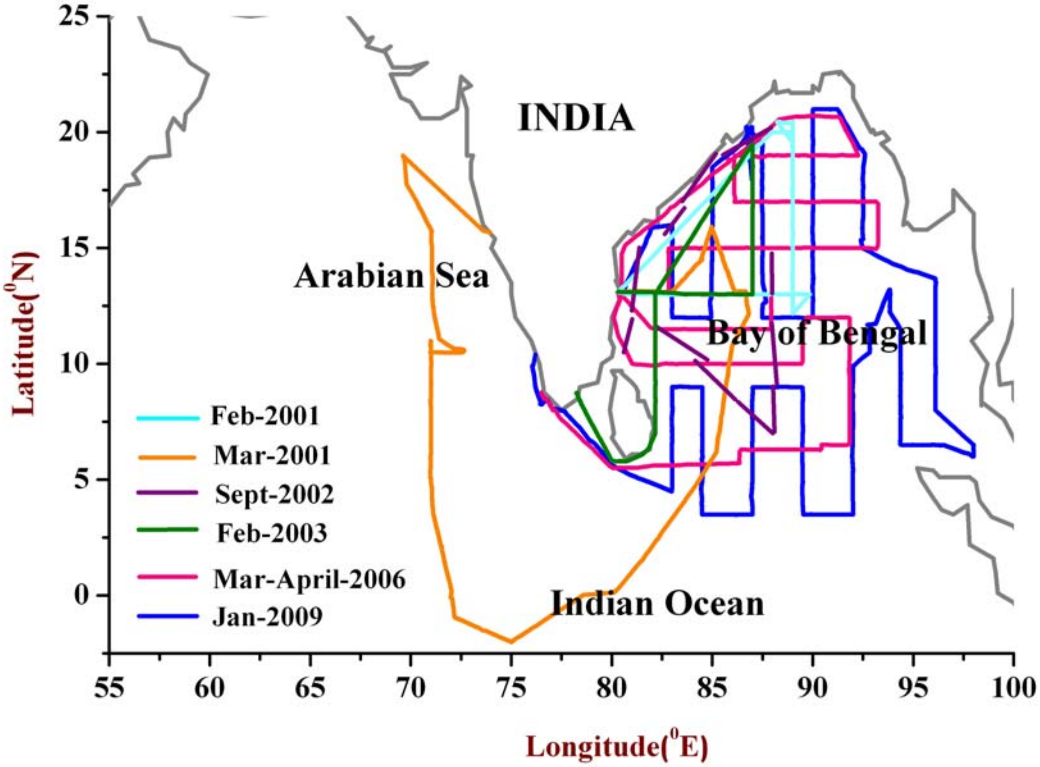

Fig 1: Number of cruise tracks undertaken onboard ORV Sagar Kanya in the Bay of Bengal during the continental outflow (Jan-mid April). The cruise undertaken in Sept-2002 represents the SW-monsoon conditions with complete reversal of winds (wind vectors are shown in Fig.2). The month of April is a transition period with winds from north easterly switching over to south westerly.

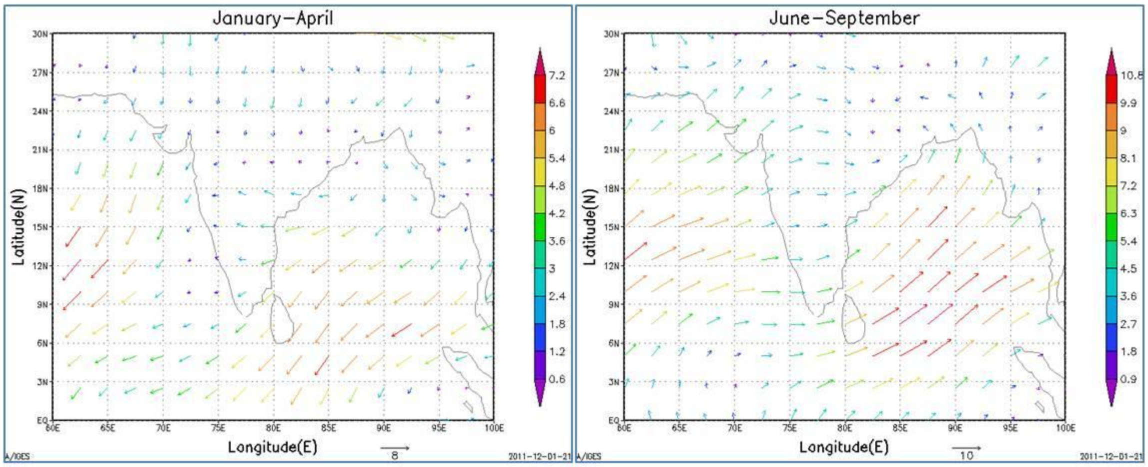

Fig 2: Typical surface wind vectors during the NE-monsoon (Jan-April) and SW-monsoon (Jun-Sept).

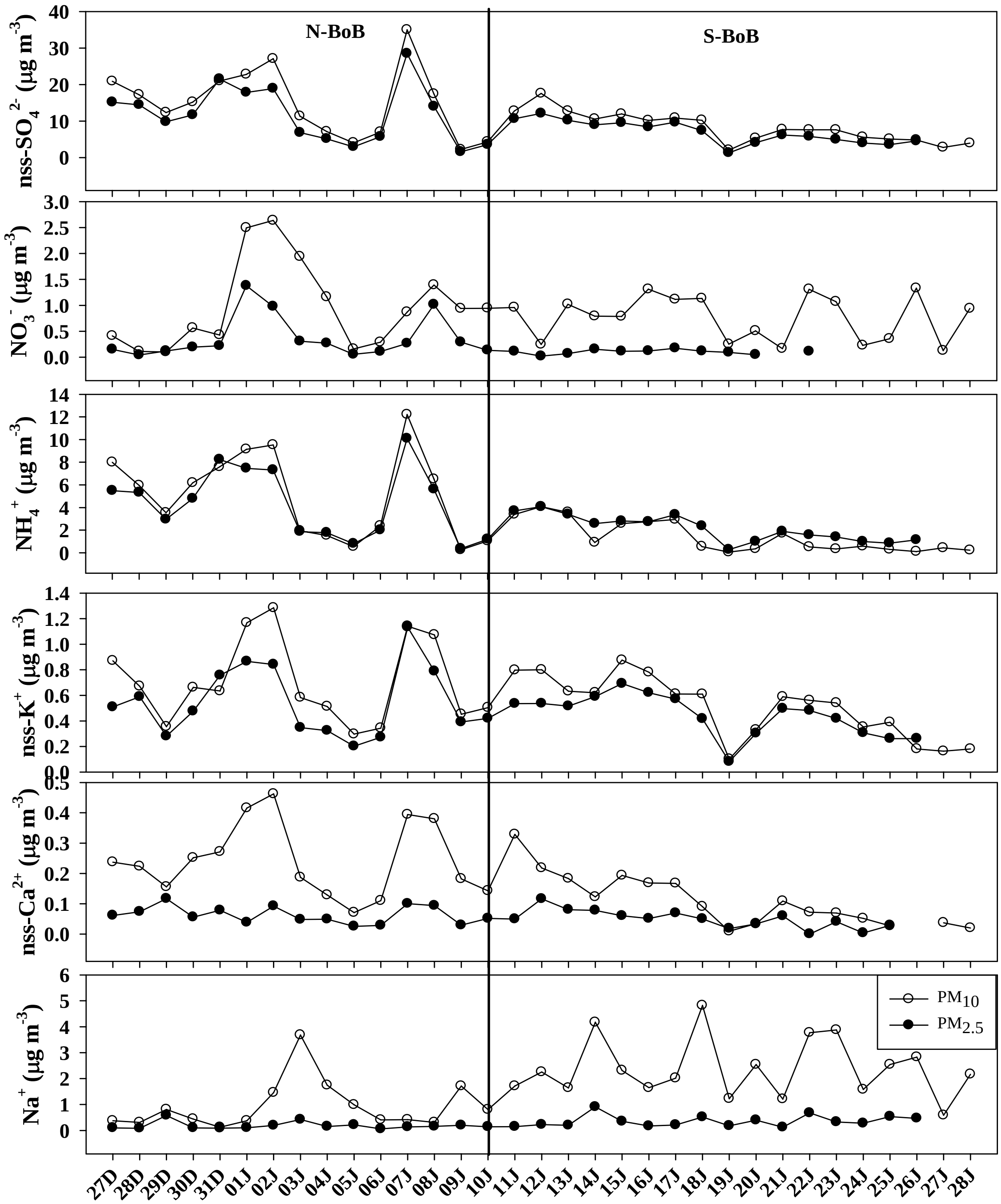

Fig. 3: Spatio-temporal variability of water-soluble inorganic constituents (WSIC) in the two size fractions during the cruise undertaken in the Bay of Bengal in Jan 2009.

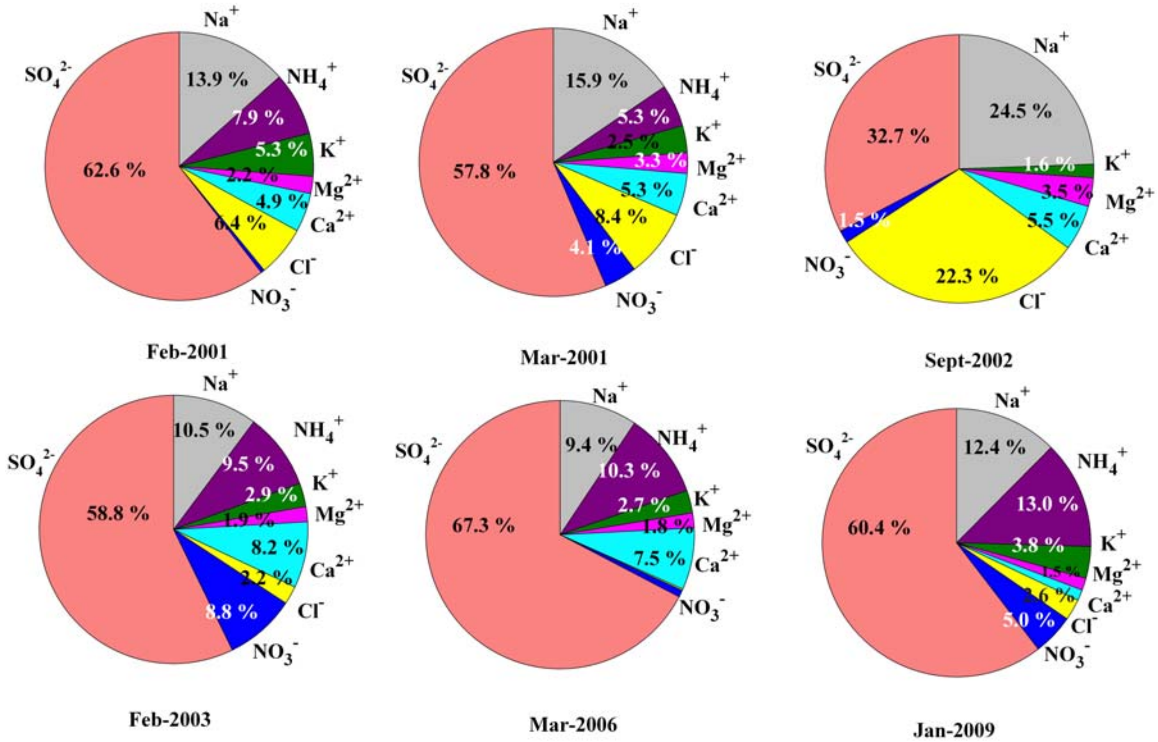

Fig 4: PM_{10} water-soluble inorganic constituents and their fractional contribution to ΣWSIC (sum of all measured cations and anions) averaged for all samples during respective cruises in the Bay of Bengal (Jan to mid-April). The high abundance of Na^+ and Cl^- in Sept-2002 cruise is consistent with SW-monsoon conditions.

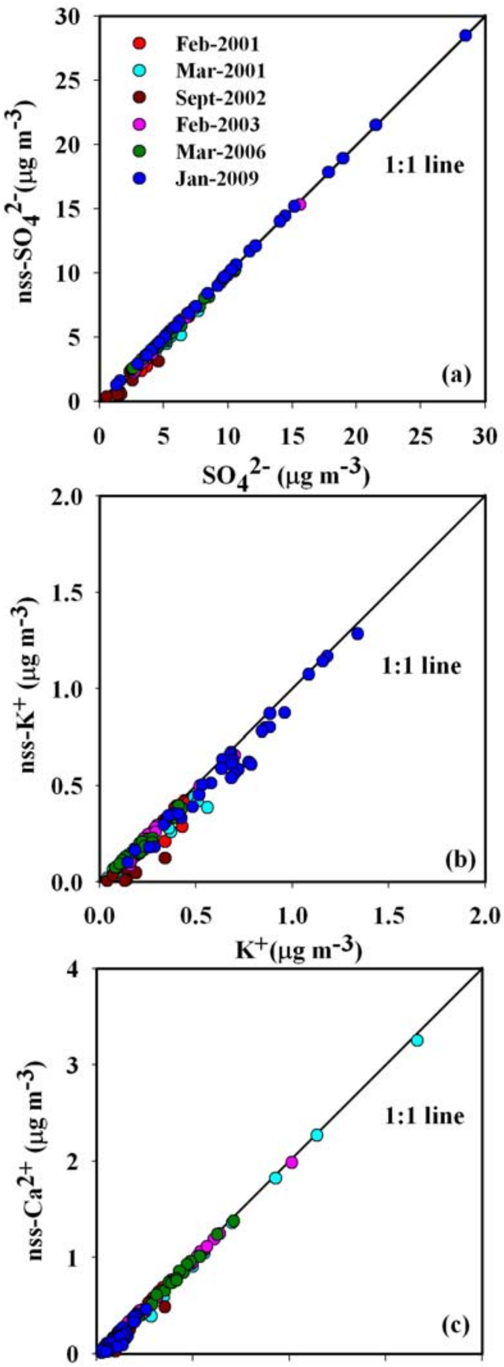

Fig. 5: Linear relationship between (a) SO_4^{2-} vs. nss-SO_4^{2-} (b) K^+ vs. nss-K^+ (c) Ca^{2+} vs. nss-Ca^{2+}, further confirm anthropogenic impact on the MABL of Bay of Bengal during NE-monsoon (Jan-Mar).

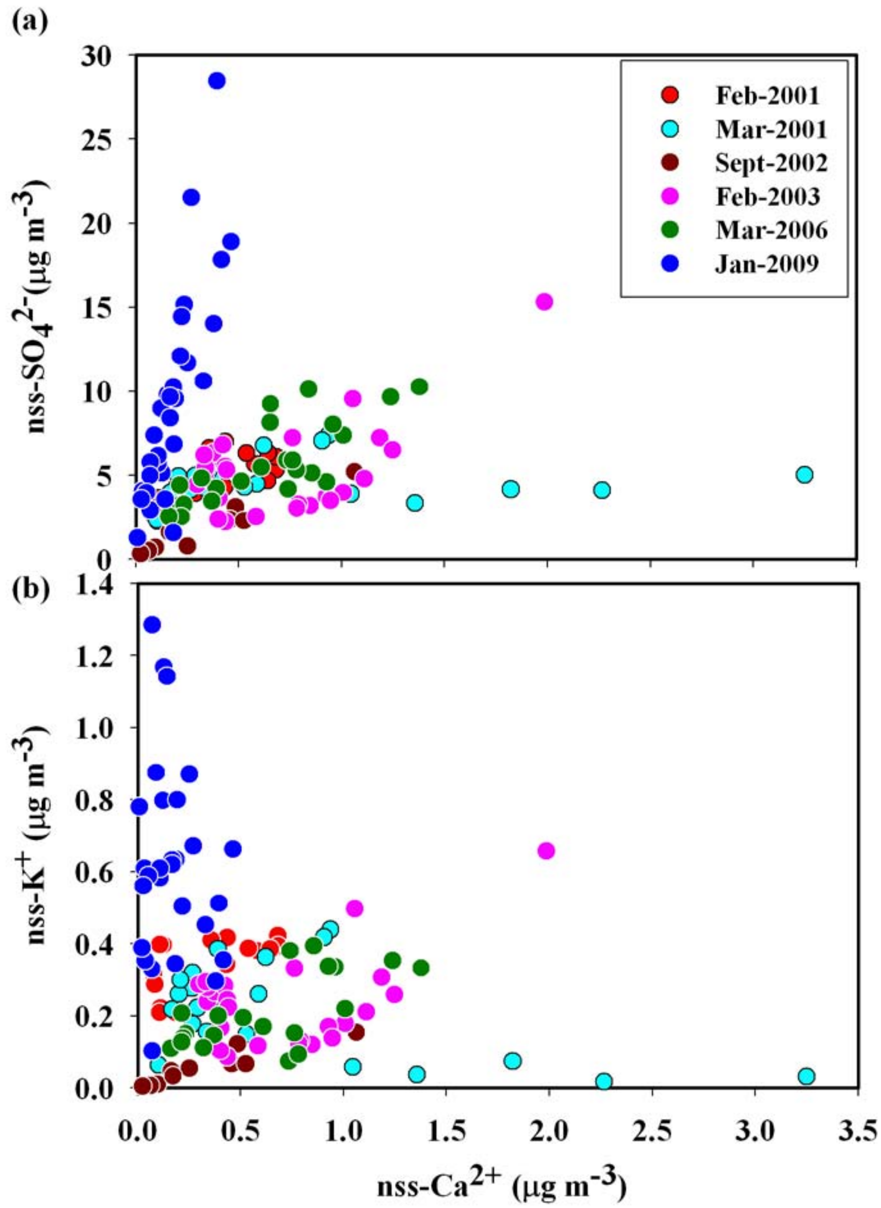

Fig.6: Scatter plots for mass concentrations of (a) nss-SO_4^{2-} and nss-Ca^{2+} (b) nss-K^+ and nss-Ca^{2+}, suggest dominant contribution of anthropogenic constituents during winter months (Jan-Feb) with relatively high concentration of nss-K^+ and nss-SO_4^{2-} compared to late NE-intermonsoon period (Mar-April).

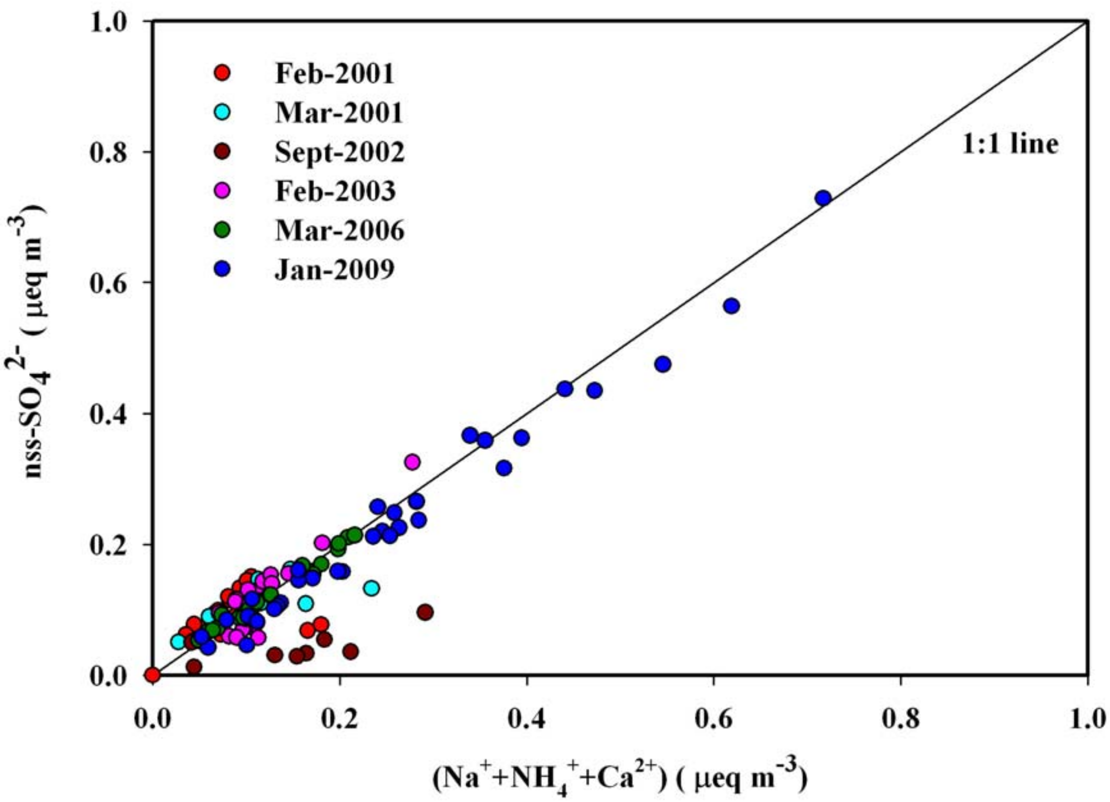

Fig. 7: Equivalent mass concentrations plotted among (Na^{+}+NH_4^{+}+Ca^{2+}) and nss-SO_4^{2-}, suggest that excess acid (defined as remainder fraction after neutralization with ammonia) interacts with mineral aerosols (enhancing the solubility of Ca^{2+}) and sea-salts (leading to chloride depletion from NaCl).

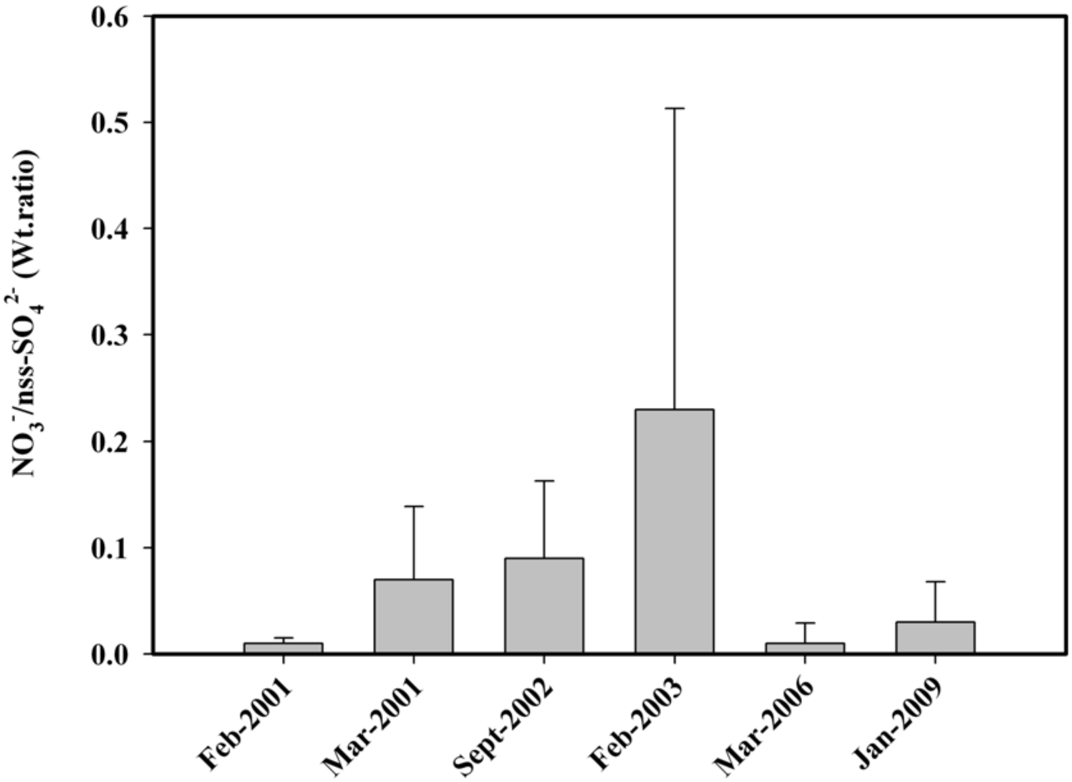

Fig. 8: Comparison of ratio of mass concentrations of $NO_3^-/nss\text{-}SO_4^{2-}$ for the aerosols collected during the continental outflow (Dec-April).

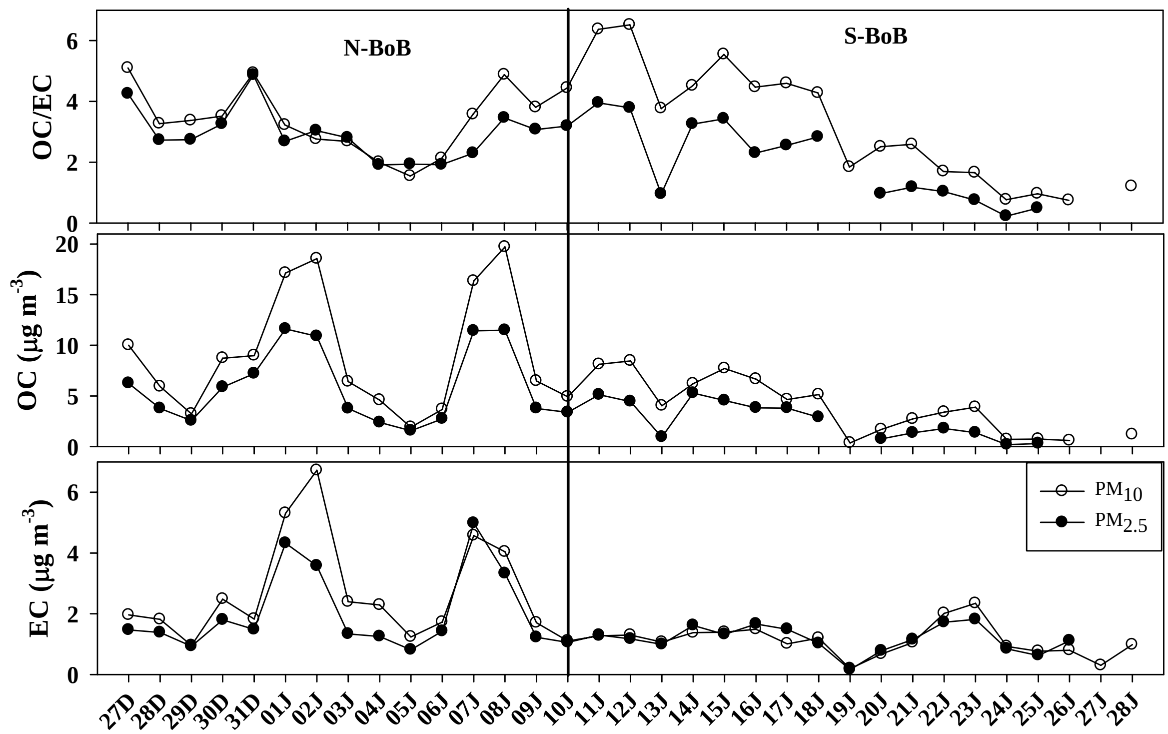

Fig 9: Spatio-temporal variability of carbonaceous species (OC, EC) and OC/EC ratio in the two size fractions; distinctly high concentrations of EC, OC and OC/EC ratios are consistent with abundance of other chemical constituents in samples collected along the coast in the north Bay of Bengal.

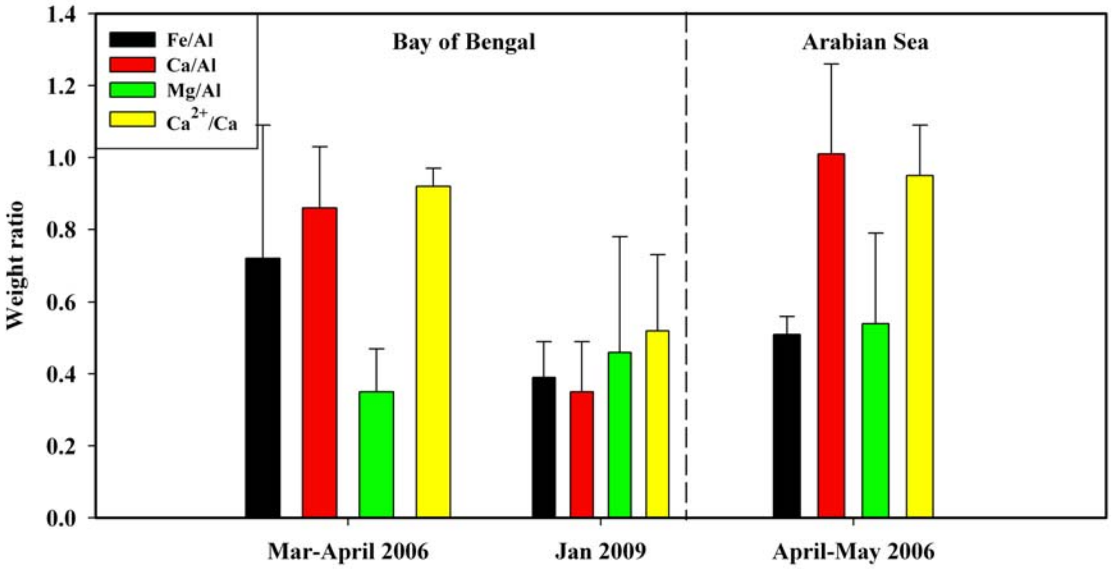

Fig. 10: Mean and standard deviation of Fe/Al, Ca/Al, Mg/Al and Ca^{2+}/Ca ratios over the Bay of Bengal (data from Mar-April 2006 and Jan 2009) compared with the Arabian Sea (April-May 2006). The distinctly higher Fe/Al ratios over Bay of Bengal (Mar-April 2006) and Arabian Sea (April-May 2006) are associated with the transport of dust from desert regions. This is also supported by higher Ca/Al and Ca^{2+}/Ca ratios.

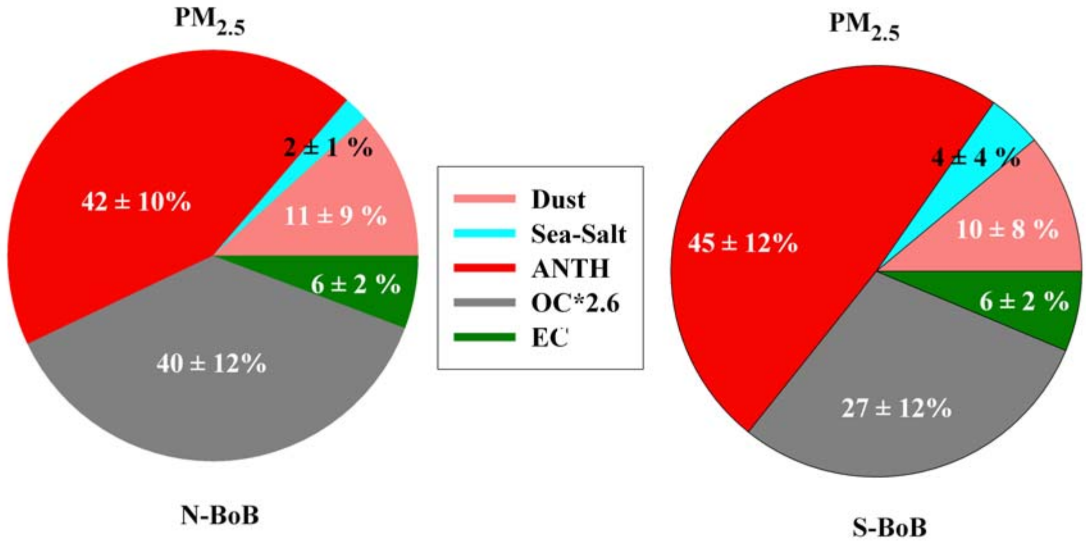

Fig.11: Average chemical components of PM2.5 mass concentrations over the North- and South-Bay of Bengal. The measured mass concentrations of individual components (Mineral dust, Sea-Salt, Anthropogenic Species, EC and Organic Matter (OM) are forced to 100 % which yields a factor of 2.6 to convert OC to OM.

Table 1: ***Range and average concentrations (μg m^{-3})of chemical species in $PM_{2.5}$ (for N = 31) and PM_{10} (N = 33) collected from the MABL of Bay of Bengal along with standard deviation of the data.***

	N-BoB		S-BoB			N-BoB		S-BoB	
	Range	Mean ± SD	Range	Mean ± SD	Parameter	Range	Mean ± SD	Range	Mean ± SD
$PM_{2.5}$	13.2 - 76.7	38.0 ± 20.2	2.0 - 35.3	22.3 ± 9.9	PM_{10}	16.2 - 108	57.8 ± 30.6	6.0 - 60.7	32.2 ± 15.1
Na+	0.06 - 0.58	0.18 ± 0.14	0.1 - 0.9	0.4 ± 0.2	Na^{+}	0.12 - 3.7	0.9 ± 0.9	0.6 - 4.8	2.4 ± 1.1
NH4+	0.37 - 10.1	4.4 ± 3.0	0.3 - 4.1	2.1 ± 1.2	NH4+	0.25 - 12.2	5.1 ± 3.8	0.06 - 4.1	1.4 ± 1.4
K+	0.21 - 1.1	0.6 ± 0.3	0.1- 0 .7	0.5 ± 0.2	K^{+}	0.33 - 1.3	0.7 ± 0.3	0.15 - 1.0	0.6 ± 0.3
Mg2+	BDL - 0.1	0.03 ± 0.02	0.01 - 0.11	0.05 ± 0.03	Mg^{2+}	0.04 - 0.4	0.1 ± 0.1	0.07 - 0.5	0.3 ± 0.13
Ca2+	0.03 - 0.14	0.07 ± 0.03	0.01 - 0.12	0.06 ± 0.03	Ca^{2+}	0.11 - 0.5	0.3 ± 0.1	0.02 - 0.4	0.2 ± 0.1
Cl-	BDL - 0.1	0.06 ± 0.02	BDL - 0.4	0.2 ± 0.1	Cl^{-}	BDL - 1.5	0.3 ± 0.4	0.04 - 1.2	0.5 ± 0.3
NO3-	0.05 - 1.4	0.37 ± 0.41	BDL - 0.2	0.1 ± 0.04	NO_3^{-}	0.1 - 2.6	1.0 ± 0.8	0.17 - 1.3	0.8 ± 0.4
SO42-	1.6 - 28.5	11.9 ± 7.8	1.3 - 12.1	7.0 ± 3.1	SO_4^{2-}	2.6 - 35.1	15.2 ± 9.3	2.3 - 18.1	8.9 ± 4.2
OC	1.6 - 11.6	5.9 ± 3.7	BDL - 5.3	2.6 ± 1.9	OC	1.9 - 19.7	9.1 ± 6.0	0.4 - 8.5	3.9 ± 2.8
EC	0.8 - 5.0	2.0 ± 1.3	0.2 - 1.8	1.2 ± 0.4	EC	1.0 - 6.7	2.7 ± 1.7	0.2 - 2.3	1.1 ± 0.5
Al*	BDL - 1077	349 ± 275	28.9 - 446	146 ± 107	Al	356 - 3468	1769 ± 1081	205 - 736	555 ± 153
Ca*	BDL - 176	61 ± 35	27.8 - 110	57 ± 22.9	Ca	157 - 732	381 ± 182	41 - 433	241 ± 101
Fe*	32 - 612	144 ± 140	14.8 -85.0	55.7 ± 22.9	Fe	127 - 1651	754 ± 517	31 - 382	213 ± 103
Mg*	28 - 152	56 ± 29	25.3 - 120	61.1 ± 25.5	Mg	135 - 580	278 ± 125	71 - 579	341 ± 129
Pb*	5.9 - 39.3	21 ± 11	2.4 - 41.1	20.6 ± 11.4	Pb	8.7 - 57	30.5 ± 17.3	2.7 - 70	28.7 ± 20.3
Cd*	0.07 -2.0	1.0 ± 0.6	0.04 - 1.4	0.7 ± 0.4	Cd	0.1 - 3.0	1.3 ± 0.9	0.03 - 2	0.9 ± 0.6

Note: * in ng m^{-3}.

Table 2: Principal component analysis (PCA) of chemical constituents in PM_{10} and $PM_{2.5}$ fractions.

PM_{10}			**$PM_{2.5}$**			
Variable	Factor (1)	Factor (2)	Factor (1)	Factor (2)	Factor (3)	Factor (4)
Na^+	-0.28	**0.94**	-0.23	0.05	**0.92**	-0.04
NH_4^+	**0.91**	-0.34	**0.86**	0.22	-0.24	0.30
K^+	**0.92**	0.25	**0.85**	0.05	-0.01	0.39
Mg^{2+}	-0.09	**0.97**	0.14	0.20	**0.91**	-0.11
Ca^{2+}	**0.92**	0.21	**0.68**	0.41	0.31	-0.18
NO_3^-	0.56	0.46	0.23	0.01	-0.09	**0.90**
SO_4^{2-}	**0.93**	-0.08	**0.89**	0.23	-0.16	0.23
OC	**0.94**	-0.09	**0.66**	0.14	-0.16	**0.63**
EC	**0.90**	0.05	**0.64**	0.06	-0.06	**0.70**
Al	**0.89**	-0.32	0.29	**0.89**	-0.07	-0.03
Ca	**0.97**	0.12	-0.08	**0.81**	0.35	0.09
Fe	**0.92**	-0.22	0.16	**0.93**	0.09	0.11
Mg	0.26	**0.93**	-0.12	**0.67**	**0.65**	-0.09
Pb	**0.73**	0.32	**0.90**	-0.11	0.06	0.07
Cd	**0.88**	0.03	**0.92**	0.03	-0.06	0.21
Expl.Var	9.43	3.41	5.48	3.11	2.45	2.12
Prp.Totl	0.63	0.23	0.37	0.21	0.16	0.14
source	continental	marine	bb	dust	sea-salt	ff-comb

Note: bb = bio-mass burning; ff-comb= fossil-fuel combustion; Expl.Var = Explained variance; Prp. Totl = proportion of total variance.