Response to Referee #2

Thank you for carefully reading the manuscript and providing useful suggestions to improve the paper. The replies to the referee comments are given below. The referee comments are highlighted in blue with our responses in black.

This paper studied the optical properties of pollen using multi-wavelength Raman Lidar. Like dust particles, it was the first to suggest a method of classifying pollen from atmospheric aerosols and calculating the optical depth, lidar ratio, and depolarization polarization of pure pollen only. This method can be applied only under conditions where there are no dust particles in the atmosphere, but it is considered to be a very important study because it is a method that can calculate information on the distribution and concentration of pollen with a spatial distribution using remote sensing technology. It is judged that the thesis is well structured and explained in detail the new method and process. It is considered acceptable to publish the paper as it is.
Authors thank the reviewer for the positive comments.

However, as a suggestion, in this paper, the study results were calculated by applying the method proposed in this study only for the two observation periods (IPP-1 and IPP-3) among four periods of Birch and Pine pollen. How about showing the results by applying this method for the period of IPP-2 and IPP-4? In this case, not only Birth and Pine, but also other types of pollen or a mixture of various types, couldn't we derive meaningful research results?
We agree that such investigation of other types of pollen or a mixture of various types are very important. In our investigation, we also applied the method for IPP-2 and IPP-4, but no good results were found. This is explained in the manuscript (Page 11 lines 14-17):

The retrieval of depolarization ratios for pure spruce or pure nettle pollen was not possible with this dataset. During IPP-2, there was always a mixture of birch and spruce pollen with variable mixing ratio; in addition, the number of available measurements is limited. For nettle pollen, we have observed relatively small depolarization ratio values, together with a small variation, which makes the separation more challenging.

We are working on this and we are collecting more data to be able to reveal the properties for different pure pollen types.