

Reply on CC1

Liviu Ivănescu et al.

Author comment on "Accuracy in starphotometry" by Liviu Ivănescu et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-88-AC3>, 2021

The community comments are presented in italic and our answers are written in plain text. Modifications of the manuscript, if any, are written in plain bold text.

We thank the reviewer for the careful reading as well as the unique descriptions and references: this helped to better articulate our reactions to his or her comments!

Comments:

1) The accuracy of Pulkovo's catalog

- *Outside accuracy*
The "outside accuracy" that we identified as a catalog bias will not, we agree, actually affect the optical depth measurements (see lines 312-313 in page 13 of the submitted manuscript).
- *Inside accuracy*
The "inside accuracy" that we interpret as the Figure 4 standard deviation of ~ 0.02 [1] is in agreement with the Pulkovo catalog findings of Alekseeva et al. (1996) [2]. This value, the reviewer will appreciate, falls short of our stated goal of 0.01 OD accuracy. We recognize that the Pulkovo catalog probably represents the most accurate bright star catalog available. Nonetheless, improvements (specifically the identification of stable stars whose OD uncertainty is significantly smaller than 0.02) are required.

In order to better underscore the significance of this subject in our paper, we added an explicit subsection title: 4.1 Pulkovo catalog errors.

2) Bouguer method

We thank the reviewer for the Mironov (2008) reference with its important synthesis of several calibration methods! **We incorporated that citation, as well as the Gutierrez-Moreno and Stock (1966) and Stock (1969) citations, in our Introduction and the 3.4.2. TSM subsection.**

3) Δ - method (Pulkovo's version) and its using for meteorology

We thank the reviewer for the manuscript on the unpublished [3] Pulkovo iterative calibration method! The method detailed the retrieval of extra-atmospheric instrumental magnitudes. This provides a set of magnitudes that would enable the creation of a new extra-atmospheric star catalog. Such a task should give better results at a high-altitude observatory. On the other hand, if a catalog is already accurately predetermined, only the

retrieval of single, star-independent, calibration parameter (C), would be required. This task may be feasible even at a low-altitude observatory. **In order to better articulate our intention to use a star-independent calibration, and to incorporate the reviewer's concerns (and those of the other reviewers), we made a significant update of the 3.4.2 TSM subsection, which includes a reference to the Pulkovo method.**

4) Two small corrections

- *Line 12 "i.e. at airmasses lower than 5" is not corrected. Must be "i.e. at airmasses less than 5".* **Corrected accordingly.**
- *Line 156 "(V < 3)". More correct will be "(V < 6)".* Even if the Pulkovo catalog incorporated V<6 stars, our star dataset selection is limited to V<3. Arctic stars with V>2 are generally difficult to use as low stars due to our small telescope diameter (11 inches) and to the limitation of the current detector. **No changes were accordingly applied to the paper.**

Footnotes

[1] represented by the blue and red shading of Fig. 4 (whose amplitude is a bit higher in the NIR)

[2] see line 316 on page 14 of the submitted manuscript

[3] unpublished, as far as we know of

References

Please see the Reference section of our paper!