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Atmospheric Chemistry and Physics Discussions

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

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To, Copernicus Publications Editorial Support For ACP Editorial Office

Handling Editor: Dr. Nikolaos Mihalopoulos; <mihalo@chemistry.uoc.gr>

MS No: acp-2011-360 Manuscript Title: Impact of continental outflow on chemistry of atmospheric aerosols over tropical Bay of Bengal.

Dear Editor,

We have posted final Authors Comments for the above referred manuscript. All Referees comments and relevant short comments have been answered point-by-point.

We are pleased with Referee #1 comments; quote "data is interesting and provides the implications for continental outflow over the Bay of Bengal and thus makes a significant contribution". While responding to Referees comments, we disagree with the overall remarks made by the Referee #4. We are uneasy about Referee's remark; quote "I don't think they can revise this manuscript to meet the standard of acceptance for publication". This is somewhat personal and unethical in the scientific spirit of reviewing a research article. The comment made by Referee #3 is also somewhat unreasonable; quote "Have the blank concentrations been subtracted from the bulk sample concentrations? Have you dissolved and analyze certified standards". It is relevant to state that we are quite familiar with the analytical protocol for the chemical analyses of atmospheric aerosols and have been engaged in these studies for more than one decade (as evident from number of our earlier publications).

We have adequately responded to Referees concern that "some of the results presented in this manuscript have been already published in a previous paper". The primary objective of this manuscript is to assess the impact of continental outflow from the Indo-Gangetic Plain (IGP) (dominated by emissions from the biomass burning and fossil-fuel combustion) on aerosol chemistry in the marine atmospheric boundary layer (MABL) of Bay of Bengal. The continental outflow from the IGP and south-east Asia is a very characteristic seasonal feature and persists over the Bay of Bengal for a short-span of about four months (late December/early January to mid-April). The month of April is a transition period with reversal of winds from north easterly to south westerly. It is, therefore, logical for us to bring out and summarize the impact of anthropogenic sources (in the sulphate dominated outflow) on aerosol chemistry. In this context, we have briefly summarized and have addressed to three important processes operating in the MABL. (1) The uptake of acid species on to mineral dust by evaluating the relationship between water-soluble-Ca2+ and total-Ca content of the aerosols; (2) The acid-base displacement of chloride form NaCl (referred as chloride-depletion) by chemical reaction with H2SO4/HNO3; and (3) enhanced fractional solubility of aerosol iron by chemical processing of mineral dust and/or contribution from combustion sources.

These chemical processes are significantly important in the regional context, merit discussion and simultaneous synthesis in one single article.

Our synthesis of the data based on NO3-/SO42-, NH4+/SO42- , Fe/Al, Ca/Al, Mg/Al and OC/EC ratios in the continental outflow is most relevant and a novel aspect of this manuscript. In order to further strengthen our interpretation and conclusion, we have performed principle component factor (PCF) analysis. Another important concept now added in the revised text relates to conversion factor to calculate POM from the measured concentration of OC in this study. We emphasize that our approach is more appropriate and representative due to the fact that we have measured all individual components (mineral dust, sea-salt, anthropogenic species, EC and OC) in this study. Our approach yields a conversion factor of 2.6 for calculating POM from OC. This information is most desirable from a regional perspective, hitherto lacking in the literature. We have provided explanation to justify the conversion factor of 2.6 to assess POM. Also, we have compared data from earlier cruises (March-April 2006, Feb 2003 and Feb-March 2001) to make the results from this study statistically significant and representative (as summarized in Fig. 4, revised version). Thus, documenting that the continental outflow (and pollutants), during the late NE-monsoon, considerably affect the chemistry of MABL over the Bay of Bengal.

As per the Reviewers' suggestion some of the Figures have been suitably revised and/or replaced with new version (appended with this response as Supplement pdf files).

We look forward to hearing from you on further peer-review process.

With regards, Manmohan Sarin.

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Please also note the supplement to this comment:

http://www.atmos-chem-phys-discuss.net/11/C13370/2011/acpd-11-C13370-2011-supplement.pdf

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