

***Interactive comment on* “Detection and characterization of birch pollen in the atmosphere using multi-wavelength Raman lidar in Finland” by Stephanie Bohlmann et al.**

Anonymous Referee #1

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The paper reports detection and characterization of birch pollen using multi-wavelength Raman lidar. This paper is considered as the first paper detecting pollen using Raman lidar and also multi-wavelength data. The dataset presented is interesting and surely deserves publication. However, I am afraid the paper cannot be published as it is, as a number of points must be clarified. A detailed review follows:

Major Comments 1. Please add the comments about background depolarization ratio at the observation site. The authors mentioned about the effect of dust and biomass particles. And there is no effect by dust and/or biomass particles during study period by satellite data etc. But, there are any explanation about background data except

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pollen period. Please add depolarization ratio value in normal day (No pollen, dust and biomass particle).

2. Authors separated the layer as shown in Fig. 2. Only the lowest layer (black color) is considered in the study as mentioned in section 3. But, diurnal variation and maximum heights are different between two pollen period in Fig. 1 (c). In addition, the authors explained that the number of pollen grains is higher in the first period (5-9 May), but the degree of polarization extinction is higher in the second periods, which is explained by the high non-sphericity of spruce pollen. However, only explained reason in the paper is not sufficient. Therefore, it seems that data for other weather elements such as atmospheric boundary layer changes in each period should be added.

Technical comments; 1. Page 3 line30: 10 l/min, change it as 10 L/min. 2. Page 5 line 9 : fro m -> from 3. Page 8 line 9 : please add wavelength for Angstrom exponent. 4. Figure 1 c. Is the scale is log scale for volume depolarization? If yes, could you change it as normal scale? The value of volume depolarization ratio is look too different between two period.

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