

# ***Interactive comment on “Atmospheric ions and nucleation: a review of observations” by A. Hirsikko et al.***

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General Comments:

Authors have reviewed the past work done on the observations of properties and nucleation of ions in the atmosphere. Also reviewed is the evolution of various techniques to measure the concentration and size distribution of ions. The review is quite extensive, well-written and covers most of the related topics. Moreover, publication of a review on this subject is timely, looking at the contemporary wide interest in this field. Therefore, I recommend publication of this article in ACP with some minor revisions as suggested in my specific/technical comments given below:

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The discussion in this article is mainly centered around the properties of ions in the lower troposphere. Ions in the upper atmosphere are not covered. This, however, seems to be intentional and, I agree, is justifiably not within the scope of this article. However, it will be appropriate that such an intention is clearly mentioned in the beginning or at an appropriate place in the article.

#### Specific comments:

1. Production of small ions by point discharge from elevated sharp points on the ground is an important source of ions close to the ground surface. The generation and evolution of these ions need be discussed in the article. 2. Authors should include a separate section on the discussion of the gaps in our present knowledge in this field. This will provide the motivation for future work and enhance the utility of this article. 3. P. 24252 l.17–19 – Give the quantitative estimates of the errors caused due to these assumptions under different environmental conditions. 4. P. 24254 –l.4-5 – First sentence may be deleted or atleast corrected. 5. P. 24275 – l.23 –These opposite observations were reported in wind speeds of <10 m sec<sup>-1</sup> ,this needs to be clarified here. 6. Fig. 7 and 9 are not necessary and may be deleted.

#### Technical comments:

P. 24247 l.29 –Change nn to nm. P. 24248 l.28 –Reference to Lida et al. (2006) is missing. P.24253 l.6 – Change ‘have observed’ to ‘have been observed’ P. 24254 l.21 – Change ‘electric’ to ‘dielectric’ P. 24260 l.5 – ‘result’ not ‘results’ P. 24261 l.4 – Include ‘in’ between available and publications. P. 24264 l. 20 – Change ‘the atmosphere the heights up to 5nm’ to ‘the atmosphere upto the height of 5 nm’. P. 24267 l. 27- Correct the sentence. P. 24268 l.28 – Change ‘Dahnorkar’ to ‘Dhanorkar’. l.21 &22 – Change ‘done’ to ‘made’ P. 24275 l.1 – Change ‘similarly’ to ‘similar’. P. 24278 l.25 – Delete ‘a with’ P. 24290 l.20 – Change ‘Chalmer’ to ‘Chalmers’ P. 24295 l.15 – Change ‘spactru’ to ‘spectra’ P. 24308 l.5 – Year of publication missing.

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