

Table 95-8a The thorium-complexing capacity in particulate matter and particulate uranium in seawater: surface waters

Sampling date	Location	ThCC (nmol l ⁻¹)	Particulate U (μBq l ⁻¹)
The western North Pacific			
Apr. 1991	32°00'N 140°15'E	3.41 ± 0.19	2.90 ± 0.42
Apr. 1991	30°00'N 140°07'E	2.30 ± 0.13	2.13 ± 0.38
May 1991	28°00'N 137°00'E	5.84 ± 0.32	4.96 ± 0.35
May 1991	18°00'N 137°00'E	3.37 ± 0.16	2.79 ± 0.22
May 1991	10°00'N 137°00'E	7.31 ± 0.42	6.07 ± 0.36
May 1991	3°00'N 144°00'E	9.47 ± 0.42	8.24 ± 0.58
May 1991	7°00'N 144°00'E	3.22 ± 0.16	2.17 ± 0.15
May 1991	22°00'N 144°00'E	4.63 ± 0.21	3.29 ± 0.23
The Japan Sea			
May 1993	38°09'N 134°27'E	13.5 ± 0.5	11.3 ± 0.6
May 1993	38°36'N 143°03'E	9.92 ± 0.48	

Table 95-8b The thorium-complexing capacity in particulate matter and particulate uranium in seawater: vertical distribution (location: 39°25'N 133°25'E)

Depth(m)	Temp. (°C)	Salinity (‰)	ThCC	Particulate U
0	13.06	34.51	11.4 ± 0.6	10.5 ± 0.7
10	12.99	34.50	9.67 ± 0.48	
25	10.92	34.44	6.89 ± 0.48	
50	9.05	34.13	4.49 ± 0.31	
100	6.08	34.04	3.05 ± 0.21	2.83 ± 0.40
200	1.63	34.05	1.62 ± 0.21	
300	0.78	34.06	1.42 ± 0.18	
500	0.38	34.07	1.28 ± 0.16	1.22 ± 0.22
750	0.29	34.07	1.23 ± 0.16	1.25 ± 0.22
1000	0.23	34.07	1.06 ± 0.14	1.16 ± 0.21

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ACID DEPOSITION

5. Acid Deposition at Summit of Mt. Fuji

Dokiya, Tsuboi, Sekino, Hosomi, Igarashi, and Tanaka (1995)

The summit of Mt. Fuji, the highest mountain in Japan, is a solitary 3,776m peak considered to be in the free atmosphere and presumably free from local pollution. The JMA has run a weather station at the summit since 1932. Because of severe meteorological conditions, no data is available on the amount of precipitation and only a few studies have been made on the chemical species in precipitation at the summit.

Dokiya *et al.* (1995) have measured chemical species in precipitation since August 1990 to evaluate the site as a background air quality station and to obtain information on the long-range transport of chemical species. They conducted intensive observations of chemical species in aerosols, gases, and other samples at the summit of Mt. Fuji and at Tarobo (1,300m up on the mountain's southern slope) during summer 1993 and 1994 to evaluate the sources of chemical species in precipitation.

From July 26 to August 3, 1993, concentrations of gaseous HCl and SO₂ were low and comparable to those at remote sites. The concentration of NH₃ during this period was higher with diurnal variation, however,

suggesting some influence of mountain climbers. Similar tendencies were found for gases from July 26 to 30, 1994.

The concentration of sulfate in aerosols increased abruptly after a typhoon passed on July 30, 1993 (Fig. 95-15). Aerosols with high sulfate concentrations were found to be acidic and back-trajectory analysis indicated that they advected to Mt. Fuji from the west. In contrast, the higher sulfate concentrations observed during the first half of July 1994 seemed to originate from local sources, presumably in the Kanto metropolitan area (Fig. 95-16).

Further intensive studies of atmospheric chemistry at the summit of Mt. Fuji (Summer Campaign 1997) are planned in 1997 by MRI scientists, including those from our laboratory.

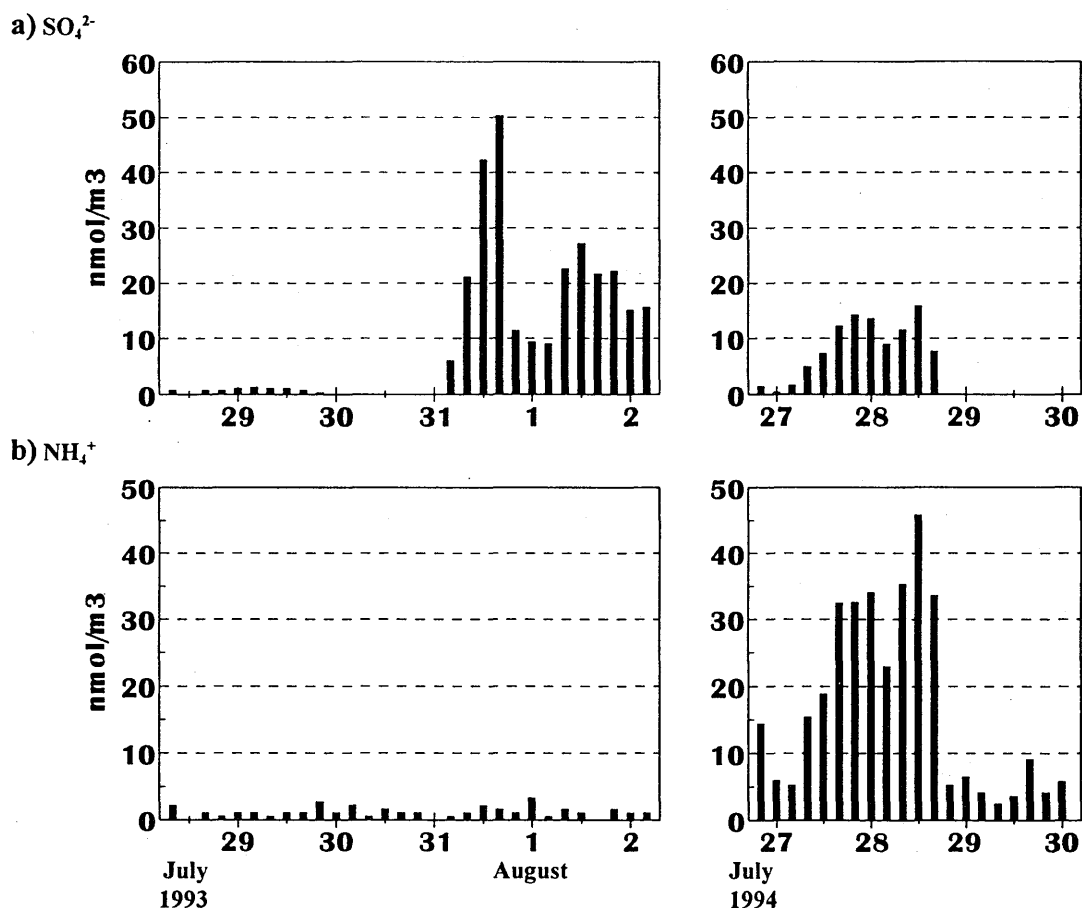


Fig. 95-15 Sulfate and ammonium concentration in aerosols a) SO_4^{2-} ; b) NH_4^+ .
 Reprinted from *Water, Air and Soil Pollution*, 85 (1995), 1967-1972, Acid deposition at the summit of Mt. Fuji: Observations of gases, aerosols, and precipitation in summer, 1993 and 1994, Dokiya *et al.*, fig. 1 (©1995 Kluwer Academic Publishers. Printed in the Netherlands.) with kind permission from Kluwer Academic Publishers.

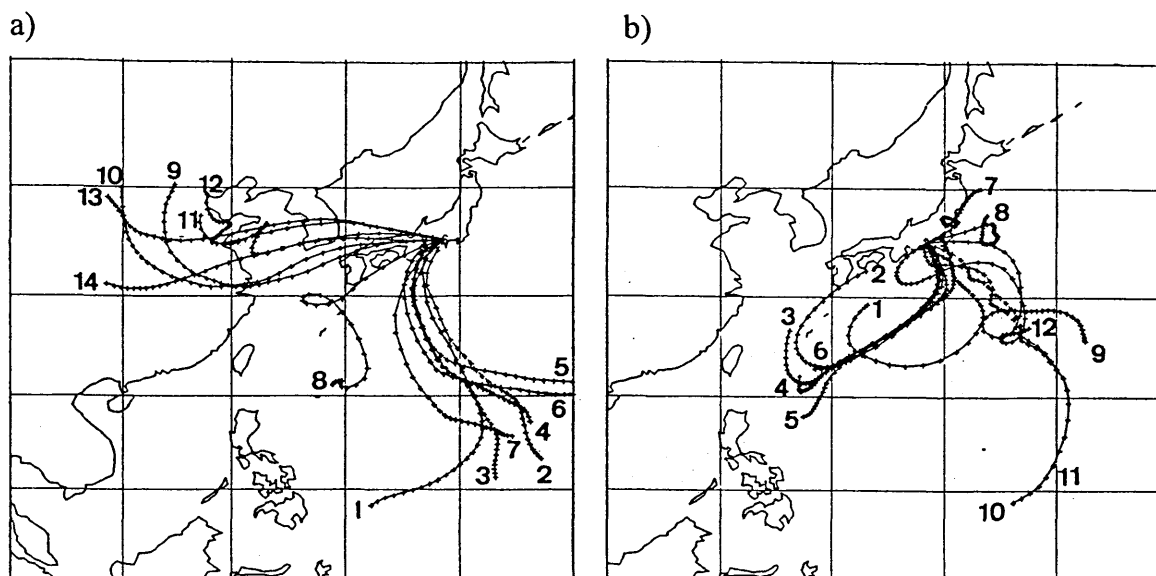


Fig. 95-16 Back trajectory analyses for air sampled on Mt. Fuji.

a) July 27 to August 2, 1993: 1: July 27, 9:00 (local time); 2: July 27, 21:00; 3: July 28, 9:00; 4: July 28, 21:00; 5: July 29, 9:00; 6: July 29, 21:00; 7: July 30, 9:00; 8: July 30, 21:00; 9: July 31, 9:00; 10: July 31, 21:00; 11: August 1, 9:00; 12: August 1, 21:00; 13: August 2, 9:00; 14: August 2, 21:00;

b) July 25 to 30, 1994: 1: July 25, 9:00; 2: July 25, 21:00; 3: July 26, 9:00; 4: July 26, 21:00; 5: July 27, 9:00; 6: July 27, 21:00; 7: July 28, 9:00; 8: July 28, 21:00; 9: July 29, 9:00; 10: July 29, 21:00; 11: July 30, 9:00; 12: July 30, 21:00. Each small tick on the line indicates 6 hours.

Reprinted from *Water, Air and Soil Pollution*, 85 (1995), 1967-1972, Acid deposition at the summit of Mt. Fuji: Observations of gases, aerosols and precipitation in summer, 1993 and 1994, Dokiya *et al.*, fig 3 (©1995 Kluwer Academic Publishers. Printed in the Netherlands.) with kind permission from Kluwer Academic Publishers.

IODINE

6. Iodine Determination in Natural and Tap Water Using Inductively Coupled Plasma Mass Spectrometry

Takaku, Shimamura, Masuda, and Igarashi (1995)

Takaku *et al.* (1995) examined the feasibility of iodine determination in natural and tap water, using inductively coupled plasma mass spectrometry (ICP-MS) to investigate the environmental behavior of iodine from the viewpoint of health science and public hygiene. Iodine is essential to the body, mainly the thyroid gland, and plays an important role in metabolism. It is also important to trace radioactive iodine (^{129}I , ^{131}I , ^{133}I , etc.) released to the environment from nuclear power plants and nuclear test sites.

Because iodine concentrations in environmental samples are usually very low, it is difficult to make a direct analysis by the traditional methods without preconcentration. Because iodine is highly volatile, however, the chemical yield of iodine during preconcentration is both low and variable. It is preferable to conduct direct analysis without preconcentration.

Takaku *et al.* (1995) easily determined iodine by ICP-MS without separation or preconcentration. The detection limit was 10 pg/ml. They obtained a stable iodine determination by adding an organic alkali to samples just before analysis to suppress iodine vaporization. They determined the iodine concentration of 42 natural water samples in the northern Kanto area, Japan (Fig. 95-17). The concentrations of iodine ranged from 0.65 to 35.9 ng/ml (Table 95-9).