After Landing Calibration of Multi-Band Camera (MBC) onboard SLIM

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SLIM spacecraft was launched from Tanegashima Space Center in September 7th by JAXA. At January 20th 0:20 (JST), furthermore, SLIM successfully did “pinpoint landing” on the lunar surface. The landing location was 50 m away from the planned location. After landing, we observed some boulders, which might be eject from SHIOLI crater, using **M**ulti-**B**and **C**amera (MBC). MBC is a compact VIS-NIR camera composed of an imaging sensor (Vis-InGaAs), a filter-wheel with 10 band-pass filters, a telephoto focusable optical system, and a movable mirror for panning and tilting. The sensor has sensitivity at wavelength from 700 to 1700 nm, which covers the characteristic absorption bands of lunar minerals, especially focused on olivine’s band position around 1000 nm.
We observed the earth, lunar and deep space data from orbit to obtain optical calibration data using MBC. Before landing on the Moon, since a movable mirror, a filter-wheel and a telephoto focusable optical system are locked, the observed wavelength was only 750 nm. The earth observation was carried out on September 22nd over the Arabian Peninsula. The observational area of MBC was the terminator line between day and night. The altitude was ~100,000 km, and spatial resolution was ~10 km/pixel. The lunar observations were carried out on December 30th and January 4th. The observational area of MBC was (297.73E, -75.74N) and (217.71E, -73.67N), respectively. The altitude was 2500-3,600 km, and spatial resolution was ~500 m/pixel. The MBC’s exposure time, which is estimated using lunar radiance and preflight data, was 128 msec on both days. When we observe lunar surface from orbit, the Auto-Exposure function onboard MBC suggested the same exposure time as our estimation (128 msec), and we confirmed that the AE function worked. The dark level obtained preflight calibration and the earth orbit phase shows the good linearity in the range from 15 to 40 degrees of celsius.
After landing, the critical operation of MBC was done perfectly. The three launch locks were smoothly unlocked, and the functions of Auto-Exposure and Auto-Focus were worked. Then, we observed lunar surface regolith, boulders and deep space and obtained 10 band spectral data. Now, we perform calibration using the data of preflight, inflight and after landing.

Acknowledgments: This study is supported by JAXA Lunar and Planetary Exploration Data Analysis group (JLPEDA / JAXA).

Keywords: SLIM, MBC, Moon, Lunar Exploration

