

Interactive comment on “Aerosol variability and atmospheric transport in the Himalayan region from CALIOP 2007–2010 observations” by S. Bucci et al.

Anonymous Referee #2

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The presented paper investigates the seasonal variability of different types of aerosol focusing on dust, smoke and polluted dust in the Himalayan region. Due to the importance of the region the investigations are important and the paper focuses on an important topic, the aerosol influence on climate. However, from my side, there are still significant limitations in the presented paper. 1) In both the Abstract and the Introduction the authors should more emphasize, why their study is so important and what is the exact gap of knowledge that will be filled with the paper. The paper should be better placed into the wider scientific content. 2) The introduction needs to be much more structured. I do not see a clear structure either in the literature summary on page

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15273 and on page 15274 (lines 2-12). 3) In the introduction clearly the questions, that will be answered with this paper, should be stated. 4) The section No.3 could also be more structured in a way, that makes it easier for the reader to follow the main results: Additionally, the authors jump between the notation of the seasons "summer", "monsoon" and "JJA" (and accordingly to the other seasons). It would be helpful to the reader to have a persistent notation. 5) The Figures could be significantly improved. In Figure 5 especially the variability for the upper atmospheric layers are really hard to see. 6) The conclusion is more a repetition of the sections before and does not really conclude and does not draw the real conclusion, that gives further information for the climatic influences of the aerosol in this important region.

Some more detailed remarks 7) P. 15275 line 23-25: How many profiles were removed? 8) P. 15276 line 1: 10 days seem quite long. Are the results still reliable? 9) P. 15277 line 19/20: Is it possible to quantify the effect of the clouds? 10) P. 15279 line 5-10: The different areas should be given in a map. 11) P. 15280 line 5: From my point of view, the maximum of the polluted dust is more between Oct-Feb rather than between Sep-Dec as stated by the authors. 12) P. 15281 line 8-12: The two mentioned corridors should be also marked in a map. 13) In Figure 5 the description of the plots should be according to the ones in the text. 14) Figure 6 is very confusing. The huge amount of black dots does not transport the information in a good way.

From my point of view, the topic of the paper is interesting and worth to publish. However before publishing the paper needs significant improvements as stated above and especially in setting the paper in a broader scientific context. A clear message is missing.

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