

## ***Interactive comment on “Atmospheric sub-3 nm particles at high altitudes” by S. Mirme et al.***

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We thank the referee for the valuable comments which helped to improve our manuscript.

**Comment 1** *i) In introduction part more references to earlier aircraft measurements of nucleation mode particles could be mentioned. For example the following recent publications:*

- C. D. O'Dowd, Y. J. Yoon, W. Junkerman, P. Aalto, M. Kulmala, H. Lihavainen, and Y. Viisanen (2007) Airborne measurements of nucleation mode particles I: coastal nucleation and growth rates, *Atmos. Chem. Phys.*, 7, 1491–1501.
- C. D. O'Dowd, Y. J. Yoon, W. Junkermann, P. Aalto, M. Kulmala, H. Lihavainen, C8105

*and Y. Viisanen (2009) Airborne measurements of nucleation mode particles II: boreal forest nucleation events, Atmos. Chem. Phys.*, 9, 937–944.

We added these references.

**Comment 2** *ii) In general some figures could have more comments and more self-informative captions. If possible, I suggest to add in Figure 4 one more panel with air pressure profile. In Figures 3, 8, 9, 10 and 11 the authors use different colors. However, some of the color codes are not well described in the figure captions.*

We added air pressure profile to figure 4 and changed it's layout to better fit four parameters.

It was made sure that all color codes are described in the mentioned figure captions, with the exception of figure 3, where the color codes are only meant to make different flights distinguishable.

**Comment 3** *iii) Scatterplots in Figure 6 show that the results from CPC and NAIS are closer to each other at lower concentrations ( $< 1000 \text{ cm}^{-3}$ ) at higher altitudes. I would expect that those instruments show better concordance at higher concentrations. Could authors comment that?*

Some of the improved match at lower concentrations can be attributed to larger measurement errors as there are also data points which show a worse match at lower concentrations. The instruments may also be simply coping differently with high altitudes and low concentrations which happens to compensate the systematic mismatch visible at higher concentrations.

**Comment 4** *iv) Figure 8 illustrates measurements results from flights over Central Europe. However, some of the measurements were made over Atlantic near west coast*

*of Ireland. Why these measurements were not included? Do other figures contain those Atlantic measurements? Is there any difference between measurement results over Central Europe and Atlantic near west coast of Ireland? I would expect that these questions were commented in the paper.*

This is an error in the caption. We changed the expression to “measurements from all flights of the EUCAARI LONGREX campaign in May 2008”.

**Comment 5** *v) Figure 9 shows that the negative small ion concentration is higher than positive one at altitudes below 4 km and lower at altitudes above 4 km. Could the authors give more comments about what would causes sudden changes in negative small ion concentration at altitudes 4 – 6 km?*

We added “Part of the negative ions are not measured above 4 km due to the shift of the measurement range of the instrument.” to the caption.

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