

## ***Interactive comment on “New particle formation infrequently observed in Himalayan foothills – why?” by K. Neitola et al.***

**Anonymous Referee #1**

Received and published: 22 June 2011

The manuscript ‘New particle formation infrequently observed in Himalayan foothills – why?’ by Neitola and co-workers presents a - based on the available measurements – comprehensive data-analyses for nucleation event days in one, until now less investigated area of the Himalayan foothills. The article is well structured and uses the currently available techniques to study the reasons for the infrequently observed new formed particles at a cut-off size of 10 nm. The use of boundary layer heights in the data analyses as an key-parameter seems to be a good explanation for the high frequency during spring in comparison with other seasons and points out the two-origin formation process between the mixed layer and the free troposphere. The paper is clear written and easy to understand and should be published in ACP after the following minor comments have to be considered.

C5259

Comments:

Page 13195, line 20: The authors mention here that a certain fraction of total particle number are formed via secondary route and only cited the work by Merikanto et al. However, there are studies from other groups around the world which claim that this numbers could be much higher or lower. I would recommend that the authors perform a small literature research on this topic and make clear in their manuscript that there is no final proof how important secondary formation is in context for the total observed particles.

Page 13201, line 13: The authors calculate the wet size of the particles with the parameterization of the particle hygroscopicity suggested by Laakso et al. This parameterization was developed for the boreal forest and will in this way also include the chemical composition of the particles from this area. If the authors use this formula they should make some statement how to justify the use for the Himalayan area.

Page 13206, line 10: Please change: . . . since particles act as a sink for both: vapours and the initially formed . . . (spelling error)

Page 13208, line 9: This paragraph shows some interesting comparisons with the selected side but it lags on information for the readers. It is mentioned that at the Pyramid station the maximum of observed events was during the monsoon season and the station is at an elevation of 5079 m. For readers like me who are not very familiar with this area it would worth to know does the Monsoon rain will build a cloud cover at this station or how much is the influence of the Monsoon at such elevation. This is a crucial point to understand the differences between the two stations.

Page 13208, line 22: Surprisingly pronounce annual pattern in the . . . (2 spelling errors)

Page 13209, line 22: The authors mention here that on other season than spring the BLH never exceeded the altitude of the station during NPF events. Are there other days out of the spring season where the BLH is high enough but no events were observed?

C5260

Page 13209, line 25: . . . in the free troposphere. In . . . (spelling error)

Table 2: These values would be nice to see additional for event and non-event classification

Figure 4: Please include also the same figure for J15 values or as a sup-figure (4b) than you do not have to change the numbers in the text.

Figure 6: Please include the height of the station as a line in the figure – otherwise the readers always have to check the paper what was the correct height.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 13193, 2011.

C5261