**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Nucleation mode growth rates in Hyytiälä during 2003–2009: variation with particle size, season, data analysis method and ambient conditions" *by* T. Yli-Juuti et al.

Anonymous Referee #3

Received and published: 21 September 2011

The authors present the study of growth rates of nucleation mode particles over 7 years of data collected in the boreal forest with three different classifiers. They investigated the variation of GR between the instruments, over the seasons, years and particles size ranges. A comparison between two different analysis methods is presented. Methods and data are well reported and proper statistical analysis has been applied. This work confirms the results of previous studies updating and extending the analyzed time series focusing on the size dependency of GR and correlation with meteorological data. Although not crucial for the publication, I would consider shortening the paper, removing some redundancy, to improve the readability. I believe this paper is suitable for publication in ACP after minor revisions.

I have two major comments:

Page 21283, line 25: "This suggests that the processes and/or vapours limiting particle formation rates are different from those limiting the growth and survival of the formed particles to climatically relevant sizes". This was the same conclusion drawn by Dal Maso et al. in 2005, but is this really the only possible explanation? Couldn't the temperature's seasonal profile explain the same observation?

Page 21296, lines 16-19: "Based on the seasonal pattern of the GR of larger than 3nm particles and the correlations of GR with the ambient parameters the concentrations and O3-oxidation of BVOCs seem to be the most important ambient variables connected to the GR". This is quite a strong statement, I would be more cautious in the formulation of this sentence being in the conclusions, for instance stressing once more that the correlation of GR with ozone-oxidized organics is driven by one single data point (over 7 years), although already clearly presented in the section 3.3.

Specific comments:

Page 21274, line 26: "In order to reduce the fluctuation in the data, the original 6 min averaged data was converted into 15 min format". You could add which type of average you applied to the BSMA data.

Page 21279, line 10: "first-order polynomial fit", isn't it simply a "linear fit"? (same for Page 21281, line 6)

Page 21280, line 22: "In this study, only the NPF events for which the growth rate fitting was successful were selected for the further analysis". Here it is not clear for the reader what does "successful" mean.

Page 21287, line 16: Although you do not use it, you could mention whether or not it is feasible to apply the mode-fitting method to the AIS and BSMA data as well.