Response to Editor

The authors have answered all comments by the referees. Although most replies indicate changes and/or additions to the manuscript associated with the comments, a few do not.

- It is not clear if the answer to referee 1 question on post-calibration and interpolation (Page 9, 267-268), is reflected in the modified manuscript. Has the Toledano et al (2018) reference added to the manuscript? It is also not clear if the authors' detailed answer to his/her question on Page 15, line 357 will be reflected in the modified manuscript. Were the references suggested in the referee's last comment added to the manuscript?

  Toledano et al. (2018) is a reference already included in the manuscript since the beginning. The authors will include the following information in lines 267-268:

  "The two $V^{SL}_{0,\lambda}$ values, one per photometer, were considered valid for the six-month period of measurements used in the present study **considering the extraordinarily high temporal stability of Cimel master found by Toledano et al. (2018).**"

- Referee 2 questions on *importance of difference in field of view* and on *inter-comparisons between the LR method and classical Langley methods* were addressed with extensive discussions and graphics. It is not clear, however, how the provided replies are reflected in the revised manuscript:

  The authors performed this calculation to respond accurately to the general comment made by Referee 2. However, our intention is not to include these results in the final manuscript.

- Same question applies to referee 2 comments on line 44:

  Yes, URL will be included in the final manuscript.

- Referee 2 comments on line 56:

  Yes, the authors will include the link to ACTRIS in the manuscript. Once the link is included, an interested reader can access the definition of ACTRIS as well as the main purpose of this Research Infrastructure.

- Referee 2 comments on line 186-187:

  This is a specific question raised by the referee regarding the one to two months observational period required for Langley calibration. The authors do not intend to include this answer in the manuscript, as we believe it is a highly specialized question related to AERONET operations, which is not the primary focus of this paper. We have, however, provided a reference to

Toledano et al. (2018), where all the details of the Langley analysis at Izaña are explained.

- Referee 2 comments on Equation 5:

  Yes, we will include this response in the final manuscript as follows:
  Line 229: "**Specifically, $\Delta\tau_a$ is calculated as follows:**

  $$\Delta\tau_a = \tau_{\lambda_m,a} - \tau_{\lambda_f,a} \approx \tau_{\lambda_m,a} - \left(\frac{\lambda_f}{\lambda_m}\right)^{-\alpha} \cdot \tau_{\lambda_m,a} \approx \tau_{\lambda_m,a} \cdot \left(1 - \left(\frac{\lambda_f}{\lambda_m}\right)^{-\alpha}\right)$$

  And $\tau_{\lambda F,a}$ is estimated using the Angstrom Law (Angstrom, 1929)."

- Referee 2 comments on line 263:

  The authors do not expect to reflect this answer in the manuscript since this is the common air mass range usually selected for Langley calibration in AERONET.

- Referee 2 comments on section 5.3.:

  The authors will include the following information in the Figure 4 caption:

  "V_0 relative differences (in %) between the calibration constant obtained by applying the standard Langley calibration (V^{SL}_0) using a CE318-TS at Izaña **as the reference** and the calibration constant transferred between two CE318-TS using the Ratio method (V^R_0) and the LR method (V^{LR}_0) to daily observations at Izaña for 340 nm".

- Similar observation applies to reply to referee 3 comment on Line 70 of the manuscript:

  The authors do not expect to include this answer in the final manuscript since we consider that this fact is clearly stated in the manuscript. For example in lines 202-203 we can read:

  "These assumptions and the common Ratio cross-calibration method itself are valid as long as the spectral bands for both photometers are very similar (i.e. $\Delta\lambda \sim 0$ and similar FWHM)."

  So, the LR method has been created specifically for those conditions in which $\Delta\lambda$ and FWHM difference are relevant, as stated in the text.