

KAGUYA LISM/MI DATA ANALYSIS FOR THE MENELAUS CRATER REGION OF THE MOON. A. Yamamoto¹, M. Ohtake², J. Haruyama², and T. Matsunaga³, ¹Remote Sensing Technology Center of Japan (3-17-1, Toranomon, Minato-ku, Tokyo 105-0001, JAPAN, aya@restec.or.jp), ²Japan Aerospace Exploration Agency, ³National Institute for Environmental Studies.

Introduction: Menelaus crater on the moon is located between Mare Serenitatis and Haemus Mts. This impact crater and its surroundings area show a wide variety of interesting geologic features and units. There are Haemus Mts. unit, Imbrium ejecta deposits, dark mantle deposits of probable pyroclastic origin, and mare units of the southern part of Mare Serenitatis. Menelaus crater itself is also interesting because its asymmetrical ejecta deposit and position. Menelaus crater straddle the topographic and compositional boundary between the Haemus Mts. and mare basalts of Mare Serenitatis (Fig.1, 2). This interesting area is studied before with earth-based telescope data and Clementine UVVIS camera data [1]. Then, from 2007 to 2009, Japanese lunar orbiter “KAGUYA (SELENE)” observed the moon with its onboard equipment [2]. In this report, we investigate this Menelaus area again with high-resolution multiband image data from KAGUYA.

Data and Methods: We used KAGUYA multi-band imager (MI) data which have already calibrated and converted to reflectance value with the method disclosed in Ohtake 2010 [3]. Target area is the Menelaus region, from 15N to 17N and 15E to 17E (Fig.1 left) on the near side of the Moon. MI mosaic image are used for multispectral classification study. ISO-DATA clustering method and segmentation analysis are used for classification analysis. Digital Terrain Model (DTM) for the target area is created from MI data (Fig.1 right). The bird's eye views from classified image and DTM for Menelaus region are also interpreted in this study.

Results and Discussions: In previous study, the reflectance spectra observed by Earth-based telescope and 5-band cube-image by Clementine UVVIS camera characterized the geology of Menelaus region. There are three areas in the Menelaus region, 1) Menelaus Crater Interior, 2) Menelaus Crater Exterior, and 3) Highlands unit. In this study, the result of MI mosaic image analysis is basically consistent with previous result at each area, but more detail distribution of geologic feature in the Menelaus region is shown in high-resolution classified map (Fig.3). Some mare unit shown in light blue in Fig.3 are excavated at around south side of the crater. Also the red color at the most part of the crater wall may represent excavated mare unit under the highland unit shown in light green to green. The difference between lightblue color mare

unit and red color mare unit is thought to be due to difference of excavation depth, which caused by low incident angle impaction from north direction. The brown and orange color area shows the mixture of ejecta and preexistent highland material. This hypothesis is backed up by the fact that most of the mixing area shown in south side of the crater.

We are now trying to interpret the 3D views of the target area. Next step, we need further study to acquire Fe content map with same resolution with MI data, and study of geological history of the moon surface will make solid progress.

References:

- [1] Hayashi A. et al (1998) LPSC XXVIII, Abstract #1838. [2] Kato M. et al. (2010) *Space Science Reviews*, 154, p1-4. [3] Ohtake M. et al (2010) *Space Science Reviews*, 154, p57-77.

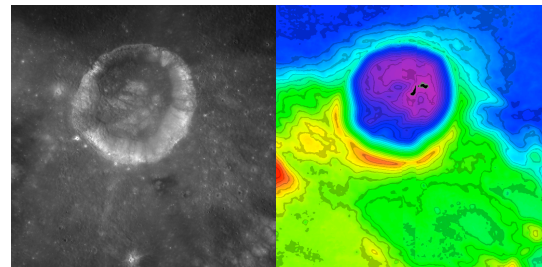


Fig.1 images of the Menelaus crater (left:750nm band, right: DTM)

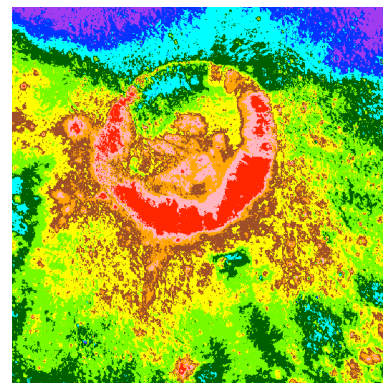


Fig.3 Classified result for the target area