Comment on acp-2021-66  
Anonymous Referee #1

Referee comment on "Overview of the SLOPE I and II campaigns: aerosol properties retrieved with lidar and sun-sky photometer measurements" by Jose Antonio Benavent-Oltra et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-66-RC1, 2021

General comments:

This paper aims to provide an overview of the aerosol optical and microphysical properties during SLOPE I and II field campaigns in Granada using the GRASP remote sensing retrieval algorithm. GRASP retrievals were validated with in-situ measurements (with nephelometer, aethalometer, SMPS, CPC, and APS) performed at the Sierra Nevada Station and airborne flights (nephelometer, aethalometer). This study shows that GRASP retrieval algorithm can provide a valuable addition to the in-situ measurements and climate models.

Abstract:

Line 20-22: Sentence needs rewording

Line 35: “study the aerosol properties profiles” ? – This sentence needs rewording.

Line 38: “simultaneous in situ measurements”. Please introduce the instruments here.

Specific comments:

"In situ” or “in-situ”, please be consistent

Line 61: “while they have”

Line 65: “provide information”, instead of “have information”

Line 114: “very variable” – without the world “very”

Line 149: “that operates”

Lines 160-161: “that performs...atmosphere” – needs rewording

Line 191: How about at 20 μm diameter?
Line 193: For consistency purposes, can you stick on just radius or diameter?

Line 194: It would be nice to provide a brief explanation what Q value is

Line 208: “divide the sampled air” instead of “de”

Line 225: From lidar? It would be nice to mention the instrument here

Line 227: Is this a necessary condition to run GARRLiC?

Line 240: “between minimum”, without “a”

Line 246: What does relative residual mean? What was its magnitude at the current case?

Line 255: “pressurized”

Line 258: What is the uncertainty on the measurements from using temperature obtained from MWR, instead of having a temperature sensor outside the aircraft?

Line 295: Have you tried to run GRASP in 1-mode? A related paper to cite here is Kezoudi et al, 2020, where the authors used 1-mode size distribution ("We constrain the investigation in this study to one dust mode because the UCASS observations at Cyprus show a dominance of coarse-mode dust particles throughout the atmospheric column...")


Line 323: Can you please elaborate on the purpose of the differences?

Line 369: You probably mean “Box-Whisker“?

Line 375: “of non-absorbing particles”... e.g. dust

Line 380-382: Any reference for this?

Line 389: that come from the Atlantic brings...

Line 416: *patterns (plural)

Line 420: How about the altitudes, any references?

Line 425: *reveals

Line 426: Does this stand for all the aerosol types?

Line 429: Please elaborate on that, give some threshold values for both

Line 430: What do you mean with "intensive" properties?

Line 435: obtained from where? Here? In Muller et al?

Line 436: ... to the ones observed...
at these levels which are dominated...
Reword this sentence please, it is too big
*pollutants
were occurred/observed, instead of “registered”
*in the morning
“in our region”? Do you mean in Europe? Spain? Granada?
affect both the intensive...
*in the aerosol layer
*as shown in Bevanent
“very similar”, please provide some numbers
“as expected for mineral dust particles”, any potential reason for that?
*are supported
“due to the few cases”, is this the reason? If there were more cases, then would the agreement be better?
*for both scattering
*of these events
It would be nice to show information about the altitude
The scale in x axis should be adjusted to the corresponding magnitude. This is too large and lines cannot be seen clearly.