We would like to thank the two reviewers for devoting time to read our manuscript and provide valuable comments for improving it and increasing its scientific value. We have modified our manuscript following the guidelines given by the two reviewers.

Kind regards,

Giannakaki Elina, on behalf of all the co-authors

Interactive comment of RC1 on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-271, 2019.

Below we answer to 1st reviewer's comment (RC). The **RC**s are given in **bold**, our replies in plain font and the corresponding *changes in the manuscript* are given in *italic*.

The authors show a study for estimating particle extinction profiles based on elastic and polarization channels from a lidar system. The data used were acquired during a field campaign in Crete. The methodology employed is well known and a direct comparison among Raman profiles and the particle linear depolarization is perfomed. While the results are quite insteresting I consider it would be necessary to stress the novelty contribution given by this paper. Apparently it is the ElEx approach but in that case I would give more detail to the description of the methodology and discuss better if using a Raman signal is a good validation method specially when concerning uncertainties of this approach. Apparently one of the conclusions is a strong dependecy on the lidar ratio value and in this context it is important to check the uncertainties involved in the process.

We would like to thank the Anonymous Referee 2 for the constructive comments and recommendations. We rearranged the methodology section in order to generalize the application of our methodology as suggested. In such a way more emphasis has been given to the novelty contribution of this study. The method is not based in a case study of desert dust and marine aerosol mixture but in Type 1 and Type 2 in general. The flowchart of ElEx is given in Figure 1 and a discussion of the pure aerosol types that can be observed along with their intensive optical properties is given in subsection 2.2.3. In addition in section 2.2.2 and 2.2.3 we provide the equations so that the reader can reproduce ElEx methodology. In section 2.2 we present our lidar system and data processing. Our case study of marine and dust is given in detail in subsection 3.2 and the sensitivity analysis of the lidar ratio is part of subsection 3.2.

Section 2.4 Line 115 – Extinction Section

"Elastic Extinxtion" has been replace by "Elastic Extinction".

A new method, called ElEx [= Elastic Extinction], is proposed for the estimation of extinction coefficient lidar profiles using only the information provided by the elastic and polarization channels of a lidar system.

2.4 Line 118 – do not have

The structure of the methodology section has been changed as proposed by the reviewer 3. The sentence "Initially, we assume that we do not have the PollyXT Raman channel" has been deleted.

Section 2.4 Line 118 – Only at a later stage

The structure of the methodology section has been changed as proposed by the reviewer 3. The sentence in now in section 2.2 written differently.

Extinction coefficient profiles at 532 nm are also retrieved based on the Raman method (Ansmann et al., 1992) and are only used for validation purposes of the proposed methodology at a later stage in this study.

Conclusions Line 227 - ElEx

"Elex" has now been corrected to "ElEx".

ElEx is not limited to nighttime Raman observations, and thus is applicable to daytime lidar measurement, with small time period analysis.

Please improve Figure 7 , Figure 8 and Figure 9 resolutions

Thank you the reviewer for this comment! We have improved the resolution of Figure 7,8 and 9.