EGU23-10320, updated on 24 Feb 2024
https://doi.org/10.5194/egusphere-egu23-10320
EGU General Assembly 2023

Sensitivity analysis and discontinuity removal of 6SV LUT-based surface reflectance for each channel: based on GEO-KOMPSAT-2A

Daeseong Jung[1], Kyung-soo Han[1], Noh-hun Seong[1], Suyoung Sim[1], Jongho Woo[1], Nayeon Kim[1], and Sungwon Choi[2]
[1]Division of Earth Environmental System Science (Major of Spatial Information System Engineering), Pukyong National University, Busan, Korea, Republic of
[2]BK21 FOUR Project of the School of Integrated science for Sustainable Earth & Environmental Disaster, Pukyong National University, Busan, Korea, Republic of

To monitor the surface based on Earth observation optical satellites, accurate atmospheric correction of satellite images is required. Surface reflectance is calculated using a look-up table (LUT) based on a radiative transfer model. In addition, atmospheric gas components and geometric information of solar and satellite observations used in LUT construction are applied to each channel at equal intervals. However, the atmospheric gas components are sensitive to the atmospheric effect in a specific wavelength range of the satellite sensor. The higher the geometric information appears in the satellite observation area, the greater the variability of the atmospheric effect occurs because the moving distance of light increases. Because of this, LUT-based atmospheric correction at equal intervals generates discontinuities in surface reflectance in satellite images. In this study, to improve the quality of the surface reflectance applied with atmospheric correction, a Second Simulation of a Satellite Signal in the Solar Spectrum Vector (6SV) radiation transfer model was used to analyze the sensitivity of the surface reflectance for each channel according to the GEO-KOMPSAT-2A-based atmospheric gas component and the geometric information of the solar and satellite observations. After figuring out the variability of surface reflectance for each channel according to the intervals of variables used in LUT construction, an error analysis of surface reflectance was performed for the optimal LUT interval considering the interpolation technique. In the future, it is considered that the results of this study can be used to identify LUT-based surface reflectance characteristics for removing discontinuities in surface reflectance, including increasing the utilization of geostationary satellite images.