

**Supplementary Information for**

**Bhuyan et al. “Understanding the Chemistry and Sources of Precipitation Ions in the mid-Brahmaputra Valley of Northeastern India”**

Table S1: pH, EC ( $\mu\text{S cm}^{-1}$ ), ionic composition ( $\mu\text{eq L}^{-1}$ ) and DOC ( $\text{mgC L}^{-1}$ ) of rainwater during the study period 2012-2014

	Tezpur												Ahmadabad <sup>a</sup>	IGP <sup>b</sup>	Jorhat <sup>c</sup>
	2012 (n=114)			2013 (n=104)			2014 (n=67)			2012-14 (n=285)			3years (n=91)	3 years (n=687)	1 year (n=42)
	Mean	SD	VWM	Mean	SD	VWM	Mean	SD	VWM	Mean	SD	VWM	VWM	AM	AM
pH	5.87	0.67	5.28	5.63	0.53	5.25	5.35	0.58	4.99	5.66	0.63	5.16	6.7	5.73*	5.5
EC	29.12	27.95	21.71	36.65	65.60	15.05	17.63	17.88	11.12	29.16	44.74	16.22	21.0	31.6	-
Li <sup>+</sup>	0.15	0.36	0.18	0.13	0.45	0.10	0.11	0.19	0.10	0.13	0.37	0.13	-	-	-
Na <sup>+</sup>	37.72	136.95	16.25	35.14	41.48	16.48	18.47	17.91	11.13	32.25	90.67	14.71	41.0	17.8	10.1
NH <sub>4</sub> <sup>+</sup>	67.22	74.19	54.74	79.07	101.12	42.12	71.14	87.16	43.65	72.47	87.70	47.17	30.0	28.0	39.8
K <sup>+</sup>	26.46	84.72	13.03	39.23	65.14	15.42	24.18	24.62	14.77	30.58	67.67	14.35	3.4	6.1	6.3
Ca <sup>2+</sup>	74.77	87.34	50.30	91.88	113.51	40.57	56.94	56.28	38.82	76.82	92.86	43.54	78.0	106.0	41.8
Mg <sup>2+</sup>	12.37	10.52	8.31	21.32	24.31	10.48	14.31	12.47	9.25	16.09	17.63	9.31	15.0	52.0	9.8
H <sup>+</sup>	3.80	6.15	5.29	4.77	6.36	5.63	9.53	12.69	10.27	5.50	8.51	6.97	-	2.0	13.3
F <sup>-</sup>	2.45	7.00	1.50	6.57	26.38	1.29	1.98	4.05	0.88	3.85	16.73	1.24	-	4.04	1.8
Cl <sup>-</sup>	127.99	859.55	25.22	46.47	109.25	18.59	20.46	19.07	12.70	72.96	548.18	19.13	50.0	29.0	7.7
Br <sup>-</sup>	0.20	1.07	0.10	7.59	1.80	7.17	4.47	2.41	4.10	3.90	3.68	3.65	-	-	-
NO <sub>3</sub> <sup>-</sup>	45.10	116.91	26.46	53.82	124.48	19.34	32.66	39.92	17.70	45.36	107.20	21.40	13.0	29.6	39.2
SO <sub>4</sub> <sup>2-</sup>	46.55	60.27	39.53	48.19	121.25	17.87	54.77	75.37	31.56	49.08	90.04	30.01	37.0	53.0	52.8
HCO <sub>3</sub> <sup>-</sup>	12.82	28.50	10.00	4.78	5.95	2.52	3.13	5.52	1.79	7.61	19.02	5.00	71.0	27.0	12.2
HCOO <sup>-</sup>	17.67	26.00	13.81	32.28	64.00	17.77	4.27	16.00	2.81	19.84	44.00	11.63	-	-	-
CH <sub>3</sub> COO <sup>-</sup>	1.66	5.00	1.75	6.51	16.00	3.66	1.45	3.00	0.93	3.37	10.00	2.11	-	-	-
DOC**	5.38	14.00	3.70	8.43	11.00	4.65	5.43	3.00	4.86	6.50	11.00	4.38	-	-	-

SD= Standard deviation; VWM= Volume weighted mean, AM= Arithmetic mean; n= number of samples, IGP= Indo-Gangetic Plain

<sup>a</sup> Rastogi and Sarin, 2005

<sup>b</sup> Tiwari et al., 2015

<sup>c</sup> Kulshrestha et al., 2014

\*Volume weighted mean

\*\* mgC L<sup>-1</sup>

Table S2: Annual variations of ion wet deposition (WD) (kg ha<sup>-1</sup> yr<sup>-1</sup>)

	2012	2013	2014	2012-14	2012-14
	WD (kg ha <sup>-1</sup> yr <sup>-1</sup> )	WD (kg ha <sup>-1</sup> yr <sup>-1</sup> )	WD (kg ha <sup>-1</sup> yr <sup>-1</sup> )	Mean WD (kg ha <sup>-1</sup> yr <sup>-1</sup> )	WD Std dev
Li <sup>+</sup>	6.34×10 <sup>-5</sup>	2.36×10 <sup>-5</sup>	4.17×10 <sup>-5</sup>	4.28×10 <sup>-5</sup>	±1.99×10 <sup>-5</sup>
Na <sup>+</sup>	0.046	0.051	0.051	0.049	±0.003
NH <sub>4</sub> <sup>+</sup>	0.130	0.102	0.157	0.130	±0.027
K <sup>+</sup>	0.067	0.081	0.115	0.088	±0.025
Ca <sup>2+</sup>	0.129	0.109	0.155	0.131	±0.023
Mg <sup>2+</sup>	0.013	0.017	0.022	0.018	±0.005
F <sup>-</sup>	0.004	0.003	0.003	0.003	±0.0003
Cl <sup>-</sup>	0.118	0.088	0.090	0.099	±0.017
Br <sup>-</sup>	0.001	0.077	0.065	0.048	±0.041
NO <sub>3</sub> <sup>-</sup>	0.215	0.160	0.219	0.198	±0.033
SO <sub>4</sub> <sup>2-</sup>	0.251	0.114	0.302	0.223	±0.097
Rainfall*	1472.21(12.91)mm	1374.18(13.47)mm	1337.25(20.0)mm		

\*total rainfall in mm and within bracket average rainfall in mm

Fig. S1: Scatter plot between  $\text{Na}^+$  and  $\text{Cl}^-$  ratio (a) 2012-14 and in different seasons of each sampling year (b) 2012 (c) 2013 (d) 2014

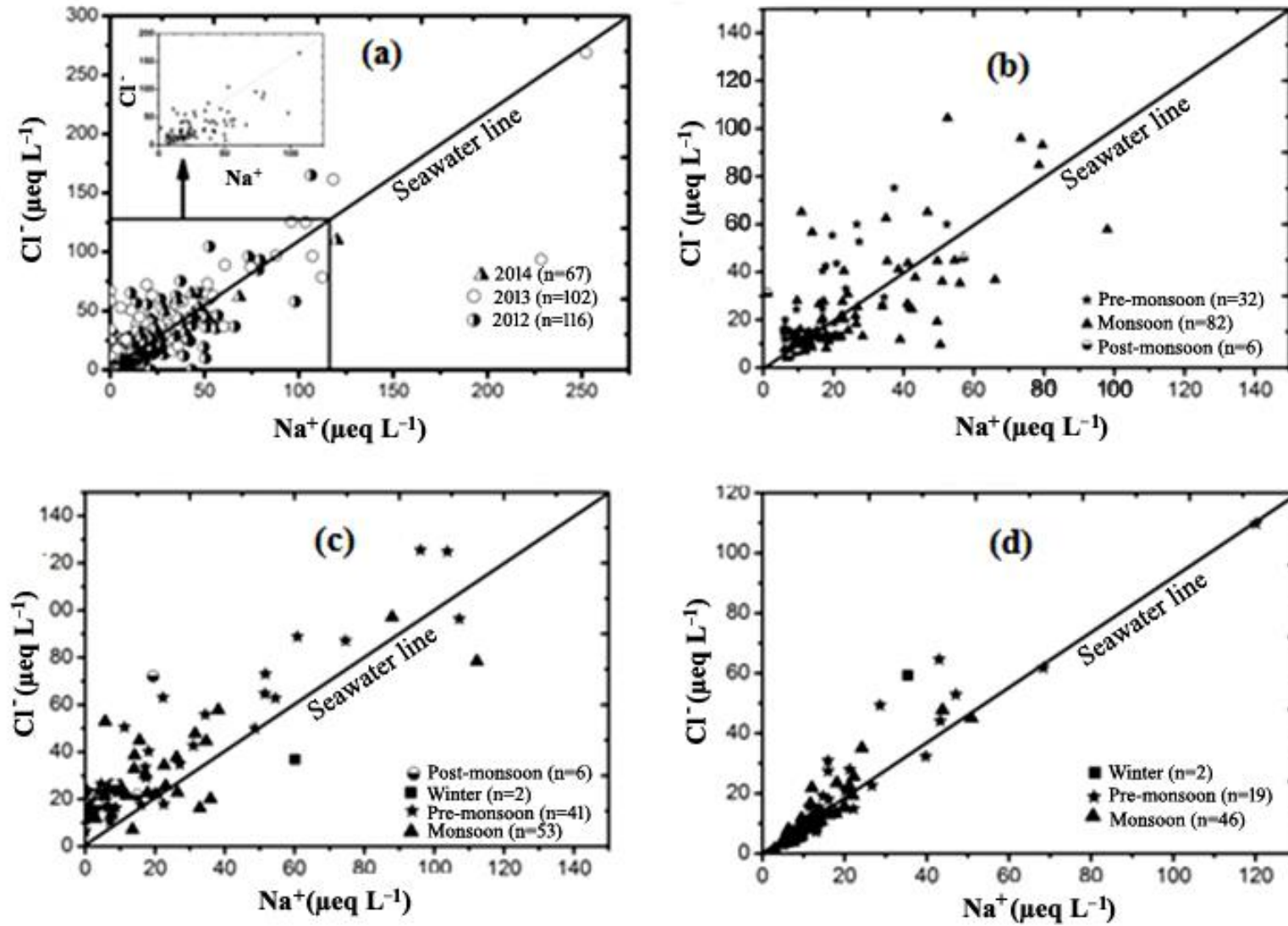


Fig. S2: Seasonal variation of (A) cations and (B) anions during different study years

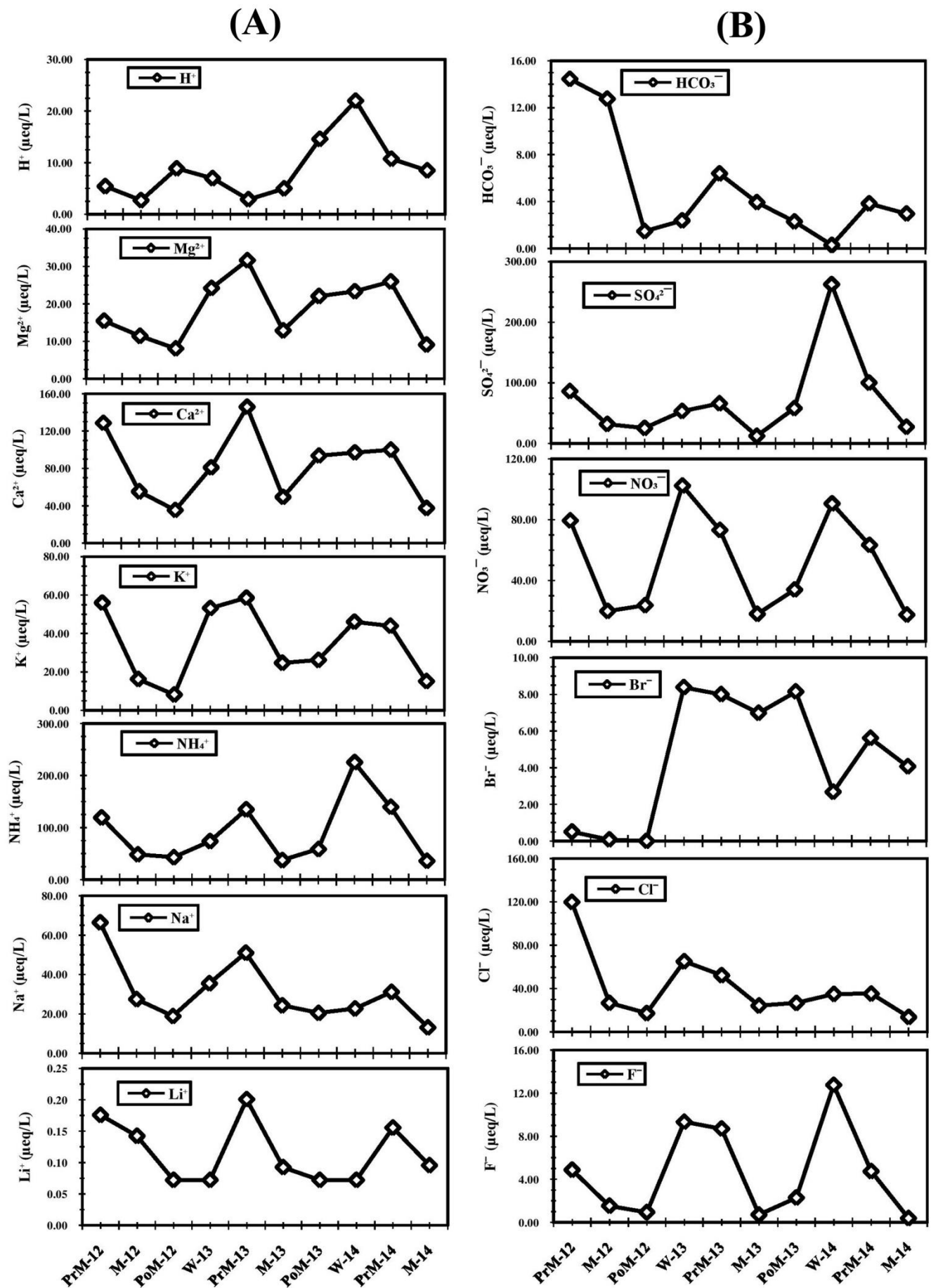


Fig. S3: Neutralization factors of major cations during the study period

