Atmospheric
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Discussions

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Interactive comment on "Ambient air quality in the Kathmandu Valley, Nepal during the pre-monsoon: Concentrations and sources of particulate matter and trace gases" *by* Md. Robiul Islam et al.

Anonymous Referee #2

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General Comments

The paper by Islam et al. describes a slightly more than two week set of trace gas and aerosol measurements in the Kathmandu Valley in spring (April) of 2005. The measurements would have extended to a longer period of time if not interrupted by an earthquake that year. Filter based measurements were available at twice daily resolution for a set of speciated compounds, while higher time resolution particle data were available from an aerosol mass spectrometer. The analysis attributes sources of organics that contributed the major fraction of the particle phase, together with some analysis of inorganic aerosol thermodynamic properties and partitioning of major inorganic ions

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between gas and condensed phases.

The paper is a useful contribution to the literature in a relatively polluted but under-sampled region. Publication is recommended following attention to the comments below.

Specific comments

Line 92: "A satellite-derived . . ."

Lines 94-96: This is not a closed budget or even a "major" components budget since most of the mass is not assigned.

Line 126: A figure with a map indicating the location of the site within the Kathmandu Valley, as well as the location of this valley within a wider geographic region would help with context.

Line 161 (and elsewhere): NO3 and Cl should be indicated as anions

Lines 259-274: The calculation appears to consider only the inorganic component of the particles. Actual liquid water content and deliquescence state should depend on the organic component as well. Have organics been excluded from the calculation? Please comment here or in the section at the end on limitations of the calculations.

Lines 286-295: Description of how HCl can be estimated from measurement of total chloride (presumably meaning gas + aerosol phase) that were at or below the detection limits is not clear. Please clarify how in the absence of a total chloride measurement but a model prediction of the aerosol pH it is possible to estimate gas phase HCl. This is likely just a wording / clarity issue as the data in Figure 3 are not consistent with a measurement that is below detection limit.

Line 320: This appears to be the first reference to a figure from the text. Normally they are called out in order rather than beginning with figure 3.

Line 436 and Table 3: The meaning of "reasonable" is not clear here. Is this intended

to indicate that the measurements are accurate ? If so, the analytical descriptions above are sufficient. More to the point, however, the comparisons of absolute mixing ratios from one place to another in Table 3 are only partially informative due to the reasons cited in the preceding paragraph that they are drawn from different seasons with likely very different meteorology and boundary layer depths. A better comparison would involve ratios of selected compounds to tracers such as CO to give a sense for the contributions to emissions in different locations.

Section 3.1.2: Here specific ratios are discussed, which is helpful, but not given in table format but rather only as in-text description? Suggest combining this information with that in table 3 to make the section more readable.

Line 574-576: Given the variability in other inorganic components are mainly ascribed to meteorology and transport rather than chemistry, the simplest explanation for the apparent diel cycle in Br species would also be meteorology.

Lines 582-599: While consistent with the recent literature and the observation of large amounts of soluble halides, the statements here are qualitative only but could be made more quantitative. For example, with data for O3, NO2 and related species, rates of the relevant gas and heterogenous phase processes could be estimated. If the supporting data for such a calculation does not exist, the paragraph should state this as a justification for not doing the calculation.

Line 747-749: Coal combustion is analyzed as a source of PM2.5, especially at night. Similarly, this could be mentioned as an explanation for the inorganic ions, particularly the halides, in the preceding section.

Line 770-774: A diel dependence of ozone would also support the analysis of photo-chemical vs nighttime contributions to secondary organics if the data are available.