



Radiometric Cross-calibration of FORMOSAT-2 RSI with Landsat-8 OLI Image

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FORMOSAT-2 satellite (FS-2) was launched in May, 2004. It is the first Earth observation satellite operated by the National Space Organization (NSPO) of Taiwan. The main payload housed in FS-2 is Remote Sensing Instrument (RSI) with high spatial resolution. Landsat-8 (L-8) is an American Earth observing satellite launched in February 2013 quite recently. The main sensor on L-8 is Operational Land Imager (OLI). For any optical sensors, ensuring the accurate radiance observing is the most important issue for the applications to the scientific researches and environmental monitoring. Since RSI is operated more than 10 years, the optical characters may be altered. Therefore, the goal in this research project is to examine radiometric coefficients of FS-2 RSI sensor by means of in-flight cross-calibration using L-8 OLI image as a reference. For FS-2 RSI sensor, OLI is not only a new and well calibrated sensor but also use the similar spectral bands and bandwidth which can provide a credible data for calibrating RSI. The desert areas are selected for the cross-calibration in this study, including Sahara desert in Africa and Sonoran desert in America. Those sites are usually used in other papers as a satellite sensor calibration site. The radiative transfer code, Second Simulation of a Satellite Signal in the Solar Spectrum (6S) is employed to drive land surface reflectance and the radiance RSI observed on the top of atmosphere. Eventually, the physical gains of RSI can be figured based on the relationship between observed radiance and the digital number. The results indicate that the changes of physical gains from the counter parts of pre-flight can reach in 10% in most spectral bands of RSI.

Keywords: FORMOSAT-2 RSI, Landsat-8 OLI, In-flight radiometric calibration, Cross-calibration, Physical gain