Atmos. Chem. Phys. Discuss., 12, C416–C418, 2012
www.atmos-chem-phys-discuss.net/12/C416/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal variations of water-soluble organic carbon, dicarboxylic acids, ketoacids, and α-dicarbonyls in the central Himalayan aerosols" *by* P. Hegde and K. Kawamura

Anonymous Referee #1

Received and published: 6 March 2012

This manuscript presents findings from measurements of aerosol particles at a remote site in the central Himalayan Mountains. Atmospheric measurements at high-elevation sites are important for the assessment of long-range transport processes and regional-scale pollution characteristics, while few such studies have been conducted in South Asia. The study presented here included detailed speciation of the carbonaceous aerosol fraction with a focus on water-soluble dicarboxylic acids and related compounds. A strong seasonal dependence was observed for most organic species, while notable diurnal variations were found for only some compounds. Dur-

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ing summer, the dicarboxylic acids and related compounds were much more abundant and mainly derived from anthropogenic activities, such as fossil fuel combustion, in the Indo-Gangetic plain, based on characteristic ratios of selected diacids. On the other hand, during winter biomass burning influence was more significant. Interestingly, photochemical aging and secondary organic aerosol formation appeared to be enhanced in the winter, which was likely related to the prevailing meteorological conditions and air mass history.

This paper address relevant scientific issues and fits well within the scope of ACP. The study appears to have been carried out with sufficient QA/QC measures, and the presentation of the methods and findings is concise and clear for the most part. Therefore, I recommend publication of this manuscript in ACP, following a few suggestions listed below, including a final check of the English grammar.

Technical corrections:

1. Please, check the correct use of the definite article "the" throughout the entire manuscript (i.e., it is missing in many cases), e.g., on p. 936, line 25; p. 937, line 4; p. 938, lines 5, 8, 10, 18 and 20; p. 939, line 22; etc.

2. p. 936, lines 25-27: The sentence is not worded well and should therefore be changed slightly; specifically the word "ever" is not proper here, and the phrase "reveal enormous pollution transport pathways" should be reworded.

3. p. 939, line 6: Change "climatology" to "climate".

4. p. 941, line 15: Isn't the filter punch placed into a quartz tube rather than a "quartz boat" in the Sunset analyzer (in contrast to the DRI carbon analyzer)?

5. p. 942, line 3: Change "chromatography" to "chromatograph".

6. p. 943, line 6: Shouldn't it say "increases" instead of "decreases"?

7. p. 943, line 17 Insert "with" before "each".

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8. p. 944, lines 25-26: Perhaps the authors may want to change this part of the sentence "... the regional air quality will considerably change ..." to "... the regional air quality will considerably be influenced by ...".

9. p. 945, line 2: These observations were made during spring rather than summer.

10. p. 945, lines 5-7: This sentence is not worded clearly, while the contents are correct.

11. p. 945, lines 17-18: It is not clear why the correlation between WIOC and EC "can be explained by that WIOC has various origins". The second part of the sentence makes sense and should be emphasized as the main reason for the good correlation, i.e., WIOC and EC have common sources, which are mainly the primary emissions from fossil fuel combustion.

12. p. 948, lines 20-23: I am not convinced that the lower diacid-C/TC ratios clearly indicate that the aerosol is influenced by hydrophobic carbonaceous material. For example, there are many other polar organic species (such as carbohydrates), aside from diacids, which contribute to TC as well. If the authors are convinced of their claim, then a better, i.e., more clear, explanation should be given here.

13. p. 955, lines 4-11: Please, provide references to support these implications.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 935, 2012.