

Response to the Referee Reed Espinosa technical corrections for the manuscript “Retrieval of aerosol properties using relative radiance measurements from an all-sky camera” By Roberto Román et al. in AMTD

First, thank you for this review. Reviewer comments are in black font (RC), and author comments (AC) in red font.

Author's answer to Referee Reed Espinosa

The essential details that I felt were missing in the initial submission have all been included in the revised manuscript and all my other concerns have been satisfactorily addressed. A few further comments related to the authors responses are listed below in case the authors want to consider them in their next revised submission, but that is at the authors discretion.

RC (5) LN 122: If the angles are to be subsetted, the justification for using AERONET hybrid geometry in particular is well described in the sentence the authors reference. But would it also help to also add a sentence or two describing the reasons mentioned in the authors review response for taking a subset of the the full range of angles in the first place? (i.e., redundant information, computational expense, etc.)

AC: We understand the comment, but we consider that the most important issues (long angle range and symmetry for cloud-screening) are now clear in the text and the addition of this extra information will not be more helpful and it could make more confuse the text.

RC (7) LN 128: The added clarification on the distinction between propagated and normalized uncertainties is very helpful here. I might also suggest the authors change the word "warranty" to something like "guarantee".

AC: We change it by “assure”:

“Both rejections are to assure cloud-free conditions and high-quality data.”

RC (8) LN 145: I think the assumption that gaseous absorption is negligible here is probably safe, but it I would recommend explicitly stating that this assumption was made in the text so that the reader is not left wondering how that aspect of the system was treated.

AC: Yes, it is better, therefore we have added the next:

“The impact of gaseous absorption on normalized sky radiance is assumed negligible at the camera effective wavelengths”

RC (13) LN 179: The word "scenarios" is still taking on multiple meanings here which makes the text confusing. I would recommend changing the first sentence of the referenced passage to say something like: "For each aerosol model, nine aerosol loads with different AOD values (AOD at 467 nm ranging from 0.1 to 0.9 in 0.1 steps) have been defined; this produces a total of 63 scenarios (7 aerosol models x 9 aerosol loads)." Also, I think GRASP only uses lat/lon for bookkeeping purposes. Thus, it would be more concise, and probably clearer, to just say that the altitude of the Valladolid site is used in the tests and avoid the more general term "spatial coordinates" all together.

AC: We agree with referee and the sentence about 63 scenarios has been changed by the suggested one.

Regarding lat/lon issue, we have changed the full sentence and “spatial coordinates” by “geographical coordinates”. Rayleigh scattering also depends on latitude, since the acceleration of gravity changes on latitude and it must be considered (see Eq. (10) of Bodhaine et al., 1999). Longitude maybe is only for bookkeeping, but the other two geographic coordinates are important for the reproducibility of our results, and hence we think it is better to indicate that. The text has been changed by:

“GRASP requires geographical coordinates as input, especially the site elevation and latitude for Rayleigh scattering default calculation (Bodhaine et al. 1999); in this work, for the GRASP simulations, the 63 mentioned scenarios are assumed that take place over Valladolid site coordinates. These coordinates are chosen to be the same coordinates than the used in the inversion of real measurements, recorded at Valladolid, shown in Section 4.”