

Interactive comment on “Airborne measurements of nucleation mode particles II: boreal forest nucleation events” by C. D. O’Dowd et al.

Anonymous Referee #3

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General:

This is one of the few studies made so far in which the vertical location and extend of atmospheric new-particle formation is investigated. The manuscript is original and contains useful information for the scientific community. There are, however, a few issues that should be addressed more carefully before the paper can be accepted for publication in ACP.

Major comments:

Air craft measurements of both aerosols and trace gases are substantially more challenging than corresponding ground-based measurements. The authors should bring up the potential uncertainties in their measurements and to explain shortly how the

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quality control of the measurement data was taken care off.

It remains unclear for the reader how the different layers (boundary layer, surface layer, residual layer, free troposphere) have been defined and how they have been distinguished from each other based on available data (the profiles of the potential temperature and relative humidity). More information with regard of this should be given in the manuscript.

I feel that most of the readers find the conserved-variable mixing diagram analysis difficult to understand, especially as one of the pictures (Figure 15 b) seems to be replaced with a wrong one.

Other comments:

Page 2823, lines 10-16: I do not agree with the statement that there is consensus on the mechanisms of nucleation in the boundary layer. In fact, there seems to be a continuous debate on this issue and even the same research groups are changing their view frequently. I suggest that the authors modify this paragraph to make it compatible with current state of affairs.

Page 2824, line 16: "7 times dilution flow" sounds a little bit odd to me.

Page 2825 (line 11): It is stated that there was 4 strong nucleation events between 24 and 30 March 2003, while I see 5 when looking at Figure 2. The authors consider 3 cases in this manuscript. What are the reasons for these differences?

The legends P.T. and R.H should be explained in the figure texts, even though these quantities are probably evident for most of the readers.

In right panel of Figure 7, the legend should probably read "3025-3010m". As a matter of fact, to be consistent with the text, one should use the notation 3010(m).

There are still quite a few typos in the text that should be corrected.

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