Corrections to "Cloud-Target Calibration for Fengyun-3D MERSI-II Solar Reflectance Bands: Model Development and Instrument Stability"

Fukun Wang, Chao Liu, Bin Yao, Xiuqing Hu, Peng Zhang, *Senior Member, IEEE*, and Byung-Ju Sohn

IN THE above article [1], a difference in the definitions of our simulated reflectance (with respect to instantaneous TOA radiance) and the operational MERSI-II L1 reflectance (with respect to solar constant) causes errors in their direct comparisons. The operational MERSI-II reflectance should be corrected by

$$R = \left(\frac{d}{d_o}\right)^2 \cdot R_o \tag{1}$$

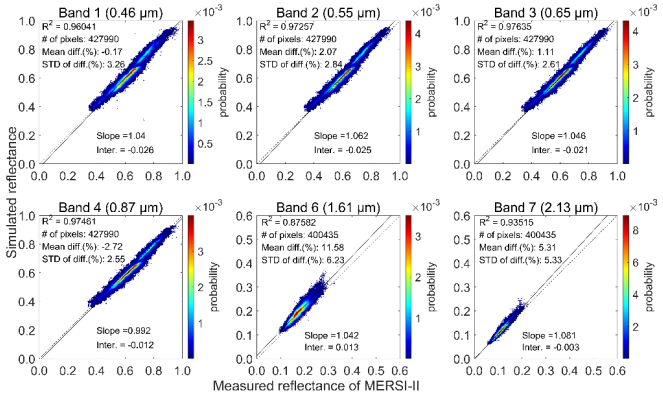

Fig. 1. Scatterplots of MERSI-II simulated reflectance versus measured reflectance values. In each panel, the linear regression line is presented as a black solid line, along with the coefficient of determination (R^2), number of used pixels, and mean and STD of the RDs.

where d is the instantaneous Earth–Sun distance, d_o is the average value, R is the correct reflectance (following the same definition as our simulated one) and R_o is the original one from the MERSI-II L1 product. The difference caused errors in Figs. 9, 10, 13, and 14,

Manuscript received 11 September 2023; accepted 11 September 2023. Date of current version 17 October 2023. This work was supported in part by the National Natural Science Foundation of China under Grant 42122038 and Grant 41871249, in part by the National Key Research and Development Program of China under Grant 2018YFB0504901, and in part by the Pre-Investigation Program of Civil Aerospace Technology under Grant D010304. *(Corresponding authors: Chao Liu; Xiuqing Hu.)*

Fukun Wang and Chao Liu are with the Key Laboratory for Aerosol-Cloud-Precipitation of China Meteorological Administration, School of Atmospheric Physics, Nanjing University of Information Science and Technology, Nanjing 210044, China (e-mail: chao_liu@nuist.edu.cn).

Bin Yao is with the Key Laboratory of Transportation Meteorology of China Meteorological Administration, Nanjing Joint Institute for Atmospheric Sciences, Nanjing 210041, China.

Xiuqing Hu and Peng Zhang are with the National Satellite Meteorological Center, China Meteorological Administration, Beijing 100081, China (e-mail: huxq@cma.gov.cn).

Byung-Ju Sohn is with the School of Earth and Environmental Sciences, Seoul National University, Seoul 08826, South Korea.

Digital Object Identifier 10.1109/TGRS.2023.3314948

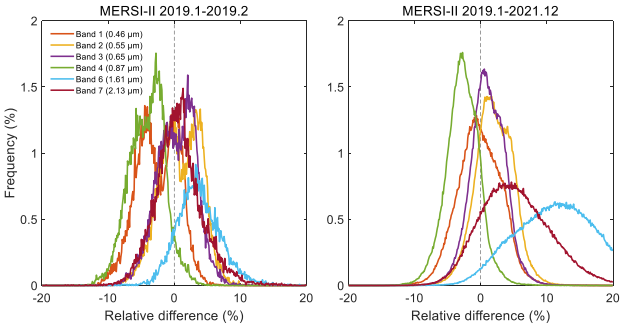

Fig. 2. Frequency distributions of RDs between the simulated and measured MERSI-II reflectances for (left) 2019.1–2019.2 and (right) 2019.1–2021.12, respectively. Bands 1–4 and 6–7 are expressed with different colors.

TABLE I
FITTING COEFFICIENTS FOR THE SIX MERSI-II BANDS

Band	C	D
1(0.46μm)	1.85	−3.15
2(0.55μm)	1.03	0.47
3(0.65μm)	0.76	0.02
4(0.87μm)	1.06	−4.29
6(1.61μm)	5.05	2.2
7(2.13μm)	3.86	−1.55

and Table II in the above article, and led to the overestimated seasonal biases. The calibration for MERSI-II results has been corrected and updated as shown in Figs. 1–4 and Table I of this correction notice. The STDs in the new Fig. 1 (corresponding to the original Fig. 9) become smaller, and the distributions of the differences in the new Fig. 2 (corresponding to the original Fig. 10) are slightly less dispersed. Here, Fig. 3 is a time series of the actual relative differences, which show almost no seasonal variation (compared to the original Fig. 13).

Because the seasonal biases in the above article were mostly caused by the error of missing Earth–Sun distance correction, the fitting equation [1, eq. (4)] is replaced by a linear equation to account for only the signal degradation as

$$\mathrm{RD} = \mathrm{C} \times \mathrm{T} + \mathrm{D}. \tag{2}$$

The new coefficients are corrected in Table I. Here, the fitted values of C are equivalent to the annual degradation, and the results after the ACT-based calibration correction are shown in Fig. 4.

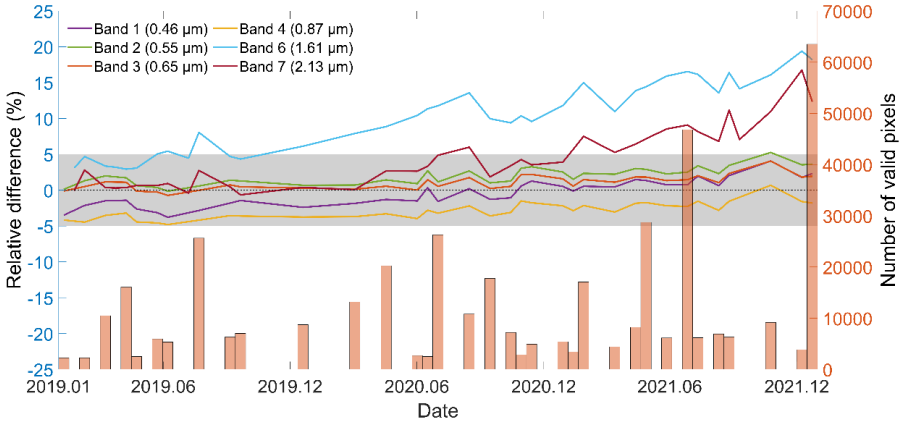

Fig. 3. Time series of RDs between the current MERSI-II calibrated reflectance and our simulations during 2019–2021.

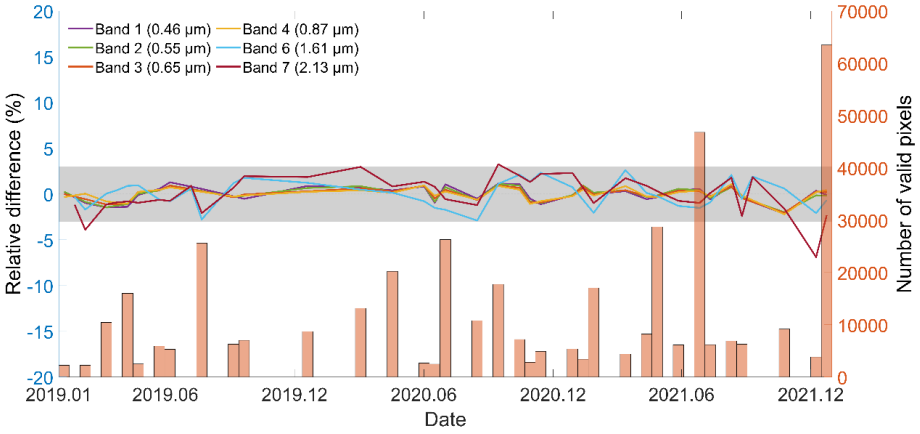

Fig. 4. Same as Fig. 3 but after correcting the degradation; the gray region indicates the 3% uncertainty range.

REFERENCES

[1] F. Wang, C. Liu, B. Yao, X. Hu, P. Zhang, and B.-J. Sohn, "Cloud-target calibration for Fengyun-3D MERSI-II solar reflectance bands: Model development and instrument stability," *IEEE Trans. Geosci. Remote Sens.*, vol. 61, 2023, Art. no. 5401313, doi: 10.1109/TGRS.2023.3244949.