

Interactive comment on “Impact of pitch angle fluctuations on airborne lidar sensing ahead along the flight direction” by Alexander Sergeevich Gurvich and Victor Alexeevich Kulikov

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Dear anonymous Referee,

Thank you very much for your comments. I appreciate your suggestions and am glad to update the manuscript following your comments.

1. "The abstract provides a detailed information however it would be nice to provide also some values from their results."

The pitch angle fluctuations uncompensated by gyro-platform with residual rms error about 0.1–0.2 degrees in presence of aerosol concentration variations on a scale of

100-300 m can have a significant impact on the level of backscattered signal changing it a few times or even more.

2. "Page 4, line24: Please consider providing reference at the end of this line."

The analysis of experimental results demonstrated a rapid spatiotemporal evolution of aerosol clusters (Veerman et al., 2014, Fig. 22).

3. "Page 13, line 15: The authors are kindly requested to define if it is full or half angle the corresponding angular beam value that is provided in the manuscript."

The full angular beam divergence was about of 200 rad.

4. "Page 13, lines 26: I would kindly suggest to the authors to provide the latitude/longitude points with less decimal numbers if possible. Please correct this through the entire manuscript."

The measurements presented in Fig.6a were acquired during the time interval from 8.32 pm to 8.33 pm UTC time, between the geographical latitude/longitude positions (47.20,6.48) and (47.30,6.48) at a height of 10km. The measurements presented in Fig.6b were acquired during the time interval from 8.22 pm to 8.23 pm UTC time, between the geographical positions (46.26,6.37) and (46.32,6.48) at a height of 9.46 km.

5. "Page 13, line 30: The authors mention that they choose the spatial window 4-14 km for their experimental study, because it is almost free from other noise factors. Please comment more on this decision."

The lidar signal correction from molecular attenuation is presented in Fig.17 (Veerman et al., 2014). It mentioned there that the lidar signal is exploitable from 3 km to 15 km due to saturation effect. In order to avoid this problem completely and be sure that noises due to equipment instability do not impact on our research results we chose 4 km as minimal distance for signal analysis.

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6. "One line later at the same page (Line 31) they state that the data from Figure 6a are provided with no pitch angle fluctuation and in Figure 6b with pitch angle fluctuation. The authors are kindly suggested to state (in the manuscript and in the corresponding caption of Figure 6) much this fluctuation is."

At least three aerosol cluster's responses can be found at the Fig.6b. The first two clusters, firstly detected at distances 6 km and 6.5 km, respectively, are weak. It can be seen that there are breaches in the signal which appeared simultaneously in both responds. The breaches demonstrate the same behavior as simulated (see Fig.5) for the case of presence of uncompensated pitch angle fluctuations. The value of observed signal was changed about 3 times.

7. "Figure 6: For reasons of clarity it would be useful for the reader if the color bars of this figure were within the same limits. I would kindly suggest to the authors to provide the z axis with the same min max values and interval."

Thank you for the suggestion. The limits of color bars are changed.

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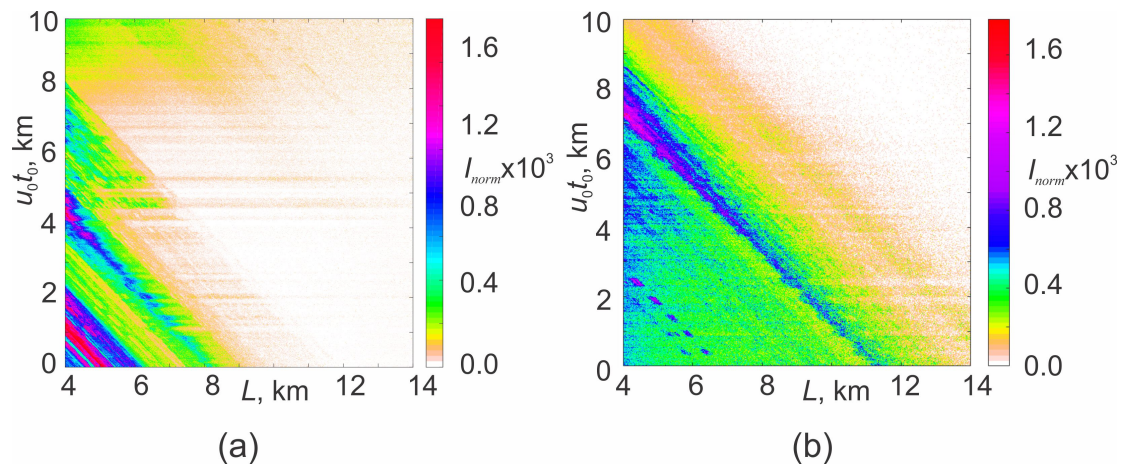


Fig. 1.

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