

Li, W., K. Ichii, B. Zhang, Y. Yamamoto, W. Yang, T. Miura, H. Yoshioka, M. Matsuoka, K. Obata, R. C. Sharma, H. Yamamoto, H. Irie, P. Khatri, B. Liley, I. Morino, H. Takenaka, and A. Higuchi, 2024: Estimation and Evaluation of Land Surface Reflectance from a Next-Generation Geostationary Meteorological Satellite, Himawari-8/9 AHI. *J. Meteor. Soc. Japan*, **103**, <http://doi.org/10.2151/jmsj.2025-005>.

Plain Language Summary: Himawari-8 and -9 acquire detailed images of the Earth's surface every 10 minutes. Compared with conventional polar-orbiting Earth observation satellites, Himawari-8 and -9 can monitor land areas with a high temporal resolution. In this study, we developed a method for estimating and evaluating land surface reflectance from Himawari-8 and -9. Our approach allows a detailed evaluation of land surface reflectance over the entire observation area based on comparisons with other satellite products (MODIS on Terra and Aqua). As a result, there was strong agreement between the estimated values and MODIS data, especially in the red and near-infrared bands. Our method can also be applied to other geostationary satellites, making it possible to monitor land changes more frequently and over a wider area, and will be useful for regional and global environmental and climate research.

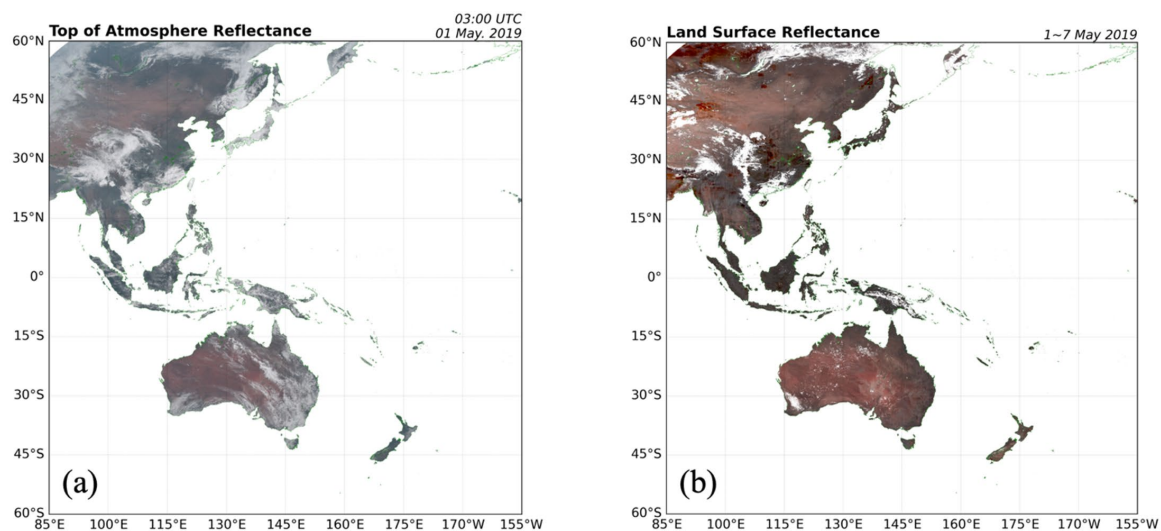


Figure 1 Comparison of Himawari-8 AHI RGB composite images based on (a) top-of-atmosphere reflectance and (b) land surface reflectance.

- We established a method to estimate and evaluate land surface reflectance observed by Himawari-8/9 AHI.
- Using the ray-matching method and BRDF modeling, the AHI LSR and MODIS LSR intercomparison results show high consistency.
- The uncertainty introduced by the input atmospheric parameters was evaluated with in situ data and was found to be lower than that in previous studies.
- The algorithms of this study can be applied to other geostationary satellites and can contribute to the development of high temporal terrestrial observation data at a global scale.