Study on remote sensing of aerosols over land using TANSO-CAI

Guosheng Zhong (1), Xiufeng Wang (2), Shuai Yin (1), Zhongyi Sun (2), and Hiroshi Tani (2)

(1) Graduate School of Agriculture, Hokkaido University, Sapporo, Japan, (2) Research Faculty of Agriculture, Hokkaido University, Sapporo, Japan

The Cloud and Aerosol Imager (CAI) is one of the subunits of observation instrument Thermal And Near-infrared Sensor for carbon Observation (TANSO) onboard the GOSAT, and is used to observe aerosol optical properties and clouds. TANSO-CAI includes 4 bands (370~390 nm, 668~688 nm, 860~880 nm and 1560~1680 nm), bands 1 to 3 have a 0.5-km spatial resolution at the nadir and 1000-km observation swath. The spatial resolution and swath of band 4 are 1.5 km and 750 km, respectively. In this study, it was assumed that the surface reflectance at 670 nm can be obatined using an empirical relationship between the reflectances at 670 nm and at 1600 nm. For analyzing the empirical relationship, dark fields were selected from the GOSAT-CAI data, where AERONET sun photometer measurements were available within 30 minutes, the distance from the AERONET station was within 30 km, and the AOD at 550 nm was below 0.1. The surface reflectance was derived by atmospheric correction with the Second Simulation of a Satellite Signal in the Solar Spectrum (6S) radiative transfer model and AERONET AOD. A regression function between top-of-atmosphere reflectances at 1600 nm and surface reflectances at 670 nm was summarized. AODs were retrieved using a look-up table method and compared with AERONET AODs. The results show that more than 70% validating data are located within expected errors for MODIS ($\pm 0.05 \pm 0.15\tau$, τ is AOD).