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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quasi-coincident Observations of Polar Stratospheric Clouds by Ground-based Lidar and CALIOP at Concordia (Dome C, Antarctica) from 2014 to 2018" *by* Marcel Snels et al.

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Interactive comment on "Quasi-coincident Observations of Polar Stratospheric Clouds by Ground-based Lidar and CALIOP at Concordia (Dome C, Antarctica) from 2014 to 2018" by Marcel Snels et al.

Answers to referee 2

We thank the referee for dedicating his precious time to read and comment the manuscript.

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TECHNICAL COMMENTS

1. p. 8, lines 29-30: This requirement means that any PSC detections considered in the analysis must have a minimum thickness of 0.9 km. Do you find any problem with situations where there may be a gap in a cloud layer, e.g. 4 PSC points followed by 1 non-PSC point followed by 3 PSC points, that would cause a potential PSC detection to be discarded?

Answer: Yes, we tried to adopt a similar criterium of continuity as used for CALIOP. We varied the number of contiguous points from 2-5 and found that a number of 5 effectively eliminates obvious spikes above 25 km, and eliminates a negligible number of points below 25 km.

2. p. 10, lines 18-20: Is this result evaluated for a single altitude along each track (e.g. 17.28 km), or does the PSC altitude vary along any given track? If the PSC altitude changes by 1-2 km, with perhaps a corresponding change in temperature, then possibly the composition changes along the track. This question does seem to be addressed in the next two paragraphs.

Answer: Yes, we use single altitudes for making the statistics. The possibility that PSC clouds might change altitude in the box around Dome C is addressed on page 14, lines 8-14, when we compare the ground-based data with CALIOP.

3. p. 11, lines 6-7: Table 1 shows 26 coincident profiles in 2014, compared to 30 profiles in 2018 and 33 profiles in 2016. This small difference in number doesn't seem like a strong reason to exclude the 2014 season.

Answer: Yes, 2014 has not been represented in the figures, but has been included in the analysis, as can been seen in Table 3. Note that 2014 was our first season at Dome C, and data acquisition started quite late in the winter (after 13 July) , which results in less data.

4. p. 13, line 1: Please clearly state that 'gb' represents "ground-based" here to avoid

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confusion.

Answer: We thank the referee for this suggestion and changed gb into ground-based in the Table and in the text.

5. p. 15, lines 16-17: Is there a reason for using ERA5 temperature and pressure data here vs. NCEP temperature and pressure data previously (p. 7, lines 12-13)? The differences are probably small, but clarification would be helpful.

Answer: ERA5 is a reanalysis with a better resolution and more vertical levels, so we preferred It to NCEP, although the differences are really small. The molecular density needed for calculating the molecular scattering, was mainly based on the local radio soundings, integrated with NCEP where necessary.

TYPOGRAPHICAL ERRORS p. 1, line 8: “allow to” should be “allow us to”.

p. 9, line 15: “thicknes” should be “thickness”.

p. 16, line 6: “It also” should be “It is also”.

p. 17, line 12: “elaborate” could be “evaluate”.

p. 17, line 27: “neglectable” could be “negligible”.

Answer: we corrected all typographical errors as suggested by the referee

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