APPENDIX

APPENDIX A

Particulate deposition amount calculation

A. Calculation of dry deposition amount for four-stage filter pack and leaf-washing method

A-1 Calculation of dry deposition amount for four-stage filter pack

$$F = V_d \times C \qquad \text{Eq. 1}$$

Where V_d = deposition velocity (cm/s)

F = Flux of deposition amount (nmol/m^2s)

C = Concentration in ambient air (nmol/m^3)

Source ; Gupta et al, 2004.

From Eq. 1 on unit of nmol/m^2s

$$F\left(mg / m^2 d\right) = \frac{nmol}{m^2 s} \times Molecular\ weight \times 86400\ S \times 10^{-6} \qquad \text{Eq. 2}$$

From Eq. 2 on unit of mg/m^2d

$$F\left(mg/m^2\right)=\frac{mg}{m^2 d}\times day \qquad \text{Eq. 3}$$

A-2 Calculation of dry deposition amount for leaf-washing method

$$Deposition\ \ amount\left(mg/m^2\right)=\frac{Concentration\left(mg/l\right)\times Volume\ of\ Deionized\ water\left(ml\right)}{Leaf\ area\left(m^2\right)\times 1000}$$

APPENDIX B

Concentration of particles

Deposition velocities of particles (V_d)

Ions	Deposition velocity (cm/s)
SO_4^{2-}	0.53
NO_3^-	1.50
Cl^-	1.10
NH_4^+	0.18
Na^+	0.91
K^+	0.89
Mg^{2+}	1.00
Ca^{2+}	2.97

Source: Rao et al.,1992

Table B. Ion deposition amount by four-stage filter pack.

Month	Concentration in ambient air (nmol/m^3)								Deposition amount (mg/m^2)							
	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}
Jul-12	2.95	1.65	6.48	6.56	5.36	3.70	7.09	1.84	2.98	3.98	8.55	3.56	0.45	3.34	21.83	1.16
(n=3)	4.69	5.42	5.56	6.45	4.07	6.65	11.62	1.58	4.74	13.07	7.34	3.50	0.34	6.00	35.78	1.00
	6.65	11.78	12.56	9.53	8.64	12.42	14.20	2.58	6.72	28.40	16.57	5.17	0.73	11.20	43.73	1.63
Average									**4.81**	**15.15**	**10.82**	**4.07**	**0.51**	**6.85**	**33.78**	**1.26**
SD									**1.87**	**12.34**	**5.02**	**0.95**	**0.20**	**4.00**	**11.08**	**0.33**
Aug-12	1.10	1.49	0.59	1.14	ND	1.41	1.71	0.52	1.15	3.71	0.80	0.64	ND	1.31	5.44	0.34
(n=3)	1.77	1.33	0.67	3.60	0.84	1.96	2.00	0.65	1.85	3.31	0.91	2.02	0.07	1.83	6.36	0.42
	1.78	7.82	6.53	2.34	6.12	8.07	17.55	1.48	1.86	19.48	8.90	1.31	0.53	7.52	55.84	0.96
Average									**1.62**	**8.84**	**3.54**	**1.32**	**0.20**	**3.55**	**22.55**	**0.58**
SD									**0.41**	**6.22**	**1.65**	**0.69**	**0.19**	**3.45**	**21.84**	**0.34**
Sep-12	3.25	7.65	1.39	25.67	2.28	2.29	4.57	2.98	3.28	18.44	1.83	13.92	0.19	2.07	14.07	1.88
(n=3)	1.60	1.84	2.08	5.18	2.86	0.93	7.23	0.68	1.62	4.44	2.74	2.81	0.24	0.84	22.26	0.43
	ND	1.27	1.34	ND	1.90	ND	2.76	0.24	ND	3.06	1.77	ND	0.16	ND	8.50	0.15
Average									**1.63**	**8.65**	**2.12**	**5.58**	**0.20**	**0.97**	**14.94**	**0.82**
SD									**0.64**	**8.51**	**0.55**	**3.36**	**0.04**	**0.84**	**6.92**	**0.73**

ND = not detected

Table B. (Continued)

Month	Concentration in ambient air (nmol/m^3)								Deposition amount (mg/m^2)							
	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}
Oct-12	0.17	4.77	3.97	13.96	53.89	8.32	21.12	1.21	0.18	11.88	5.41	7.82	4.69	7.75	67.20	0.79
(n=3)	0.35	7.07	2.82	11.00	57.04	8.45	13.36	2.19	0.37	17.61	3.85	6.16	4.96	7.88	42.51	1.43
	0.16	1.34	2.67	1.58	3.02	1.66	6.99	0.35	0.17	3.34	3.64	0.89	0.26	1.55	22.24	0.23
Average									**0.24**	**10.95**	**4.30**	**4.96**	**3.30**	**5.73**	**43.99**	**0.81**
SD									**0.11**	**7.18**	**0.97**	**3.62**	**2.64**	**3.62**	**22.52**	**0.60**
Nov-12	2.08	2.44	6.13	5.65	7.76	3.57	28.53	0.97	2.10	5.88	8.09	3.06	0.65	3.22	87.85	0.61
(n=3)	3.23	4.68	12.82	6.37	17.13	9.37	18.18	1.38	3.26	11.28	16.92	3.45	1.44	8.45	55.98	0.87
	3.38	6.44	6.93	5.50	7.38	7.35	22.29	1.25	3.42	15.53	9.15	2.98	0.62	6.63	68.64	0.79
Average									**2.93**	**10.90**	**11.38**	**3.17**	**0.91**	**6.10**	**70.82**	**0.76**
SD									**0.72**	**4.83**	**4.82**	**0.25**	**0.46**	**2.66**	**16.05**	**0.13**
Dec-12	3.34	1.69	3.37	4.56	1.12	1.64	5.58	0.23	3.49	4.21	4.60	2.56	0.10	1.53	17.76	0.15
(n=3)	5.57	1.38	12.35	6.79	6.27	6.21	21.81	0.99	5.82	3.44	16.84	3.80	0.55	5.79	69.40	0.64
	2.22	0.40	4.11	2.78	3.61	0.68	8.48	0.26	2.32	1.00	5.60	1.56	0.31	0.63	26.98	0.17
Average									**3.87**	**2.88**	**9.01**	**2.64**	**0.32**	**2.65**	**38.05**	**0.32**
SD									**1.78**	**1.68**	**6.80**	**1.13**	**0.22**	**2.15**	**27.54**	**0.28**

Table B. (Continued)

Month	Concentration in ambient air (nmol/m^3)								Deposition amount (mg/m^2)							
	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	Cl^-	NO_3^-	SO_4^{2-}	Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}
Jan-13	5.83	0.97	3.86	7.18	3.38	8.96	7.84	1.21	6.09	2.42	5.26	4.02	0.29	8.35	24.95	0.79
(n=3)	4.33	2.68	2.05	4.08	2.43	7.67	15.30	1.07	4.52	6.68	2.80	2.29	0.21	7.15	48.68	0.70
	2.97	4.91	10.53	4.08	11.33	14.00	17.60	1.93	3.10	12.23	14.36	2.29	0.99	13.05	56.00	1.26
Average									**4.57**	**7.11**	**7.47**	**2.87**	**0.50**	**9.52**	**43.21**	**0.91**
SD									**1.49**	**4.92**	**6.09**	**1.00**	**0.43**	**3.12**	**16.24**	**0.30**
Feb-12	2.21	6.77	17.08	6.37	16.12	19.23	20.53	2.55	2.08	15.23	21.04	3.22	1.27	16.19	59.00	1.50
(n=3)	7.52	6.09	22.37	38.48	20.25	10.22	26.17	1.15	7.09	13.70	27.55	19.48	1.59	8.60	75.21	0.68
	6.02	13.62	36.56	12.15	40.54	26.53	41.74	3.24	5.68	30.65	45.03	6.15	3.18	22.33	119.96	1.91
Average									**4.95**	**19.86**	**31.21**	**9.62**	**2.01**	**15.71**	**84.73**	**1.36**
SD									**2.58**	**9.37**	**12.41**	**8.66**	**1.03**	**6.88**	**31.57**	**0.63**
Mar-13	4.17	10.97	18.00	8.28	20.82	8.66	28.52	2.73	4.36	27.33	24.55	4.64	1.81	8.07	90.75	1.78
(n=3)	6.55	14.96	30.51	5.89	43.27	15.97	33.02	3.46	6.84	37.27	41.60	3.30	3.76	14.88	105.07	2.25
	3.79	6.73	10.83	1.62	10.89	4.16	23.92	2.16	3.96	16.77	14.77	0.91	0.95	3.88	76.11	1.41
Average									**5.05**	**27.12**	**26.97**	**2.95**	**2.17**	**8.94**	**90.64**	**1.81**
SD									**1.56**	**10.25**	**13.58**	**1.89**	**1.44**	**5.56**	**14.48**	**0.42**

APPENDIX C

Ion deposition amount in each direction by leaf-washing method

Table C-1. Ion deposition amount (mg/m^2) in July 2012

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	0.08±0.05	0.35±1.09	ND	**0.43**	1.39±0.40	0.84±0.03	0.66±0.06	9.60±0.80	0.23±0.13	**12.73**
NE	1.25±0.52	0.73±0.66	4.34±2.88	**6.32**	2.62±1.71	0.99±0.13	0.91±0.16	10.60±1.08	0.19±0.06	**15.31**
E	1.05±0.73	1.26±0.61	7.20±1.59	**9.51**	2.84±1.14	1.49±0.35	1.40±0.55	13.80±2.96	0.18±0.12	**19.72**
SE	0.48±0.87	0.63±0.53	5.71±5.40	**6.82**	2.42±1.27	1.35±0.38	1.24±0.34	12.66±2.45	0.19±0.04	**17.85**
S	0.89±0.21	0.57±0.45	2.71±3.95	**5.42**	2.40±1.04	1.17±0.10	0.97±0.27	9.73±1.29	0.21±0.02	**14.47**
SW	1.04±0.31	1.07±0.43	2.38±4.12	**4.17**	2.66±1.75	1.06±0.43	0.71±0.19	8.72±2.87	0.23±0.19	**13.38**
W	0.89±0.30	0.38±0.15	4.64±0.76	**5.91**	1.11±0.39	0.81±0.07	0.96±0.14	8.25±1.32	0.14±0.01	**11.26**
NW	ND	0.91±0.29	2.06±0.58	**2.91**	1.35±0.20	0.88±0.06	0.97±0.01	8.21±0.95	0.17±0.07	**11.58**
Average±SD	**0.71±0.47**	**0.74±0.32**	**3.63±2.41**	**5.29±2.73**	**2.10±0.99**	**1.07±0.19**	**0.98±0.22**	**10.20±1.72**	**0.19±0.08**	**14.54±2.99**

ND = not detected

Table C-2. Ion deposition amount (mg/m^2) in August 2012

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	0.38±0.18	0.60±0.05	2.35±0.14	**3.33**	0.59±0.23	0.43±0.08	0.70±0.05	9.01±0.47	0.19±0.07	**10.93**
NE	0.29±0.15	1.05±0.14	2.96±0.32	**4.30**	0.32±0.20	0.51±0.12	0.99±0.24	10.21±1.40	0.23±0.06	**12.25**
E	1.23±0.34	1.00±0.22	3.30±0.55	**5.53**	0.67±0.13	0.61±0.09	0.87±0.50	13.30±2.98	0.22±0.01	**15.68**
SE	1.10±0.46	1.13±0.23	3.76±0.71	**5.99**	0.51±0.20	0.86±0.08	1.22±0.25	12.91±2.87	0.27±0.21	**15.78**
S	0.38±0.13	0.58±0.09	2.56±0.46	**3.52**	0.70±0.04	0.52±0.04	0.65±0.12	9.52±0.72	0.18±0.16	**11.57**
SW	0.57±0.46	0.52±0.16	2.46±0.73	**3.55**	1.08±0.56	0.64±0.16	0.73±0.17	8.85±2.57	0.14±0.08	**11.43**
W	0.52±0.15	0.61±0.15	2.31±0.39	**3.44**	0.81±0.21	0.50±0.17	0.67±0.12	8.33±1.22	0.21±0.03	**10.52**
NW	0.77±0.50	0.77±0.05	2.31±0.26	**3.85**	0.80±0.50	0.58±0.09	0.74±0.64	7.92±0.68	0.15±0.03	**10.19**
Average±SD	**0.66±0.30**	**0.78±0.14**	**2.75±0.44**	**4.29±1.02**	**0.68±0.31**	**0.58±0.10**	**0.82±0.26**	**10.01±1.61**	**0.20±0.08**	**12.29±2.21**

Table C-3. Ion deposition amount (mg/m^2) in September 2012

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	1.48±0.69	0.92±0.24	1.11±0.09	**3.52**	1.69±0.61	0.46±0.21	0.46±0.09	2.48±0.36	0.24±0.19	**5.34**
NE	1.79±0.43	1.40±0.35	1.32±0.12	**4.51**	1.80±0.88	0.61±0.11	0.74±0.03	4.12±0.42	0.14±0.05	**7.40**
E	2.15±1.25	1.70±0.49	1.56±0.26	**5.42**	1.62±0.36	0.64±0.21	0.72±0.15	4.95±1.48	0.30±0.12	**8.24**
SE	1.32±0.61	1.09±0.20	1.65±0.33	**4.06**	2.04±0.30	0.83±0.26	0.98±0.26	2.42±0.83	0.18±0.07	**6.45**
S	2.05±0.44	0.94±0.27	1.23±0.15	**4.21**	1.34±0.16	0.47±0.02	0.67±0.17	2.30±0.46	0.14±0.13	**4.92**
SW	1.54±1.21	0.57±0.15	1.08±0.36	**3.19**	1.14±0.57	0.54±0.25	0.61±0.18	2.04±0.78	0.19±0.12	**4.52**
W	1.34±0.83	0.74±0.33	0.99±0.18	**3.07**	1.55±0.06	0.47±0.10	0.61±0.20	2.20±0.42	0.13±0.03	**4.95**
NW	1.34±0.53	4.15±1.96	1.05±0.08	**6.54**	1.32±0.44	0.44±0.08	0.67±0.02	1.81±0.13	0.16±0.03	**4.40**
Average±SD	**1.63±0.75**	**1.44±0.24**	**1.25±0.20**	**4.31±1.18**	**1.56±0.42**	**0.56±0.15**	**0.68±0.14**	**2.79±0.61**	**0.18±0.09**	**5.78±1.43**

Table C-4. Ion deposition amount (mg/m^2) in October 2012

Sampling direction (n=3)	Anions			Total	Cations					Total
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	0.54±0.28	0.48±0.07	2.80±0.22	**3.82**	2.72±1.05	0.71±0.06	1.10±0.21	8.33±0.95	0.14±0.02	**13.00**
NE	0.50±0.29	0.43±0.13	3.80±0.51	**4.73**	1.67±0.88	0.93±0.15	0.87±0.33	8.72±0.92	0.16±0.08	**12.35**
E	0.15±0.05	0.49±0.45	4.67±0.96	**5.31**	4.25±1.37	1.18±0.23	1.36±0.68	11.78±3.02	0.21±0.15	**18.78**
SE	0.46±0.10	0.84±0.39	4.35±0.98	**5.65**	2.70±0.99	1.26±0.35	1.30±0.78	11.08±2.38	0.32±0.14	**16.65**
S	0.48±0.17	0.49±0.18	3.41±0.56	**4.38**	3.99±0.90	0.87±0.13	1.57±0.21	8.70±0.92	0.17±0.03	**15.30**
SW	0.17±0.15	0.12±0.04	3.03±0.92	**3.32**	2.23±0.96	1.06±0.33	0.73±0.32	7.31±2.24	0.13±0.06	**11.45**
W	0.77±0.57	0.42±0.37	2.69±0.44	**3.87**	1.16±0.58	0.69±0.09	0.48±0.17	6.84±1.20	0.17±0.03	**9.34**
NW	0.26±0.02	0.52±0.06	2.89±0.32	**3.68**	2.26±0.36	0.88±0.07	0.67±0.13	7.11±0.88	0.15±0.02	**11.08**
Average±SD	**0.42±0.24**	**0.48±0.23**	**3.45±0.61**	**4.35±0.83**	**2.62±0.89**	**0.95±0.18**	**1.01±0.35**	**8.73±1.56**	**0.18±0.07**	**13.49±3.16**

Table C-5. Ion deposition amount (mg/m^2) in November 2012

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	6.49±5.65	4.05±3.10	5.20±2.54	**15.74**	5.89±2.08	2.63±0.57	2.75±0.98	33.83±7.22	0.47±0.29	**45.56**
NE	7.58±4.26	3.29±1.31	5.59±2.36	**16.45**	5.80±1.47	3.06±0.82	2.23±1.95	30.47±12.62	0.58±0.35	**42.14**
E	7.18±4.70	4.88±1.63	6.27±3.00	**18.33**	5.72±2.16	3.70±1.06	3.82±1.73	40.36±11.91	0.99±0.82	**54.61**
SE	8.73±6.66	4.71±2.09	6.70±2.48	**20.14**	8.09±5.89	4.06±1.56	6.25±6.91	44.64±6.39	0.89±0.52	**63.93**
S	7.29±3.53	4.22±1.27	5.62±2.35	**17.12**	5.61±2.15	3.22±0.71	3.02±1.29	37.83±8.69	0.56±0.48	**50.24**
SW	7.18±4.88	3.19±1.15	4.58±2.48	**14.95**	6.18±4.82	3.17±0.96	4.39±4.69	30.21±8.45	0.84±0.75	**44.78**
W	7.63±4.81	3.02±0.99	4.46±1.90	**15.11**	5.47±3.04	2.80±0.77	2.32±0.94	29.74±3.97	0.62±0.36	**40.95**
NW	7.37±4.55	2.77±1.13	4.37±2.21	**14.51**	5.41±2.39	2.94±0.66	1.88±0.85	28.48±2.57	0.33±0.29	**39.04**
Average±SD	**7.43±4.88**	**3.77±1.58**	**5.35±2.42**	**16.54±1.92**	**6.02±3.00**	**3.20±0.89**	**3.33±2.42**	**34.44±7.73**	**0.66±0.49**	**47.66±8.30**

Table C-6. Ion deposition amount (mg/m^2) in December 2012

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	10.27±4.32	4.86±2.62	3.33±2.29	**18.47**	4.07±2.83	7.54±2.75	1.06±0.75	27.73±14.52	1.75±0.78	**42.16**
NE	10.71±4.67	5.38±2.80	1.15±0.77	**17.24**	4.06±1.77	7.04±1.48	1.35±0.91	33.07±12.87	1.24±0.59	**46.75**
E	10.17±1.40	6.19±2.72	1.94±1.33	**18.30**	3.93±2.56	7.50±1.96	1.70±1.04	38.44±14.77	1.76±0.48	**53.34**
SE	11.16±3.61	5.85±2.26	1.57±1.16	**18.58**	4.14±2.22	7.54±1.91	0.95±0.81	34.19±9.29	1.84±0.59	**48.66**
S	10.24±1.99	5.33±2.94	1.22±0.79	**16.79**	4.18±2.35	6.95±2.14	0.82±0.38	32.66±12.31	1.23±1.59	**45.85**
SW	9.91±4.48	5.01±3.26	1.43±0.48	**16.35**	2.58±1.05	6.30±2.51	0.51±0.31	30.61±14.51	1.63±1.02	**41.64**
W	8.68±1.85	4.95±3.23	1.72±0.94	**15.36**	2.71±1.03	6.16±2.17	1.66±1.25	26.74±10.93	1.48±0.87	**38.76**
NW	9.61±3.97	4.66±2.88	1.91±1.05	**16.18**	3.26±2.47	6.46±2.63	0.75±0.93	29.69±11.57	1.26±0.83	**41.42**
Average±SD	**10.09±3.29**	**5.28±2.84**	**1.78±1.10**	**17.16±1.20**	**3.62±2.04**	**6.94±2.19**	**1.10±0.92**	**31.64±12.60**	**1.53±0.84**	**44.82±4.72**

Table C-7. Ion deposition amount (mg/m^2) in January 2013

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	3.53±1.57	4.96±1.20	2.76±1.03	**11.25**	4.13±2.91	6.70±1.13	8.56±6.65	26.24±10.04	1.20±1.04	**46.83**
NE	4.92±3.40	5.19±1.87	2.32±0.71	**12.43**	3.16±1.06	7.47±1.40	3.68±3.53	32.14±8.41	0.60±0.36	**47.04**
E	5.16±2.19	5.11±2.39	3.65±1.04	**13.92**	4.89±2.86	7.87±1.99	14.22±12.60	48.92±20.50	1.41±1.08	**77.31**
SE	4.28±1.98	5.92±3.63	3.24±1.71	**13.43**	4.77±1.81	8.45±1.98	5.83±4.10	46.97±21.30	1.61±1.31	**67.62**
S	4.22±1.67	4.18±2.24	2.91±1.17	**11.31**	4.21±2.65	6.70±1.52	6.37±5.59	28.76±10.82	0.46±0.20	**46.50**
SW	3.34±1.75	3.63±1.36	2.16±0.96	**9.13**	3.50±1.62	7.40±2.66	2.54±1.12	31.66±9.64	0.89±0.58	**45.99**
W	3.24±1.39	3.63±2.10	2.13±0.77	**9.00**	3.62±3.07	6.56±1.50	5.44±4.35	31.27±6.03	0.98±0.64	**47.86**
NW	6.00±4.01	3.84±1.21	2.49±1.14	**12.32**	2.50±1.84	6.92±1.46	2.85±1.24	37.79±24.61	0.89±0.13	**50.96**
Average±SD	**4.34±2.24**	**4.56±2.00**	**2.71±1.07**	**11.60±1.81**	**3.85±2.23**	**7.26±1.70**	**6.19±4.90**	**35.47±13.92**	**1.00±0.67**	**53.76±11.93**

Table C-8. Ion deposition amount (mg/m^2) in February 2013

Sampling direction (n=3)	Anions			**Total**	Cations					**Total**
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	4.10±2.74	7.61±3.16	14.13±8.45	**25.84**	2.10±0.89	6.31±5.91	5.32±1.45	45.80±3.08	1.38±0.55	**60.92**
NE	2.68±1.56	8.93±3.28	15.76±9.34	**27.36**	3.05±2.40	7.30±6.51	5.65±1.45	50.44±4.65	2.72±0.81	**69.15**
E	3.69±2.38	14.43±5.24	19.32±10.46	**37.44**	3.20±1.71	8.35±6.69	7.24±3.30	62.77±11.30	3.19±0.87	**84.75**
SE	4.90±2.88	17.99±6.11	20.22±13.09	**43.12**	3.15±2.24	7.31±5.40	7.34±2.45	61.57±11.63	3.56±0.79	**82.93**
S	3.95±2.40	9.16±4.56	15.40±9.43	**28.51**	3.52±2.65	7.28±6.76	4.71±1.57	47.94±6.92	1.66±1.39	**65.12**
SW	4.42±3.53	8.21±5.60	12.65±8.87	**25.28**	2.54±1.75	6.12±5.56	3.18±1.86	40.55±18.30	2.03±1.05	**54.42**
W	3.98±2.80	8.08±3.10	12.80±8.02	**24.87**	2.29±1.69	6.41±5.40	4.55±1.28	40.79±5.77	2.07±0.75	**56.11**
NW	2.76±1.72	6.51±2.73	12.56±6.89	**21.83**	2.08±1.30	6.27±5.80	3.24±0.97	41.23±3.07	1.42±1.10	**54.24**
Average±SD	**3.81±2.50**	**10.12±4.22**	**15.35±9.32**	**29.28±7.22**	**2.74±1.83**	**6.92±6.00**	**5.15±1.79**	**48.89±8.09**	**2.25±0.91**	**65.96±12.22**

Table C-9. Ion deposition amount (mg/m^2) in March 2013

Sampling direction (n=3)	Anions			Total	Cations					Total
	Cl^-	NO_3^-	SO_4^{2-}		Na^+	NH_4^+	K^+	Ca^{2+}	Mg^{2+}	
N	3.79±2.25	15.13±10.31	10.81±6.41	**29.74**	4.11±2.27	2.73±0.96	7.00±2.05	76.43±25.9	3.38±1.50	**93.65**
NE	4.71±2.34	18.97±12.80	12.42±7.46	**36.10**	3.72±1.33	3.14±0.99	7.50±2.44	86.59±32.4	4.32±2.21	**105.27**
E	5.95±2.28	21.52±11.57	16.30±10.66	**43.78**	4.21±1.70	4.00±1.30	10.71±4.85	107.64±42.2	4.89±2.00	**131.45**
SE	4.15±1.96	21.36±9.70	15.55±9.49	**41.06**	4.67±1.22	4.40±0.99	10.74±2.95	108.23±44.0	5.24±1.74	**133.28**
S	4.26±1.64	12.38±6.57	12.09±7.52	**28.74**	3.53±1.24	2.91±0.94	6.83±0.98	79.58±31.8	2.93±1.15	**95.77**
SW	3.99±2.11	14.48±11.23	10.62±7.27	**29.10**	2.98±1.68	2.51±1.13	6.80±2.65	73.63±33.9	2.97±1.76	**88.89**
W	3.07±1.12	8.35±5.94	9.88±6.35	**21.30**	2.60±1.25	2.24±0.78	6.35±1.79	69.96±26.7	3.52±1.61	**84.67**
NW	3.43±1.85	9.09±8.46	10.05±6.29	**22.56**	3.26±0.83	2.47±0.98	6.97±1.87	70.93±24.6	3.35±1.78	**86.99**
Average±SD	**4.17±1.94**	**15.16±9.57**	**12.22±7.68**	**31.55±8.14**	**3.63±1.44**	**3.05±1.01**	**7.86±2.45**	**84.12±32.74**	**3.82±1.72**	**102.50±19.49**

APPENDIX D

Photos of jambolan plum leaves

Table D. The photos of jambolan plum leaves

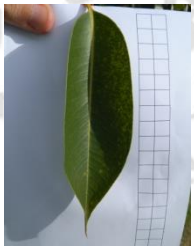
Sample type	Direction	Photos of leaves	Leaf area (mm^2)
Blank	-		8852
			3873
			8900
			8863
			8702

Table D. (Continued)

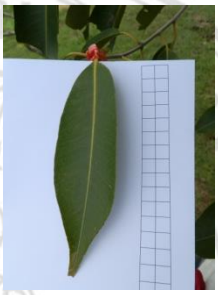
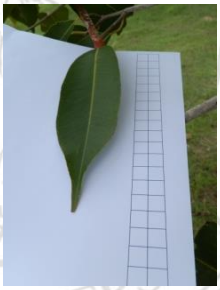
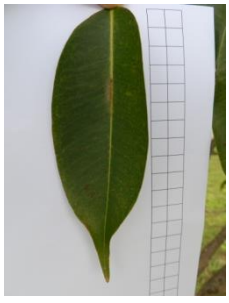
Sample type	Direction	Photos of leaves	Leaf area (mm^2)
Sample	North		5341
			5389
			6036
	Northeast		5426
			4921

Table D. (Continued)

Sample type	Direction	Photos of leaves	Leaf are (mm^2)
			4386
	East		4236
			4247
			3034

Table D. (Continued)

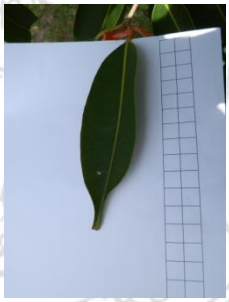
Sample type	Direction	Photos of leaves	Leaf area (mm^2)
	Southeast		5008
			3326
			3669
	South		5898
			4839

Table D. (Continued)

Sample type	Direction	Photos of leaves	Leaf area (mm^2)
			4693
	Southwest		5373
			4629
			8945

Table D. (Continued)

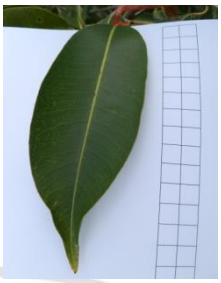
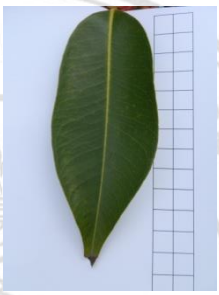
Sample type	Direction	Photos of leaves	Leaf area (mm^2)
	West		7656
			5396
			5934
	Northwest		6297
			6742

Table D. (Continued)

Sample type	Direction	Photos of leaves	Leaf area (mm^2)
			5637

CURRICULUM VITAE

Author's Name	Mr. Jakrapan Moryadee
Date/Year of Birth	December 20, 1988
Place of Birth	Phayao Province, Thailand
Education	2004-2006 High School, Pongratchadapisek School, Phayao. 2007-2010 Bachelor degree of Science (Chemistry), Naresuan University.
Publication	Moryadee, J; Wiriya, W; Chantara, S., 2014. *"Analysis of atmospheric particulates deposition on tree leaves"*, Proceedings of the Burapha University International Conference 2014. July 3-4, 2014 at Dusit Thani, Pattaya, Thailand.