

Responses to Review #2

The authors would like to thank the reviewer for his valuable comments which helped improving the quality of the manuscript. Our point-by-point responses to the reviewer's comments appear in bold below.

Abstract:

Line 12: allow study → allow to study the

The correction has been made.

Line 12: water vapour → water vapour profiles

The correction has been made.

Line 13: lidar derived backscatter coefficients → lidar-derived aerosol backscatter coefficients

The correction has been made.

Line 15: long range pollution transport → long range air pollution transport

The correction has been made.

Line 22: of Raman lidar → of a Raman lidar

The correction has been made.

Introduction:

Line 27: The Earth surface → the Earth's surface

The correction has been made.

Line 28: **The reference "IPCC, 2023" has been added.**

Line 36: **More recent works on CCN have been added ("Che et al., 2016 ; Paramonov et al., 2015"). We thank the reviewer for the last reference.**

Line 56: and backscattering coefficient → and aerosol backscattering coefficient

The correction has been made.

Line 73: the origin of air masses → the origin of sampled air masses

The correction has been made.

Section 2:

Line 96: and thus play → and thus, play

The correction has been made

Line 102: of various pollutants → of various air pollutants

The correction has been made.

Line 117: uses as emitter pulsed → uses as emitter a pulsed

The correction has been made.

Line 125: **The following references on the identification of aerosols using depolarisation of the signal have been added: Chazette and Totems, 2023; Dieudonné et al., 2015.**

Section 3:

Line 183: **The following references on first Stokes vibrational lines have been: Whiteman et al., 1992; Weitkamp, 2005.**

Line 232: Angstrom → Ångström

The correction has been made.

Line 235: **References on low PDR for pollution particles have been added: Dieudonné et al., 2015 ; Mylonaki et al., 2021.**

Line 266: Where → where

The correction has been made.

Section 4:

Line 353: Five-days back trajectories → Five-days air mass back trajectories

The correction has been made.

Line 474: Figure 5a-e further support → Figures 5a-e further support

The correction has been made.

Acknowledgements:

Line 551: Thanks are extended to the → We acknowledge the

The correction has been made.