

Interactive comment on “Seasonal variations of aerosol size distributions based on long-term measurements at the high altitude Himalayan site of Nepal Climate Observatory-Pyramid (5079 m), Nepal” by K. Sellegri et al.

Anonymous Referee #1

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The paper "Seasonal variations of aerosol size distributions based on long-term measurements at the high altitude Himalayan site of Nepal Climate Observatory-Pyramid (5079 m), Nepal" by Sellegri et al. presents a two-year data set of particle size distribution measurements at a high altitude Himalayan site. The paper uses only SMPS and OPC data in the analysis and relies on their parallel papers on supporting data. The data set is unique, since only few studies of such long-term measurements have been conducted in Asia and especially at such high altitudes. The data presentation is satisfactory and the findings are explained in reasonable manner. Tools used in the

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analysis are common to the scientific community. The frequent referring to the group's parallel papers makes it hard for the reader in some parts of the manuscript. Some details should be included in the manuscript to make it more readable on its own, without having for example Bonasoni et al., 2010 paper on the side. Detailed comments are listed below. Overall, the unique data set provided by this paper deserves to be published in ACP after considering the following issues.

Detailed scientific comments:

- Page 6539, row 5: I found four different data periods in this study. Please correct and use the same throughout the paper. (see also: p6542 r19, p6543 r13, p6554 r11) .
- Page 6540, row 10: Seems to be a missing reference.
- Page 6543, rows 15-18: Please clarify how the SMPS and Grimm data were merged (since they measure different diameters).
- Page 6543, rows 18-21: How and why you have selected these limits for the mode mean diameters? This should be justified for the reader.
- Page 6543: It would be valuable for the reader to have a sentence or two about the treatment of the sample aerosol (inlet/dryer/etc) and possible particle losses.
- Page 6544: Please define the seasons in understandable way (i.e. "pre-monsoon (Mar-May)").
- Page 6546, row 14: Would you have any estimate of how much of the particles are lost by cloud droplet activation? With such low number concentration, the activation percentage would be relatively large in the occurrence of a cloud at the site.
- Page 6546, row 20: I would prefer stating only that this will be "confirmed" or "disproved" later on in Sect 3.2, not both.
- Page 6547, rows 20-22: "In order to. . .". This sentence needs some re-phrasing, or it is missing something.

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- Page 6552, row 9-10: Three or two sub-classes here? Only two are listed in this sentence.
- Page 6552: The term "regional air masses" needs to be clarified. All other air masses with specific directions should be clear to the reader, but regional needs a sentence or two of explanation.
- Page 6554, row 15: Descesari et al., 2010 is not listed in the reference list.
- Table 2: The caption talks about Aitken and acc modes, the table shows acc and coarse modes, please correct the caption.
- Table 3: It would be informative to add a column with the number of trajectories from each air mass origin.
- It would be interesting to see a figure of diurnal evolution of total particle number concentration in different seasons (as in Komppula et al., 2009, Figure 8b).

Technical comments:

- Page 6542, row 10: "Mt. Lemnon" should be "Mt. Lemmon", correct throughout the paper.
- Page 6545, row 25: "port-monsoon" correct to "post-monsoon".
- Page 6546, row 1: "Kompulla" correct to "Komppula", also in p6547 r24.
- Page 6550, row 9: "lower?", no need for a question mark.
- Figure 1: Is bit shady in my print.
- Figures 2 & 3: The fontsize should be increased to make the figures more readable.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6537, 2010.