

Interactive comment on “Impact of continental outflow on chemistry of atmospheric aerosols over tropical Bay of Bengal” by B. Srinivas et al.

Anonymous Referee #1

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General Comment: This paper presents the chemical (carbonaceous, inorganic ionic and trace elemental) composition of atmospheric aerosols, in two size fractions (PM_{2.5} and PM₁₀), over Bay of Bengal collected in winter period (December 2008 to January 2009). The data is interesting and provides the implications for continental outflow over to Bay of Bengal and thus makes a significant contribution. However, the phrase “on chemistry” in title may be reconsidered, because this paper has mainly focused on chemical composition and spatial (N-BOB & S-BOB) distributions of chemical components rather than chemical processes. It also requires some clarification/further discussion in the text. This paper may be published in ACP after minor revision, following the comments given below.

Specific Comments: Pages 20672-20673, (i) lines 12-15: It is important to provide the

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details of extraction procedure adopted for ion analyses in brief, including analytical errors, instead of just stating the instrument used for the analysis. (ii) Lines 16-26: Provide the percent recovery obtained in standard analysis and reference for methodology. (iii) Lines 27-29 & 1-6: Similar to previous ones, it is important to give the analytical procedure in brief and necessary to provide the analytical errors although literature has been cited for details. (iv) What are the concentration levels of chemical components in field blanks and whether the data reported here were corrected for them or not? Field blank may contain little amount of most of the components and significant amount of OC because zip-lock bags (plastic), in which the sample filters were packed (lines 2-3), cause high contamination of organic species.

Page 20673-20674: (i) As air mass trajectories and mass concentration belongs to different categories, it is better to divide the sub-Sect. 3.1 into two sub-sections. (ii) Lines 19-26: Define acronyms; SEA, MAP, N-BoB and S-BoB, at appropriate places. (iii) As the range and temporal and spatial variability in mass concentration of PM₁₀ and PM_{2.5} has already been reported in Kumar et al. (2010), it is necessary to note that in the text or to cite the reference in Table 1. Similarly, the same reference should be cited in the cases of nss-SO₄²⁻, NO₃⁻/nss-SO₄²⁻ ratios and OC/EC ratios as well as metal species in other sections of the text (or Table/Fig), as they have also been used in Kumar et al. (2010). (iv) Lines 10-15: The higher (2-3 times) PM₁₀ concentration observed in this study than the TSP reported previously needs to be explained further, probably relating to the seasonal differences in meteorology.

Page 20675, (i) Line 7: —ionic composition (WSIC —; Does it ‘composition (or) content’? (ii) Lines 9-14: — northern Bay of Bengal. — N-BoB and S-BoB. Use either full-name or acronym through out the text consistently. (iii) Lines 21-22: Replace ‘dot’ mark with ‘cross’ symbol to indicate the multiplication in all equations, and also in other sections of the text.

Page 20678, lines 3-5, 9-11 & 21-23: Does the meteorology is a driving force for the differences in concentrations observed in the present study and previous report(s)?

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Page 20680, lines 9-21 & page 20681, line 1: Quantification of source (biomass & fossil fuel combustion) contribution based only on TC/EC ratios is not appropriate, because EC concentrations in particles emitted from biomass burning are highly depend on type of biomass (or biofuel) and burn rate (Habib et al., Environ. Sci. Technol. 42, 2008; Stone et al., J. Geophys. Res. 115, 2010). Further, based on recent evidences (e.g. Gustafsson et al., Science 323, 2009), the contribution of 80% of aerosol carbon from fossil fuel combustion in South Asia is unbelievable, although such contribution has been reported earlier over northern Indian Ocean. Hence, it is more reasonable to state qualitatively (mixed sources) rather quantitatively (percent contribution).

Page 20682, lines 7-9: Discuss the comparability (and differences) of metal ratios observed in this study with those of literature values in the text instead of just providing the data in Table 3. In fact, Ca/Al and Mg/Al as well as mean Fe/Al ratios reported in all sites, Arabian sea and Bay of Bengal, respectively (Table 3), are quite different to those observed in the present study.

Page 20683, lines 12-14: — are in well agreement —. Provide the percent differences between measured and weighed mass in the text.

Page 20685-20686, sub-Sect. 3.3.3: As aerosol iron solubility over BoB has been reported in Kumar et al. (2010), it is not appropriate to discuss it again here under separate sub-section. So delete sub-Sect. 3.3.3 and include its essence in sub-Sect. 3.3.4.

Page 20686, lines 15-18: Where the scatter plot and linear correlations are shown? The origins and transport of Cd and Pb needs to be better explained based on spatial variability linking with air mass trajectories in order to show the impact of anthropogenic sources on chemical components of aerosols over BoB.

Technical Errors/Typos: Citation of literature in the text is not appropriate at certain places; for example: page 20672, lines 11-12: “— described in (Kumar et al., 2010; Kumar and Sarin, 2010)”. It should be “— described in Kumar et al. (2010) and Kumar

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and Sarin (2010)”. Look for similar kind of error through out the text.

Page 20683, (i) lines 22-23: As PM10 contains PM2.5 particles too, it is not correct to use the phrase ‘size-segregated aerosols’ in the text. Rather it may be termed as ‘two size fractions of aerosols’. (ii) Lines 24-26: — over the north Indian Ocean —. Does it north Indian Ocean (or) Bay of Bengal? If it is north Indian Ocean, how does this study emphasize —! I feel that this concluding statement is not necessary here.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 20667, 2011.

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