

Interactive comment on “Lidar observations of pyrocumulonimbus smoke plumes in the UTLS over Tomsk (Western Siberia, Russia) from 2000 to 2017” by Vladimir V. Zuev et al.

Anonymous Referee #2

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The contribution is an important documentation of pyrocumulonimbus-related aerosol events occurring in the upper troposphere and lower stratosphere. Long-term lidar observations taken over Tomsk, Siberia, Russia, from 2000-2017 are carefully analysed, presented, and discussed. The result is a well written paper that even may guide other lidar groups to re-analyze their own lidar observations. Nevertheless, only few stations around the world can provide such results as presented here.

I recommend: Minor revisions.

Details

Abstract: Remove the first lines. . . Start with: In this paper. . . The abstract should be
C1

always compact and as short as possible: Goals, methods, key results, not more. All motivating points shall be given in the Introduction (only).

P2, L13-15: Satellite remote sensing is not able to provide us with the top of the smoke layers, the retrieved tops are at much too low altitudes. That should be clearly mentioned. Only lidars are able to resolve smoke plumes correctly. Satellites often provide the erroneous impression that most of the smoke is in the PBL, which is contradiction with almost all lidar observations around the world (e.g., as monitored by EARLINET teams of Amiridis et al., ACP and JGR, Nicolae et al., JGR, and also Mattis et al., JGR 2008. . .). So, on a global scale, only CALIOP can do a reliable job.

P3, L21-25: Any comment? Why not using always the tropopause as H1 in Eq.(2)? The tropopause height is always available from GDAS. . . And the reader (at least this reviewer) wants to obtain a clear picture of the smoke impact on stratospheric aerosol conditions.

P7, P15: No event from 2003 to 2013? Can you say something about the reasons? Was it wet in western Canada, western United states? Or was the long range transport blocked?

P15, L6-24: What about bad weather conditions? ..and the probability that you missed several short-term PyroCB events. . .? Is your lidar automated? Probably not, so the probability is at least not zero that you missed some nice events.

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