

Detection and Visualization of the Absorption Features of the Reflectance Spectra on the Moon based on Data from Spectra

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The Spectral Profile (SP) onboard Kaguya/SELENE is a visible and near-infrared spectrometer covering wavelengths of 0.5-2.6 micrometer and observed the Moon globally. Generally, the reflectance spectra contain mineral information. We can detect the lunar minerals by analyzing the SP spectra.

Modified Gaussian Model (MGM) developed by Sunshine et al. [1990] is one the methods of such analyses. MGM resolves the reflectance spectra and quantifies the features of the absorption bands. By comparing the results of MGM (detected features of the absorption bands) with those of the known samples, we can identify the observed minerals.

However, the original MGM tool has two problems, which are; (i) The tool is difficult to be applied to a large amount of spectral data, and (ii) The comprehension of the results of MGM tends to be complicated.

We focused on these two problems. A new produce was added to refer and access to the meta data of SP data. We also developed a visualization tool which helps to comprehend the detected features of the absorption bands easily on the lunar image. RGB color was allocated corresponding to the value of absorption features, such as central wavelength and strength of the absorption bands, and displayed on the observed spots in the lunar image.

We succeeded in customizing MGM tool and applied it to bunches of SP data. The visualization of the deconvolved absorption features was successful, too. The set of the two tools would enable us to analyze SP data efficiently, detect the minerals, and clarify their distribution on the surface of the Moon.

In the presentation, we show some examples. The target areas are the lunar swirls. We exhibit the results of our analyses of SP data using the set of developed tools and try to understand the spectral characteristics of the areas.

Keywords: Spectral Profiler/Kaguya, visible-near infrared spectrum, Moon, feature of absorption band, Modified Gaussian Model, Visualization