# SPATIALLY HIGH-RESOLUTION ELEMENTAL MAPS OF THE MOON USING KAGUYA GRS DATA.

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**Introduction:** Distributions of major elements and radioactive elements on the lunar surface give the essential information to understand the lunar origin and evolution. The Gamma-Ray Spectrometer onboard Kaguya (KGRS) was designed with a high-energy resolution to determine the lunar subsurface composition in the upper layer of about 60 g/cm$^2$ by observing gamma rays emitted from the Moon [1]. Recently, three elemental maps of the Moon were reported by successive KGRS data analysis. Kobayashi et al. [2] reported the spatial response function of the KGRS and the potassium map of the Moon. Yamashita et al. [3] reported the distribution maps of thorium and uranium. The uranium map using the KGRS data is the first reliable map generated independently of the thorium map. These results were based on data that were obtained in lunar polar and circular orbit at about 100 km altitude during the period from December 2007 to December 2008.

**Low Altitude Observation:** Kaguya, the main orbiter of the SELENE mission, was in a 50 km altitude after February 1, 2009, until it crashed into the Moon on June 10, 2009 [4]. Since the spatial resolution of the KGRS measurements is primarily determined by the spacecraft altitude, the low altitude data have a spatial resolution about 2 times better (67 km×67 km) than that from the nominal altitude observation data (130 km×130 km [2]). Here, we present preliminary result using KGRS data obtained during the low-altitude observation (February to May 2009).

**Results:** The elemental maps, such as natural radioactive elements (K and Th) and major elements (Fe and Ti), were made in this study based on the low-altitude observation data. Radioactive elements are highly concentrated around Mare Imbrium. Those highly concentrated regions are found in Aristillus, Mairan and Aristarchus craters, Jura and Carpathian mountains, and Fra Mauro. In addition, low-altitude data indicate that Th concentration at Copernicus crater is moderately lower than that of surrounding region.

Fe and Ti maps were made by procedures similar to those in Lawrence et al. [5]. These maps are in good agreement with the Lunar Prospector maps reported by Prettyman et al. [6]. The relative concentration of Fe in maria becomes lower in the order as Procellarum, Imbrium, Tranquillitatis, Serenitatis, Nectaris, Crisium, SPA, Smythii and Australe. The Ti distribution is slightly different from that of Fe. The Ti signature of Mare Tranquillitatis is as high as that of Procellarum and Imbrium, and obviously higher than that of other maria such as Serenitatis.

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