## Authors' response

We thank the anonymous reviewer for his/her comments and suggestions that have helped to improve the quality of the manuscript. According to the referees' reports, the following changes have been performed on the original manuscript and a point-by-point response is included below, where blue colour is related with answers.

**Interactive comment on "Towards continuous monitoring of aerosol hygroscopicity by Raman lidar measurements at the EARLINET station of Payerne" by Francisco Navas Guzmán et al.**

**Reviewer 2**

Review for manuscript "Towards continuous monitoring of aerosol hygroscopicity by Raman lidar measurements at the EARLINET station of Payerne"

Authors study important problem of the aerosol hygroscopic growth basing on long term multiwavelength lidar observations. The research is done on high scientific level. Authors well understand all the issues, when the information about humidification process is extracted from lidar measurements. Manuscript is well written and can be published after minor revisions. The Reviewer 1 provided very detailed review, so I can add just several technical comments.

Comment 1:

Title. I agree with Reviewer 1 that title can be shortened.

According to the suggestions of both referees we have modified the title of this paper. It reads now as:

**"Characterization of aerosol hygroscopicity using Raman lidar measurements at the EARLINET station of Payerne"**

Comment 2:

p.10, ln 24. "From this figure, a marked increase of with altitude is observed for the altitude range between 1.7 and 2.3 km (asl)." The same time for range 1.5-2.0 backscattering doesn't increase significantly, though RH rises. Any ideas why (potential temperature and mixing ratio are quite stable)?

The fact that the aerosol backscatter coefficients do not increase in the lower part of the layer (1.5-2.0), despite of having good mixing conditions (almost constant values of potential temperature and mixing ratio), is due to the lower RH at that range. For this example, the deliquesce relative humidity (DRH, RH at which solid particle spontaneously absorbs water) was around 80%RH which was reached at 2 km (asl).

Comment 3:

Fig.7. What will happen with these curves and Hanel parameters if starting height is 1.5 km? How sensitive are results to the choice of height interval?

We selected the range 1.7-2.3 km due to the higher stability of potential temperature and water vapour mixing ratio found in that range (mean(θ)=300.6±0.5 K; mean(r)= 5.3±0.1 g/kg), which indicated very good mixing conditions. However, following the referee's suggestion we have calculated the Hänel parameter for the layer 1.5-2.3 km, observing that its value (γ=0.47±0.07) is almost the same than the one obtained in the thinner layer (layer 1.7-2.3 km: γ=0.48±0.08). This result shows that the selection of our height interval was not very critical and give consistency to our results.

Comment 4:

Fig.11-13. Figures should be done in the same style: size, format, fonts, grids should be kept the same. Some fonts are very small, difficult to read. Probably Fig11b,c can be shown on the same plot.

The mentioned figures have been improved in the revised manuscript.