15 11:45	0.50	900	3.6E-05	7.5E-06	6.1E-05	1.2E-05	9.5E-06	1.7E-06
2011/3/16 13:15	2011/3/16 13:45	0.50	900	7.8E-07	1.6E-07	1.4E-07	5.6E-08	2.2E-08	9.6E-09
2011/3/16 18:32	2011/3/17 9:00	14.47	26040	5.7E-08	1.2E-08	6.6E-09	1.4E-09	1.4E-09	4.5E-10
2011/3/17 9:00	2011/3/18 10:15	25.25	45450	4.4E-08	8.9E-09	4.8E-09	1.0E-09	1.5E-09	3.6E-10
2011/3/18 10:30	2011/3/19 6:44	20.23	36420	7.7E-08	1.6E-08	1.5E-09	4.5E-10	5.9E-10	2.7E-10
2011/3/19 10:05	2011/3/20 10:00	23.92	43050	7.8E-08	1.6E-08	1.7E-09	4.4E-10	8.6E-10	2.4E-10
2011/3/20 10:00	2011/3/21 10:00	24.00	43200	5.4E-06	1.1E-06	2.4E-06	4.8E-07	2.4E-06	4.3E-07
2011/3/21 10:00	2011/3/22 10:00	24.00	43200	2.4E-06	4.9E-07	1.6E-06	3.2E-07	6.4E-07	1.2E-07
2011/3/22 10:00	2011/3/23 10:00	24.00	43200	7.8E-06	1.6E-06	7.4E-07	1.5E-07	1.3E-07	2.3E-08
2011/3/23 10:00	2011/3/24 10:10	24.17	43500	1.3E-06	2.7E-07	7.2E-09	1.6E-09	1.5E-08	2.8E-09
2011/3/24 10:10	2011/3/25 9:55	23.75	42750	1.6E-07	3.2E-08	1.3E-09	4.3E-10	2.5E-09	5.5E-10
2011/3/25 9:55	2011/3/26 10:00	24.08	43350	1.2E-07	2.6E-08	3.8E-09	7.9E-10	4.5E-09	8.4E-10
2011/3/26 10:00	2011/3/27 10:15	24.25	43650	2.0E-08	4.1E-09	2.5E-09	5.8E-10	2.6E-09	5.2E-10
2011/3/27 10:15	2011/3/28 11:00	24.75	44550	2.6E-08	5.4E-09	1.1E-09	3.4E-10	2.3E-09	4.8E-10
2011/3/28 11:00	2011/3/29 9:35	22.58	40650	1.0E-07	2.1E-08	4.4E-09	9.4E-10	2.5E-08	4.6E-09
2011/3/29 9:35	2011/3/30 11:15	25.67	46200	2.8E-07	5.7E-08	2.6E-08	5.3E-09	2.9E-07	5.2E-08
2011/3/30 11:15	2011/3/31 10:00	22.75	40950	1.7E-07	3.5E-08	1.5E-08	3.1E-09	2.9E-07	5.2E-08
2011/3/31 10:00	2011/4/1 10:00	24.00	43200	1.2E-08	2.4E-09	7.2E-12	2.2E-10	2.0E-09	4.2E-10
2011/4/1 10:00	2011/4/2 10:00	24.00	43200	2.3E-08	4.7E-09	2.5E-10	1.5E-10	4.3E-09	8.0E-10
2011/4/2 10:00	2011/4/3 9:30	23.50	42300	9.4E-09	2.0E-09	5.1E-10	2.7E-10	3.0E-09	5.9E-10
2011/4/3 9:30	2011/4/4 10:00	24.50	44100	3.6E-08	7.3E-09	7.4E-10	2.8E-10	1.2E-08	2.2E-09
2011/4/4 10:00	2011/4/5 9:15	23.25	41850	9.3E-09	1.9E-09	5.5E-10	2.3E-10	2.9E-09	5.7E-10
2011/4/5 9:15	2011/4/6 10:00	24.75	44550	9.8E-09	2.0E-09	0.0E+00	1.9E-10	1.6E-09	3.6E-10
2011/4/6 10:00	2011/4/7 10:00	24.00	43200	1.2E-08	2.5E-09	2.8E-10	2.1E-10	4.4E-09	8.4E-10
2011/4/7 10:00	2011/4/8 10:00	24.00	43200	8.9E-09	1.9E-09	1.5E-10	2.1E-10	5.2E-09	9.9E-10
2011/4/8 10:00	2011/4/9 9:20	23.33	42000	5.9E-09	1.2E-09	0.0E+00	1.4E-10	2.9E-09	5.5E-10
2011/4/9 9:20	2011/4/11 10:00	48.67	87600	1.7E-08	3.4E-09	1.2E-10	1.2E-10	1.9E-08	3.4E-09
2011/4/11 10:00	2011/4/13 10:00	48.00	86400	5.8E-09	1.2E-09	1.2E-10	7.9E-11	4.3E-09	7.8E-10
2011/4/13 10:00	2011/4/15 10:30	48.50	87300	2.7E-09	5.7E-10	0.0E+00	1.1E-10	1.1E-09	2.3E-10
2011/4/15 10:30	2011/4/17 10:00	47.50	85500	1.3E-09	3.0E-10	0.0E+00	1.2E-10	2.7E-09	5.0E-10
2011/4/17 10:00	2011/4/19 10:00	48.00	86400	2.5E-08	5.1E-09	3.2E-11	9.9E-11	2.1E-08	3.8E-09
2011/4/19 10:00	2011/4/21 10:00	48.00	86400	1.2E-08	2.5E-09	1.2E-10	1.4E-10	1.2E-08	2.2E-09

**Table 2. (continued) Radioactivity concentrations of <sup>136</sup>Cs, <sup>134</sup>Cs, and <sup>99</sup>Mo.**

Air sampling		Air	<sup>136</sup> Cs	er	<sup>134</sup> Cs	er	<sup>99</sup> Mo	er	
Start	Stop	[h]	[L]	[Bq/cm <sup>3</sup> ]		[Bq/cm <sup>3</sup> ]	[Bq/cm <sup>3</sup> ]		
2011/3/15 11:15	2011/3/15 11:45	0.50	900	1.3E-06	2.2E-07	7.0E-06	1.3E-06	1.1E-06	2.0E-06
2011/3/16 13:15	2011/3/16 13:45	0.50	900	0.0E+00	1.2E-08	7.2E-09	9.6E-09	1.6E-07	3.9E-07
2011/3/16 18:32	2011/3/17 9:00	14.47	26040	4.4E-10	3.1E-10	1.4E-09	4.7E-10	1.9E-09	2.4E-09
2011/3/17 9:00	2011/3/18 10:15	25.25	45450	5.8E-11	1.8E-10	8.3E-10	2.8E-10	2.2E-09	1.4E-09
2011/3/18 10:30	2011/3/19 6:44	20.23	36420	0.0E+00	2.4E-10	0.0E+00	2.6E-10	2.8E-11	1.8E-09
2011/3/19 10:05	2011/3/20 10:00	23.92	43050	0.0E+00	1.7E-10	3.7E-10	2.1E-10	4.2E-10	1.6E-09
2011/3/20 10:00	2011/3/21 10:00	24.00	43200	2.6E-07	4.4E-08	1.8E-06	3.3E-07	1.4E-07	3.4E-08
2011/3/21 10:00	2011/3/22 10:00	24.00	43200	6.9E-08	1.2E-08	4.7E-07	8.7E-08	1.8E-08	1.3E-08
2011/3/22 10:00	2011/3/23 10:00	24.00	43200	9.7E-09	2.0E-09	1.0E-07	1.9E-08	5.2E-08	1.2E-08
2011/3/23 10:00	2011/3/24 10:10	24.17	43500	1.3E-09	3.6E-10	1.2E-08	2.3E-09	5.3E-09	2.1E-09
2011/3/24 10:10	2011/3/25 9:55	23.75	42750	2.6E-10	2.4E-10	1.4E-09	4.1E-10	2.7E-09	1.8E-09
2011/3/25 9:55	2011/3/26 10:00	24.08	43350	8.8E-11	1.2E-10	3.2E-09	6.2E-10	1.1E-09	9.3E-10
2011/3/26 10:00	2011/3/27 10:15	24.25	43650	0.0E+00	1.9E-10	2.3E-09	4.8E-10	7.0E-10	1.6E-09
2011/3/27 10:15	2011/3/28 11:00	24.75	44550	1.2E-10	1.7E-10	1.5E-09	3.6E-10	8.6E-10	1.6E-09
2011/3/28 11:00	2011/3/29 9:35	22.58	40650	1.1E-09	2.8E-10	2.0E-08	3.8E-09	6.2E-10	1.6E-09
2011/3/29 9:35	2011/3/30 11:15	25.67	46200	1.1E-08	1.9E-09	2.3E-07	4.2E-08	1.3E-08	3.9E-09
2011/3/30 11:15	2011/3/31 10:00	22.75	40950	1.1E-08	1.9E-09	2.2E-07	4.1E-08	4.2E-09	3.0E-09
2011/3/31 10:00	2011/4/1 10:00	24.00	43200	1.1E-10	1.7E-10	1.4E-09	3.4E-10	6.7E-10	1.3E-09
2011/4/1 10:00	2011/4/2 10:00	24.00	43200	3.1E-10	1.2E-10	3.1E-09	5.9E-10	1.6E-09	9.3E-10
2011/4/2 10:00	2011/4/3 9:30	23.50	42300	1.9E-10	1.7E-10	1.6E-09	3.8E-10	6.7E-10	1.7E-09
2011/4/3 9:30	2011/4/4 10:00	24.50	44100	6.0E-10	2.1E-10	9.7E-09	1.8E-09	0.0E+00	1.3E-09
2011/4/4 10:00	2011/4/5 9:15	23.25	41850	1.7E-10	1.7E-10	2.0E-09	4.4E-10	1.9E-09	1.3E-09
2011/4/5 9:15	2011/4/6 10:00	24.75	44550	0.0E+00	1.6E-10	1.1E-09	2.9E-10	4.6E-10	1.1E-09
2011/4/6 10:00	2011/4/7 10:00	24.00	43200	1.6E-10	1.7E-10	4.1E-09	8.0E-10	0.0E+00	1.2E-09
2011/4/7 10:00	2011/4/8 10:00	24.00	43200	3.1E-10	1.7E-10	4.0E-09	7.9E-10	4.6E-10	1.2E-09
2011/4/8 10:00	2011/4/9 9:20	23.33	42000	0.0E+00	1.1E-10	2.3E-09	4.5E-10	8.7E-10	8.4E-10
2011/4/9 9:20	2011/4/11 10:00	48.67	87600	3.9E-10	1.3E-10	1.5E-08	2.8E-09	5.2E-10	7.4E-10
2011/4/11 10:00	2011/4/13 10:00	48.00	86400	7.7E-11	5.5E-11	3.4E-09	6.4E-10	0.0E+00	4.8E-10
2011/4/13 10:00	2011/4/15 10:30	48.50	87300	7.6E-11	8.1E-11	7.8E-10	1.8E-10	0.0E+00	7.1E-10
2011/4/15 10:30	2011/4/17 10:00	47.50	85500	1.1E-10	8.5E-11	1.7E-09	3.4E-10	0.0E+00	7.4E-10
2011/4/17 10:00	2011/4/19 10:00	48.00	86400	3.3E-10	1.0E-10	1.7E-08	3.1E-09	0.0E+00	6.1E-10
2011/4/19 10:00	2011/4/21 10:00	48.00	86400	2.8E-10	1.3E-10	9.7E-09	1.8E-09	0.0E+00	8.1E-10



**Table 2. (continued) Radioactivity concentrations of  $^{140}\text{Ba}$  and  $^{140}\text{La}$ .**

Air sampling		Air	$^{140}\text{Ba}$	er	$^{140}\text{La}$	er	
Start	Stop	[h]	[L]	[Bq/cm <sup>3</sup> ]	[Bq/cm <sup>3</sup> ]		
2011/3/15 11:15	2011/3/15 11:45	0.50	900	5.4E-07	2.1E-07	1.1E-05	2.1E-06
2011/3/16 13:15	2011/3/16 13:45	0.50	900	0.0E+00	4.9E-08	2.8E-07	2.7E-07
2011/3/16 18:32	2011/3/17 9:00	14.47	26040	3.1E-10	1.3E-09	0.0E+00	4.3E-10
2011/3/17 9:00	2011/3/18 10:15	25.25	45450	8.4E-11	7.5E-10	3.2E-10	2.6E-10
2011/3/18 10:30	2011/3/19 6:44	20.23	36420	0.0E+00	9.0E-10	4.5E-11	3.6E-10
2011/3/19 10:05	2011/3/20 10:00	23.92	43050	1.1E-09	7.3E-10	0.0E+00	3.0E-10
2011/3/20 10:00	2011/3/21 10:00	24.00	43200	3.7E-08	1.6E-08	9.2E-09	2.7E-09
2011/3/21 10:00	2011/3/22 10:00	24.00	43200	1.1E-08	7.9E-09	5.8E-09	1.6E-09
2011/3/22 10:00	2011/3/23 10:00	24.00	43200	4.0E-09	4.9E-09	1.4E-09	9.0E-10
2011/3/23 10:00	2011/3/24 10:10	24.17	43500	0.0E+00	1.2E-09	7.2E-12	3.3E-10
2011/3/24 10:10	2011/3/25 9:55	23.75	42750	2.0E-10	9.1E-10	1.4E-10	3.7E-10
2011/3/25 9:55	2011/3/26 10:00	24.08	43350	3.0E-11	4.4E-10	2.3E-10	1.8E-10
2011/3/26 10:00	2011/3/27 10:15	24.25	43650	0.0E+00	6.7E-10	1.2E-10	3.8E-10
2011/3/27 10:15	2011/3/28 11:00	24.75	44550	0.0E+00	6.9E-10	6.9E-11	3.6E-10
2011/3/28 11:00	2011/3/29 9:35	22.58	40650	7.9E-10	8.6E-10	3.0E-10	3.1E-10
2011/3/29 9:35	2011/3/30 11:15	25.67	46200	4.6E-09	2.2E-09	1.6E-09	4.4E-10
2011/3/30 11:15	2011/3/31 10:00	22.75	40950	3.8E-09	2.0E-09	2.0E-09	4.6E-10
2011/3/31 10:00	2011/4/1 10:00	24.00	43200	0.0E+00	6.4E-10	1.7E-10	3.1E-10
2011/4/1 10:00	2011/4/2 10:00	24.00	43200	1.5E-10	4.3E-10	0.0E+00	1.9E-10
2011/4/2 10:00	2011/4/3 9:30	23.50	42300	2.1E-10	6.7E-10	0.0E+00	3.2E-10
2011/4/3 9:30	2011/4/4 10:00	24.50	44100	0.0E+00	7.2E-10	0.0E+00	2.8E-10
2011/4/4 10:00	2011/4/5 9:15	23.25	41850	4.4E-10	6.3E-10	0.0E+00	2.5E-10
2011/4/5 9:15	2011/4/6 10:00	24.75	44550	0.0E+00	6.1E-10	0.0E+00	2.6E-10
2011/4/6 10:00	2011/4/7 10:00	24.00	43200	4.0E-10	6.8E-10	0.0E+00	2.8E-10
2011/4/7 10:00	2011/4/8 10:00	24.00	43200	3.2E-10	6.6E-10	0.0E+00	2.5E-10
2011/4/8 10:00	2011/4/9 9:20	23.33	42000	0.0E+00	4.1E-10	2.1E-11	1.8E-10
2011/4/9 9:20	2011/4/11 10:00	48.67	87600	0.0E+00	4.3E-10	0.0E+00	1.4E-10
2011/4/11 10:00	2011/4/13 10:00	48.00	86400	0.0E+00	2.1E-10	2.1E-10	1.1E-10
2011/4/13 10:00	2011/4/15 10:30	48.50	87300	4.7E-11	3.3E-10	2.0E-10	1.6E-10
2011/4/15 10:30	2011/4/17 10:00	47.50	85500	0.0E+00	3.2E-10	1.6E-11	1.6E-10
2011/4/17 10:00	2011/4/19 10:00	48.00	86400	3.8E-10	3.4E-10	2.5E-10	1.2E-10
2011/4/19 10:00	2011/4/21 10:00	48.00	86400	0.0E+00	4.9E-10	1.2E-10	1.4E-10

**Table 2. (continued) Radioactivity concentrations of <sup>95</sup>Nb and <sup>110m</sup>Ag.**

Air sampling		Air	<sup>95</sup> Nb	er	<sup>110m</sup> Ag	er	
Start	Stop	[h]	[L]	[Bq/cm <sup>3</sup> ]	[Bq/cm <sup>3</sup> ]		
2011/3/15 11:15	2011/3/15 11:45	0.50	900	4.2E-08	2.7E-08	5.5E-08	3.0E-08
2011/3/16 13:15	2011/3/16 13:45	0.50	900	0.0E+00	8.4E-09	4.9E-09	9.3E-09
2011/3/16 18:32	2011/3/17 9:00	14.47	26040	4.4E-10	3.0E-10	0.0E+00	3.6E-10
2011/3/17 9:00	2011/3/18 10:15	25.25	45450	0.0E+00	1.6E-10	0.0E+00	2.3E-10
2011/3/18 10:30	2011/3/19 6:44	20.23	36420	2.4E-10	2.0E-10	0.0E+00	2.8E-10
2011/3/19 10:05	2011/3/20 10:00	23.92	43050	7.5E-11	1.6E-10	1.1E-10	2.1E-10
2011/3/20 10:00	2011/3/21 10:00	24.00	43200	0.0E+00	2.8E-09	1.2E-09	3.6E-09
2011/3/21 10:00	2011/3/22 10:00	24.00	43200	5.5E-10	1.5E-09	2.5E-09	2.1E-09
2011/3/22 10:00	2011/3/23 10:00	24.00	43200	0.0E+00	9.6E-10	1.9E-10	1.2E-09
2011/3/23 10:00	2011/3/24 10:10	24.17	43500	2.1E-10	2.3E-10	1.3E-10	2.7E-10
2011/3/24 10:10	2011/3/25 9:55	23.75	42750	4.1E-10	2.4E-10	2.8E-10	2.8E-10
2011/3/25 9:55	2011/3/26 10:00	24.08	43350	3.5E-10	1.2E-10	8.1E-11	1.3E-10
2011/3/26 10:00	2011/3/27 10:15	24.25	43650	6.6E-11	1.5E-10	0.0E+00	2.0E-10
2011/3/27 10:15	2011/3/28 11:00	24.75	44550	2.6E-10	1.5E-10	3.2E-10	2.1E-10
2011/3/28 11:00	2011/3/29 9:35	22.58	40650	6.8E-10	2.1E-10	2.6E-10	2.2E-10
2011/3/29 9:35	2011/3/30 11:15	25.67	46200	1.5E-09	4.6E-10	1.7E-09	5.6E-10
2011/3/30 11:15	2011/3/31 10:00	22.75	40950	1.5E-09	4.3E-10	1.4E-09	5.4E-10
2011/3/31 10:00	2011/4/1 10:00	24.00	43200	2.4E-11	1.4E-10	0.0E+00	1.8E-10
2011/4/1 10:00	2011/4/2 10:00	24.00	43200	3.4E-10	1.1E-10	1.7E-10	1.3E-10
2011/4/2 10:00	2011/4/3 9:30	23.50	42300	2.4E-10	1.5E-10	1.0E-10	1.9E-10
2011/4/3 9:30	2011/4/4 10:00	24.50	44100	4.8E-10	1.8E-10	9.1E-11	2.2E-10
2011/4/4 10:00	2011/4/5 9:15	23.25	41850	2.0E-10	1.4E-10	1.3E-11	1.8E-10
2011/4/5 9:15	2011/4/6 10:00	24.75	44550	9.5E-11	1.4E-10	1.7E-10	1.8E-10
2011/4/6 10:00	2011/4/7 10:00	24.00	43200	1.1E-10	1.5E-10	4.9E-10	2.2E-10
2011/4/7 10:00	2011/4/8 10:00	24.00	43200	9.4E-12	1.4E-10	1.0E-10	2.1E-10
2011/4/8 10:00	2011/4/9 9:20	23.33	42000	9.7E-11	9.2E-11	0.0E+00	1.2E-10
2011/4/9 9:20	2011/4/11 10:00	48.67	87600	4.4E-10	1.2E-10	5.5E-10	1.6E-10
2011/4/11 10:00	2011/4/13 10:00	48.00	86400	9.6E-11	4.7E-11	6.4E-11	6.3E-11
2011/4/13 10:00	2011/4/15 10:30	48.50	87300	0.0E+00	6.8E-11	0.0E+00	9.3E-11
2011/4/15 10:30	2011/4/17 10:00	47.50	85500	1.6E-10	7.8E-11	8.4E-14	9.5E-11
2011/4/17 10:00	2011/4/19 10:00	48.00	86400	2.7E-10	8.1E-11	1.1E-10	8.7E-11
2011/4/19 10:00	2011/4/21 10:00	48.00	86400	1.5E-10	1.0E-10	1.4E-10	1.4E-10

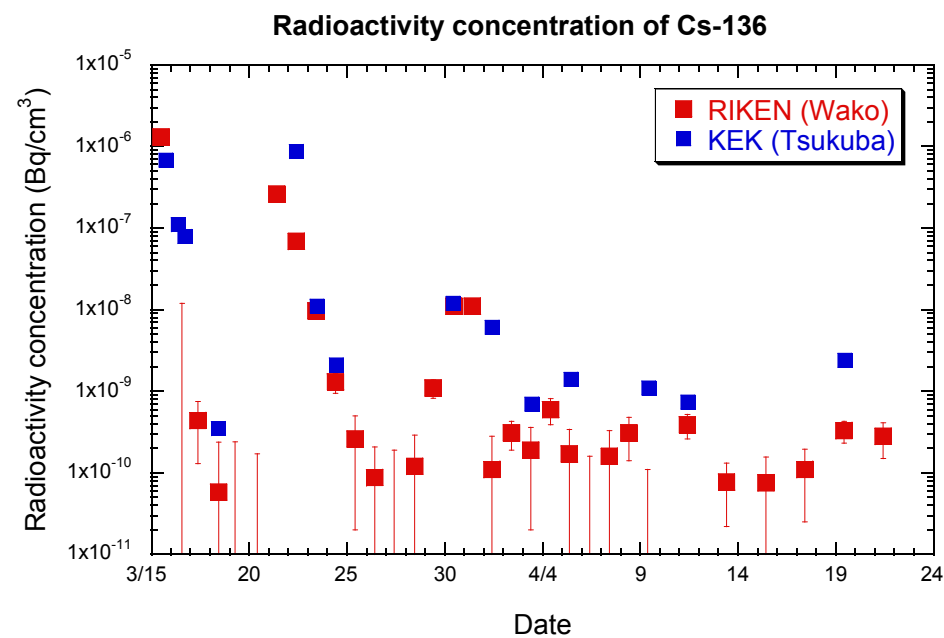
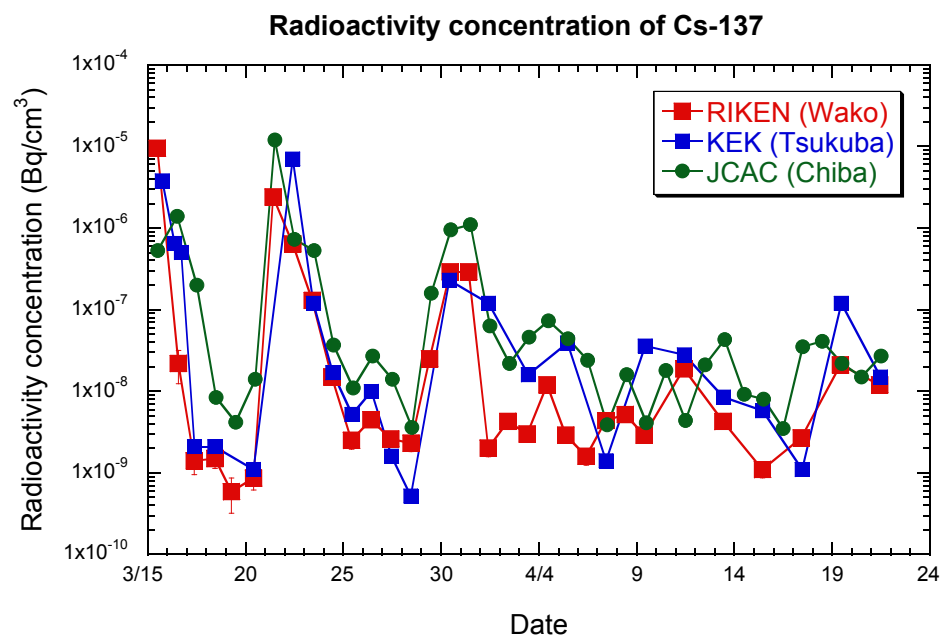
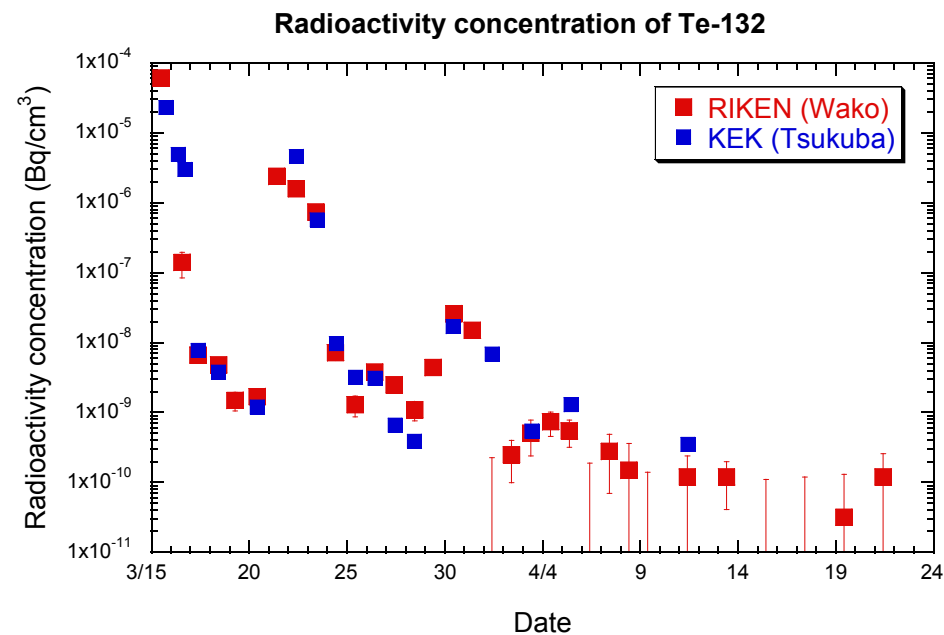
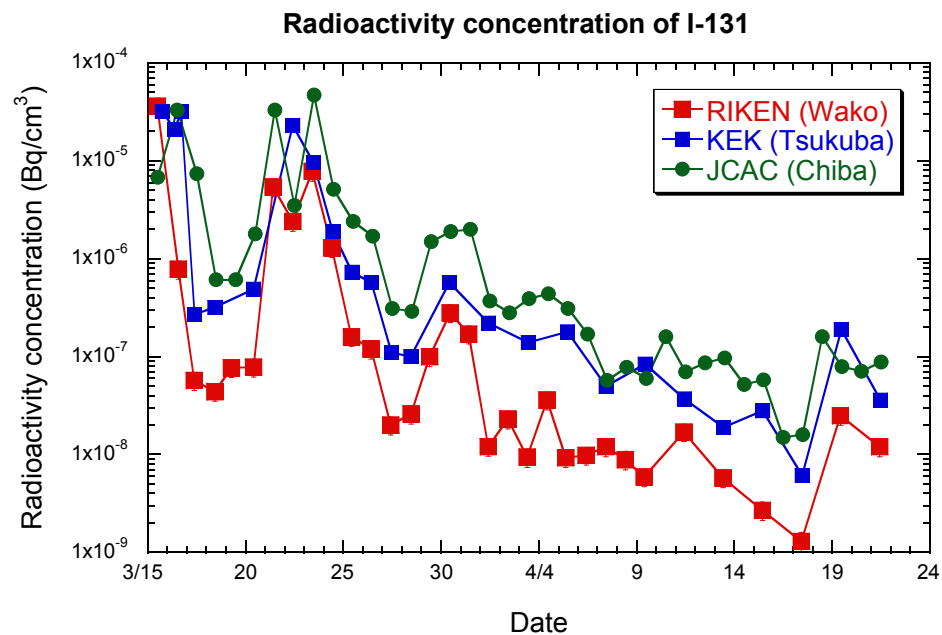


Fig. 2. Time variation of the radioactivity concentration of <sup>131</sup>I, <sup>132</sup>Te, <sup>137</sup>Cs, and <sup>136</sup>Cs.

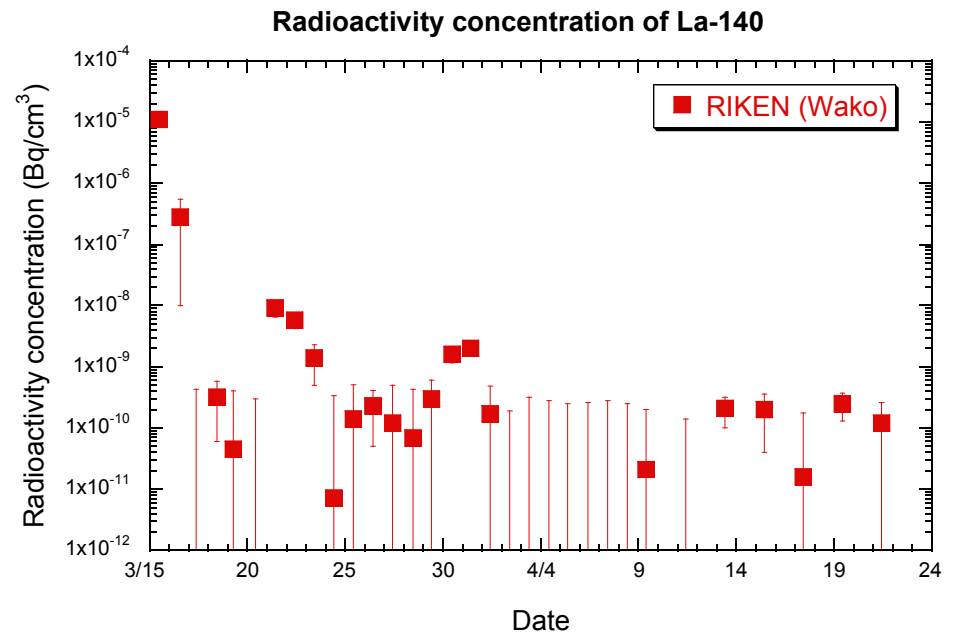
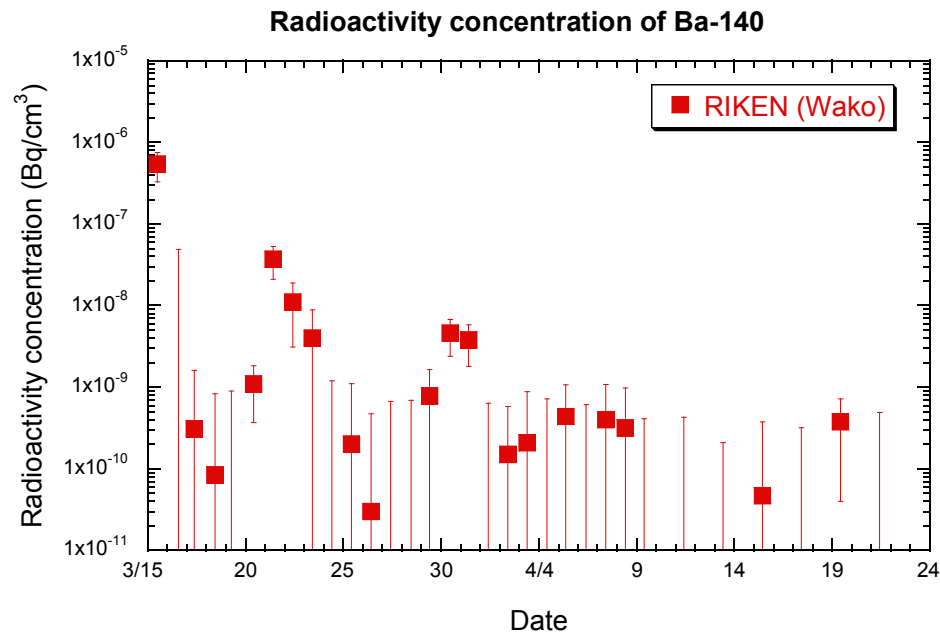
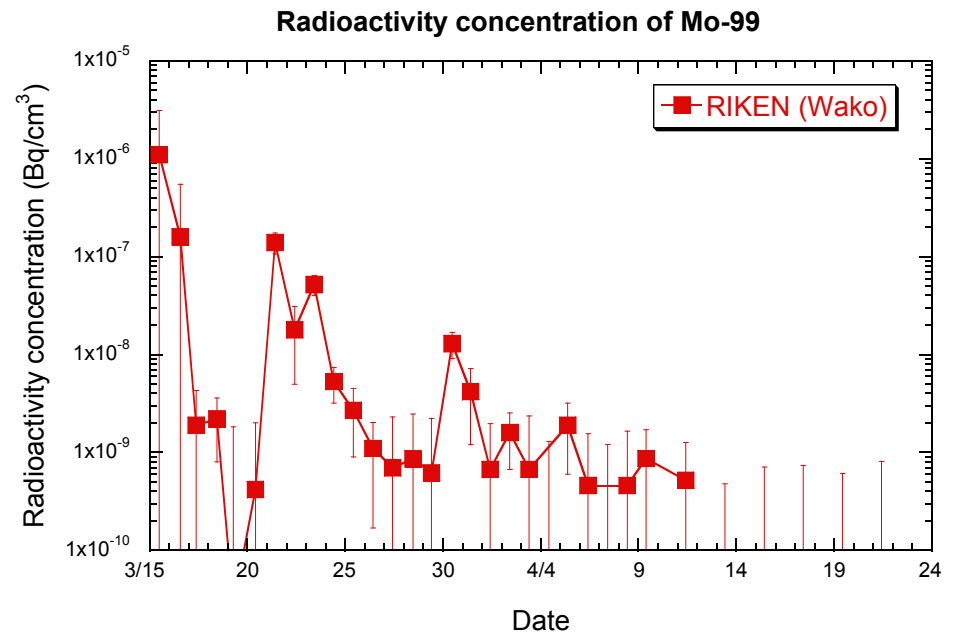
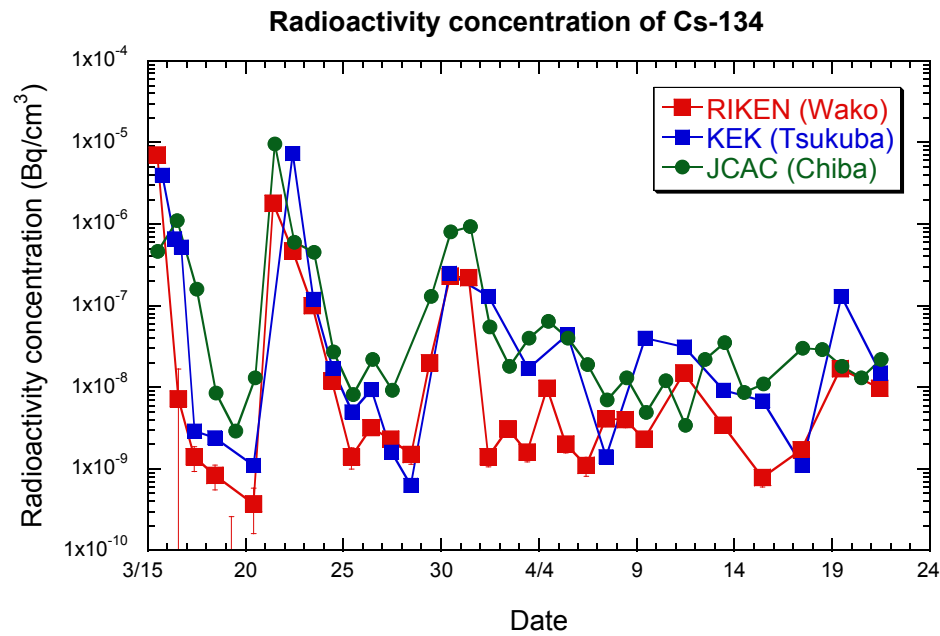


Fig. 2. (continued) Time variation of the radioactivity concentration of  $^{134}\text{Cs}$ ,  $^{99}\text{Mo}$ ,  $^{140}\text{Ba}$ , and  $^{140}\text{La}$ .

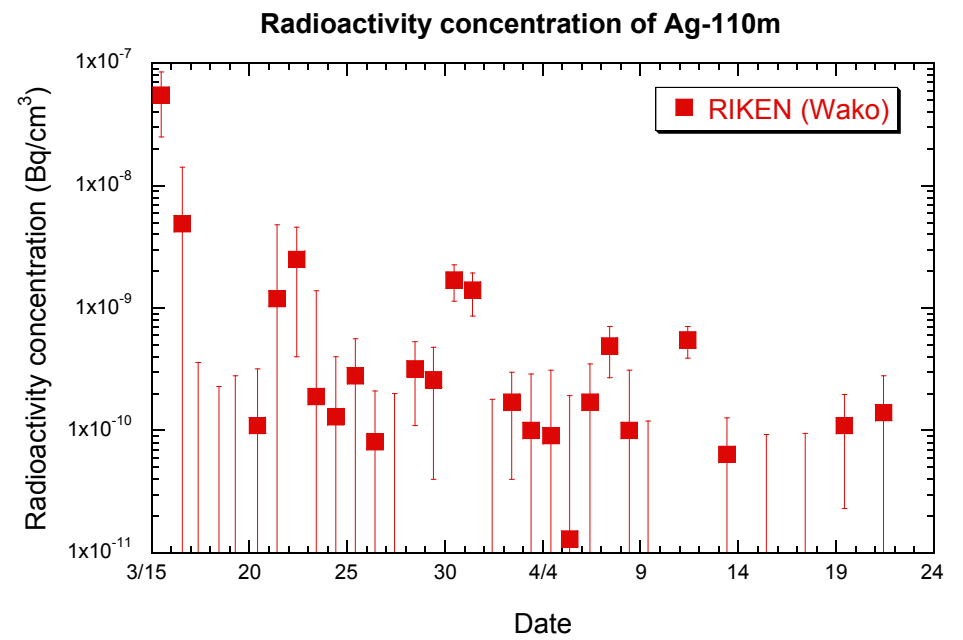
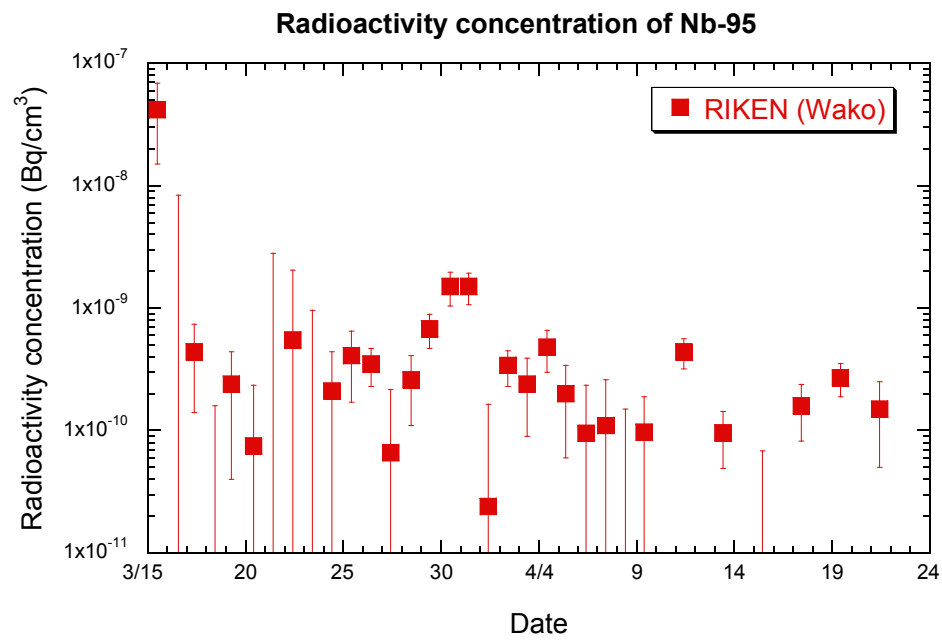


Fig. 2. (continued) Time variation of the radioactivity concentration of <sup>95</sup>Nb and <sup>110m</sup>Ag.

# Appendix

## Distance between Fukushima I Nuclear Power Plant and RIKEN



Fig. A1. Map between Fukushima I Nuclear Power Plant and RIKEN Wako Institute.

## Effective dose rate at RIKEN Wako Institute

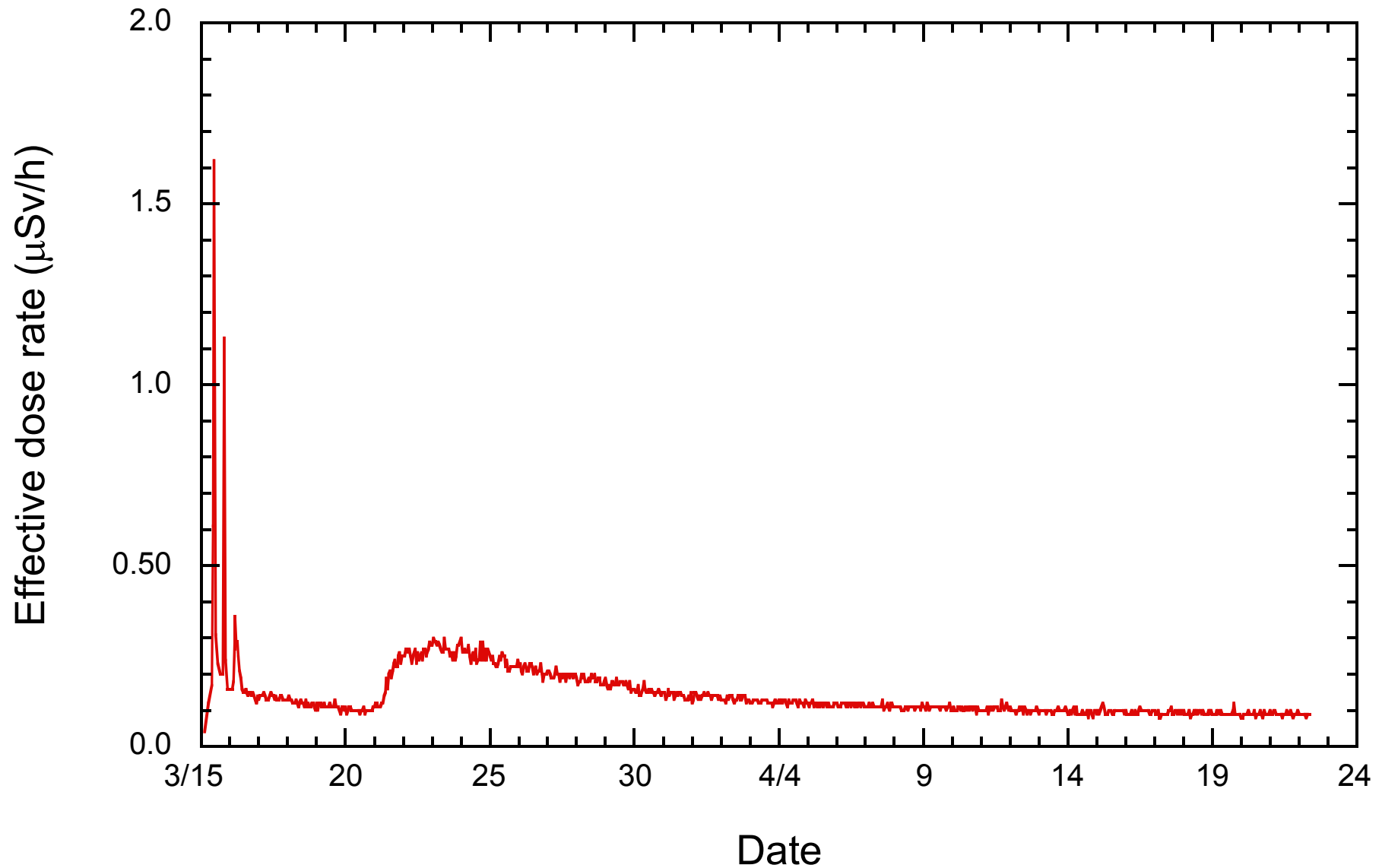


Fig. A2. Effective dose rate measured at the radiation monitoring posts at RIKEN Wako Institute.

## Rainfall at RIKEN Wako Institute

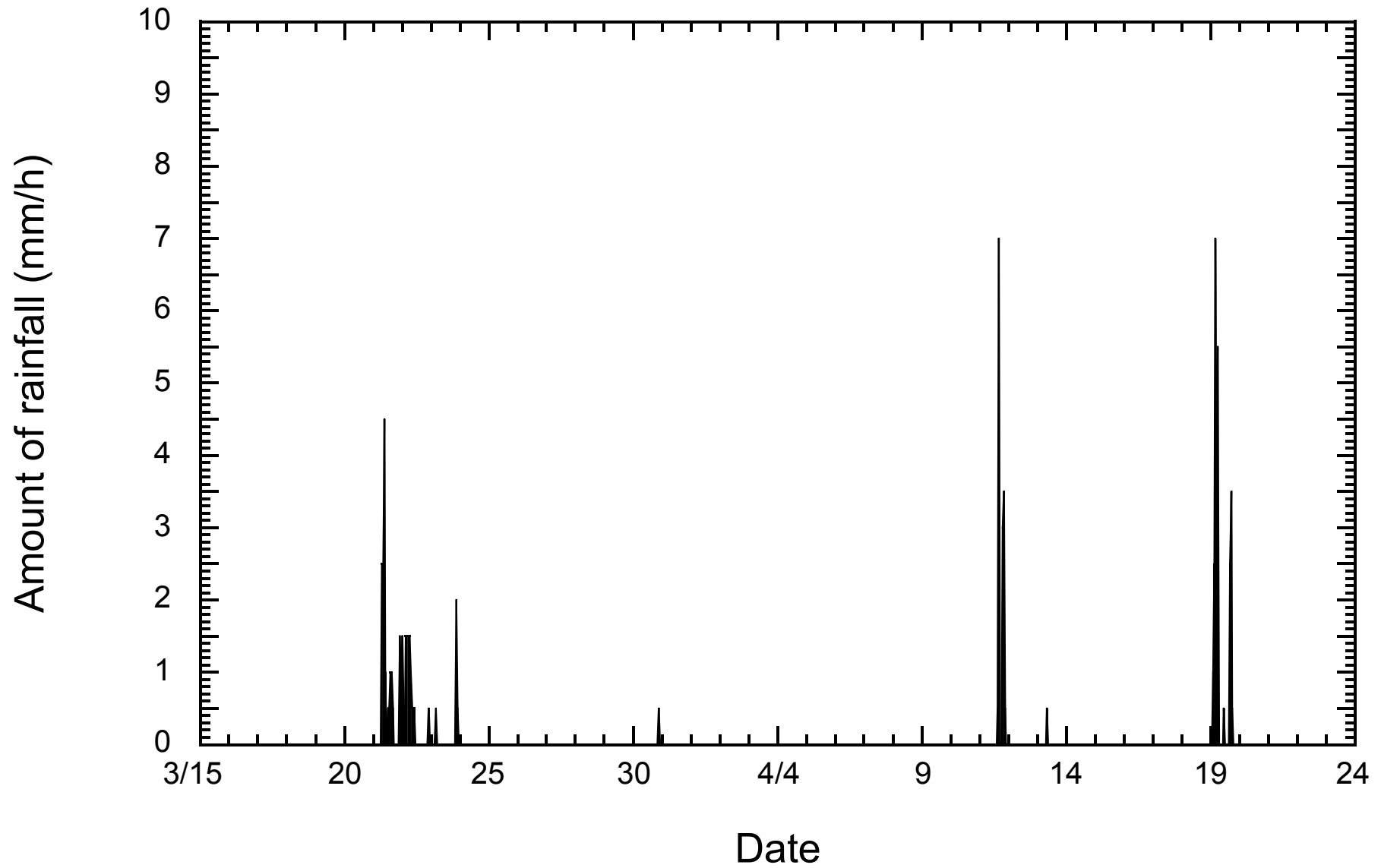


Fig. A3. Amount of rainfall at RIKEN Wako Institute.



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