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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.

Anonymous Referee #2

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GENERAL SUMMARY AND COMMENTS

This paper presents an analysis of approximately coincident polar stratospheric cloud (PSC) observations between ground-based lidar measurements from a single location in Antarctica and CALIOP satellite lidar measurements. The current work is a refinement of previous work (by the same lead author) that considered a larger combined dataset at a different Antarctic location, which used only geographic coincidence as a requirement. Specific temporal and spatial coincidence requirements are developed to maximize the consistency of the scene between the ground-based and satellite in-

struments. While these requirements reduce the number of candidate events that can be analyzed, analysis indicates that a majority of events identify PSCs with the same composition. These results suggest that appropriately filtered ground-based PSC measurement data sets can be constructed for further comparisons and model studies.

This paper is generally well-written and constructed. However, I have some requests for clarification before recommending it for publication.

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?

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.

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.

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

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.

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".

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