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Comment

## ***Interactive comment on “Comparison of aerosol properties from the Indian Himalayas and the Indo-Gangetic plains” by T. Raatikainen et al.***

**T. Raatikainen et al.**

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*The authors describe meteorological as well as aerosol data from two Indian measurement sites: one semi-urban and one more remote site at higher altitude. The similarities and differences in the data sets are discussed both in a long term and a short term perspective.*

*The paper presents a lot of different data parameters. It is generally very well written, and the scientific content is relevant for ACP. However, a significant part of the main conclusions as well as the data presented has been published before, in papers referred to in this work. Of course, it is almost inevitable to in one way or another relate to old data and old conclusions, but in my opinion, this paper has way too much direct overlap with previous studies.*

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*I cannot recommend publication of this paper. There are simply too much old conclusions in relation to what is new. I would suggest the authors to write a significantly shorter version (a few pages), focusing more on the boundary layer evolution, which connects the two sites, as can be nicely seen in figure 8. Although this is an interesting finding, it is a too small part of this paper.*

We would like to thank Referee #1 for the comments. In order to avoid repeating detailed description of initial data treatment and instruments, we may have overemphasized the availability of data from the previous publications. For example, all Mukteshwar optical parameters from the current time period and half of the aerosol mass concentration data starting from January 2009 is new. This will be clarified in the next version. Nevertheless, we will change our topic from the comparison, where observed differences were explained by the boundary layer evolution, to the boundary layer evolution and its effect on aerosol concentrations in both measurement sites. In practice, sections related to meteorological parameters and trajectories will be greatly shortened and only figures and text with direct relevance to boundary layer dynamics will be kept. The effect of boundary layer dynamics on aerosol concentrations is already fully explained. If new text is added, it will be about aerosol properties and their dependence on boundary layer dynamics. However, preliminary inspection showed that it is difficult to make conclusions due to the limited data coverage.

**Specific comments.**

*P 11420 row 11: “found from” should be “found in”*

OK

*P 11420 row 21 “two years long” should be “two year long”*

OK

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*P 11421 row 15: “only a brief” should be “only brief”*

OK

*P 11422 row 10. Should be “from a PM2.5 inlet”*

OK

*P 11422 row 24: “Minimum data coverage was not required..” What do you mean by “enough data points”? Please be specific.*

This will be clarified.

*P 11426 row 4: Why do you set the density to 1 gcm-3, is this based on something or just a guess?*

This part of text will be reformulated.

*P 11426 row 12: “wind speeds are slightly lower during winter”. Is this really statistically significant?*

This part of the text will be removed.

*Page 11428 row 16. Delete “even”*

OK

*P 11429: Define q-value when it is first introduced.*

OK

*Page 11430 delete the sentence “Averaging, however, helps a lot”.*

OK

*Page 11431 row 15: “these size ranges are detected independently by the Gual Pahari DMPS units. This means that the data coverage for the size fractions is actually slightly higher than the original 16%”. I do not understand this at all. Please explain what you*

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mean.

Both DMPS unit were operating simultaneously only 16 % of the time, but the data coverage is higher for individual DMPS units. This will be explained.

*P 11432 row 11: "The both" should be "Both"*

OK

*P 11432 row 12: "measures absorption" should be "measures the absorption".*

OK

*Supplement page 1 row 5: "it is already" Delete "already".*

OK

*Supplement page 1 row 16: "coefficients over" should be "coefficients above".*

OK

*Supplement 4.3 Excluding all points were PM10 was lower than BC seems dangerous, when you have a very noisy signal. This should not be a problem when averaging, I think.*

Current approach was selected, because hourly BC/PM10 values are needed for the diurnal cycles. Diurnal cycles are based on hourly averages, but it is important to note that average of BC divided by average of PM10 is not always equal to the average of BC/PM10 especially when data coverages of PM10 and BC are different. The bias from ignoring the highest BC/PM10 values is small, because BC is rarely higher than PM10. This will be clarified.

Figures:

*Figure S4. Legend is hardly visible. Please move it.*

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OK

*Figure S7. Legend is hardly visible. Please move it.*

OK

*Figure S14. I suggest excluding some of the top values, to better use the plot area. Now it is very hard to read, since so many values are close to the x-axis.*

OK

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 11417, 2011.

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