

Interactive comment on “Arctic aerosol life cycle: linking aerosol size distributions observed between 2000 and 2010 with air mass transport and precipitation at Zeppelin station, Ny-Ålesund, Svalbard” by P. Tunved et al.

Anonymous Referee #2

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The manuscript "Arctic aerosol life cycle: linking aerosol size distributions observed between 2000 and 2010 with air mass transport and precipitation at Zeppelin station, Ny-Ålesund, Svalbard" describes the aerosol characteristics at an Arctic station over a period of 10 years, and gives a qualitative (and also partly quantitative) picture of the overall changes in the sub micron aerosol. The authors give a well-justified explanation of the effect of precipitation on the aerosol concentrations, which in itself is a valuable addition to the knowledge. I would recommend publishing this paper in ACP. The text needs a checking of English language, as there are quite a number of bugs that seem

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typical for non-native speakers. A thorough checking that the figures and their captions are correct and easily readable is also required. Some minor points that should be addressed are given below.

Section 2.1.1: The differences are reported only for 2000 and 2002, but longer periods of missing data are given for 2004 and winter 2008-2009 in section 2.1. It should be noted that these years are also not fully representative (albeit with minor effects)

p29976, l 24: some estimated order-of-magnitude quantification for 'short' should be given

p29977: l 21: what are these numbers based on? Reference?

l26: I don't understand what unimodal means for the integral number concentration (=total number concentration?)

29978: l15-16: The wording here makes it sound like air mass transport plays a small role in the transition; however, to me it would seem that photochemical processes cannot explain the vanishing of the accumulation mode, and for this the transport should have some effect. Reword to make the point so that the effect of transport is more obvious.

Figures and tables.

Table 2: As this is not discussed, maybe move this to an appendix?

Fig 4: legend does not correspond to axes labelling Fig 10: This figure should not be presented with a log-scale, as variation is lost. Also, are the lines means or medians? Maj->May Fig 11: The caption does not correspond to the text. Figs 12-13: The colour bar should be moved so that it does not obscure the image. Also, maybe the layout could be changed, maybe a 3x4 grid? This would use the space more efficiently and enable larger maps. Fig. 15: I see no reason to extend the x axis to negative values.