Dear Editor, Dear Reviewer 1!

We thank you for careful reading of the manuscript and for providing us with valuable comments to improve the manuscript.

All changes in the revised manuscript are given in **BOLD**

The comments of Reviewer 1 are given in **BLUE**, our answers are given in **GREEN**.

The manuscript presents very interesting long-term observations of the stratospheric wildfire smoke event captured in the Southern Hemisphere. They present the geometrical, optical, and microphysical properties of the smoke layer. The decay behaviour of such a stratospheric perturbation, and the smoke impact on the ozone hole over Antarctica were discussed.

The dataset is interesting, and the manuscript is well written. The manuscript is worthwhile to be published, after addressing all the points raised by reviewers.

Please see below some suggestions and comments:

l17, please specify the wavelength of ext.

Corrected (at 532nm).

l79, does Polly continuously measure the Raman signals?

Yes, it does. We improved the full sentence.

l226, "This is in agreement with the CALIOP observations." please specify.

We now write: This is in agreement with the CALIOP observations shown in \citet{Khaykin2020} who found that the initial ascent rate was at 0.45~km~day^{-1}, ……

l234-237, please check and make this sentence clearer.

We improved the explanation and extended the discussion on the findings in Table 1.

l295, "on most of the days", specify the period referred.

Now specified in text. We write: … for the next two years.

l307, the CORAL AOT values are only for the smoke layer?

CORAL minimum measurement height is 15 km! Therefore, we have observations between 15km and smoke layer top. This is now better specified.

l314, "total AOT", please specify the total AOT here.

This is now improved: The contribution of Australian smoke to the total AOT is shown in Fig. 8d. The total AOT includes also contributions by Australian smoke reaching the stratosphere from September-December 2019, Ulawun volcanic aerosol, and background particles.

l535, please define PSC.

Improved.

Table2 does the std here present the time variation? what is the number of profiles used for the calculation? What about provide additional values for the intense period, e.g. only for 1/2020

This is now explained in the Table caption: The standard deviations include atmospheric variability and dominating retrieval uncertainties. Further explanation is given in the text.

In the text we provide numbers: The statistics consider 366 values for each Angstrom exponent, 7-10 values for each of the lidar ratios, except for the Polly-AERONET 532 nm lidar ratio (19 values). The PLDR statistics are based on 14 (355~nm) and 17 values (532~nm).

The intense period (January 2020) was discussed in Ohneiser et al. (2020).

Fig.1-2 add lat lon in fig.1a and fig.2a

Improved.

Fig7. Maybe provide some uncertainty bars in the figure.

Improved.

Fig. 8, there are negative PLDR values shown in c. Maybe use some thresholds (e.g. SNR or bsc value) to screen out too noisy data.

We checked all cases again (visual inspection) and decided at the end: too noisy signals! So we removed the questionable values.