Nomenclature

Lunar nomenclature cited from the USGS Gazetteer of Planetary Nomenclature (https://planetarynames.wr.usgs.gov).

Lunar global topography [km]

Lunar global topography map acquired by SELENE Laser Altimeter (LALT) observations. The product is represented by 360-degree spherical harmonics referenced to a 1737.4 km sphere at the lunar center of mass. For an overview of the instrument, see below:
https://www.kaguya.jaxa.jp/en/equipment/lrs_e.htm
Source data:
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lalt-5-topo-ggt-map-v2.0/
Reference:
If you use this product, please cite the following paper.
Araki, H., Tazawa, S., Ishihara, Y., et al. Lunar global shape and polar topography derived from Kaguya–LALT laser altimetry. Science, 323, 5916, 897-900 (2009). https://doi.org/10.1126/science.1164146

Mare unit age (Gyr)

Polygons representing the estimated ages of lunar maria based on stratigraphic relationships of mare basalt units interpreted from SELENE Lunar Radar Sounder (LRS). The source data were obtained from Figure 5 in Oshigami et al. (2014). The absolute ages were determined based on crater size–frequency distributions reported in Hiesinger et al. (2000, 2003, 2010), Kodama and Yamaguchi (2003), and Morota et al. (2011).
References:
Oshigami, S., Watanabe, S., Yamaguchi, Y., et al. Mare volcanism: Reinterpretation based on Kaguya Lunar Radar Sounder data. Journal of Geophysical Research Planets, 119, 1037–1045 (2014). https://doi.org/10.1002/2013JE004568
Hiesinger, H., Jaumann, R., Neukum, G., et al. Ages of mare basalts on the lunar nearside. Journal of Geophysical Research Planets, 105, 29229–29275 (2000). https://doi.org/10.1029/2000JE001244
Hiesinger, H., Head III, J. W., Wolf, U., et al. Ages and stratigraphy of mare basalts in Oceanus Procellarum, Mare Nubium, Mare Cognitum, and Mare Insularum. Journal of Geophysical Research Planets, 108, E7, 5065 (2003). https://doi.org/10.1029/2002JE001985
Morota, T., Haruyama, J., Ohtake, M., et al. Timing and characteristics of the latest mare eruption on the Moon. Earth and Planetary Science Letters, 302, 255–266 (2011).

https://doi.org/10.1016/j.epsl.2010.12.028
Kodama, S., and Yamaguchi, Y. Lunar mare volcanism in the eastern nearside region derived from Clementine UV/VIS data. Meteoritics & Planetary Science 38, Nr 10, 1461–1484 (2003). https://doi.org/10.1111/j.1945-5100.2003.tb00251.x

LRS subsurface reflection points

The unit boundary depths of mare basalts determined by Ishiyama and Kumamoto (2019), based on radargrams obtained by SELENE Lunar Radar Sounder (LRS), are shown. By clicking on a point displayed in Mare Smythii, the depths of four echoes (i.e., unit boundaries) at that location are displayed. Elevation of surface indicates the depth of the surface echo read from the LRS radargram, Elevation of echo 1–4 indicate the depths of subsurface echoes read from the LRS data, Apparent depth is the difference between the surface echo and the subsurface echoes, and Depth is the true depth calculated assuming a dielectric constant of 6.

Reference

If you use this product, please cite the following paper.

Ishiyama, K. and Kumamoto, A. Volcanic history in the Smythii basin on SELENE radar observation. Scientific Reports, 9, 14502 (2019). https://doi.org/10.1038/s41598-019-50296-9

SP radiance [W/m^2/μ/Sr]/diffuse reflectance (including the "reduced" version)

Hyperspectral visible and near-infrared reflectance spectra based on the SP Level2C Product derived from observations by the SELENE Spectral Profiler (SP). The SP acquired hyperspectral data over areas of ~500 m × 500 m across the Moon. By clicking on an observation point in this layer displays the radiance [W/m^2/μ/Sr] and reflectance. Spectra from the VIS and NIR1 detectors are calibrated following Yokota et al. (2011), and the NIR2 detector is calibrated following Yamamoto et al. (2014). The "reduced" version achieves faster rendering by reducing the number of observation points.

For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/tc_e.htm

Data source:

https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-mi-5-map-v3.0/

References:

If you use this data, please cite the following papers.

Yokota, Y., Matsunaga, T., Ohtake, M., et al. Lunar photometric properties at wavelengths 0.5-1.6 μm acquired by SELENE Spectral Profiler and their dependency on local albedo and latitudinal zones. Icarus, 215, 639–660 (2011). https://doi.org/10.1016/j.icarus.2011.07.028
Yamamoto, S., Matsunaga, T., Ogawa, Y., et al. Calibration of NIR 2 of Spectral Profiler onboard

Kaguya/SELENE. IEEE Transactions on Geoscience and Remote Sensing, 52, 6882–6868 (2014). https://doi.org/10.1109/TGRS.2014.2304581

SAR (5 km/10 km/40 km)

Sounder SAR image processed using a synthetic aperture of 5 km/10 km/40 km acquired by SELENE Lunar Radar Sounder (LRS) reflection echoes. Clicking on a survey line displays the product. The horizontal axis is the satellite ground track. The vertical axis represents the apparent depth calculated with dielectric constant ε = 1, which differs from the actual depth. Surface and subsurface discontinuities appear as variations in echo intensity. The spatial resolution is ~75 m on the horizontal axis and ~75 m on the apparent depth of the vertical axis. For an overview of the instrument, see below:
https://www.kaguya.jaxa.jp/en/equipment/lrs_e.htm
Data source:
5 km: https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lrs-5-sndr-ss-sar05-power-v1.0/
10 km: https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lrs-5-sndr-ss-sar10-power-v1.0/
40 km: https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lrs-5-sndr-ss-sar40-power-v1.0/
Reference:
Ono, T., Kumamoto, A., Kasahara, Y., et al. The Lunar Radar Sounder (LRS) Onboard the KAGUYA (SELENE) Spacecraft. Space Science Reviews, 154, 145–192 (2010).
https://doi.org/10.1007/s11214-010-9673-8
If you use this product, please cite the following paper.
Kobayashi, T., Kim, J. H., Lee, S. R., et al. Synthetic aperture radar processing of Kaguya Lunar Radar Sounder data for lunar subsurface imaging. IEEE Transactions on Geoscience and Remote Sensing, 50, 6082437, 2161–2174 (2012). https://doi.org/10.1109/TGRS.2011.2171349

LRS Radargram

2D high-resolution subsurface cross section of reflected echo intensity obtained by SELENE Lunar Radar Sounder (LRS). Clicking on a survey line displays the product. The horizontal axis is the satellite ground track. The vertical axis represents the apparent depth calculated with dielectric constant ε = 1, which differs from the actual depth. Surface and subsurface discontinuities appear as variations in echo intensity. The spatial resolution is ~75 m on the horizontal axis and ~75 m on the apparent depth of the vertical axis. For an overview of the instrument, see below:
https://www.kaguya.jaxa.jp/en/equipment/lrs_e.htm
Data source:
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lrs-5-sndr-ss-high-v2.0/
Reference:

Ono, T., Kumamoto, A., Kasahara, Y., et al. The Lunar Radar Sounder (LRS) Onboard the KAGUYA (SELENE) Spacecraft. Space Science Reviews, 154, 145–192 (2010).
https://doi.org/10.1007/s11214-010-9673-8

MI FeO abundance [wt%], TiO_2 abundance [wt%]

Abundance (wt%) of FeO and TiO_2 based on SELENE Multiband Imager (MI) observations. This product was calculated from the MI_MAP product using the method by Otake et al. (2012). This layer covers latitudes from 85°N to 85°S with a spatial resolution of 128 pix/degree.
Reference:
If you use this product, please cite the following paper.
Otake, H., M. Ohtake, and N. Hirata, Lunar iron and titanium abundance algorithms based on SELENE (Kaguya) Multiband Imager data, Lunar and Planetary Science Conference, 43rd (2012), Abstract 1905. https://ui.adsabs.harvard.edu/abs/2012LPI....43.1905O

MI reflectance

Visible and near-infrared reflectance spectral data based on the MI_MAP Product derived from observations by the SELENE Multiband Imager (MI). The MI_MAP product is a 9-band data cube covering latitudes from 85°N to 85°S with a spatial resolution of 2048 pix/degree. This layer allows viewing of the reflectance spectrum at a selected position by clicking. Two reflectance values are plotted at 1000 nm because this is observed by both the VIS and NIR detectors. For an overview of the instrument, see below:
https://www.selene.jaxa.jp/en/equipment/tc_e.htm
Data source:
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-mi-5-map-v3.0/
References:
Ohtake, M., Haruyama, J., Matsunaga, T., et al. Performance and scientific objectives of the SELENE (KAGUYA) Multiband Imager. Earth, Planets and Space 60, 257–264 (2008).
https://doi.org/10.1186/BF03352789

Nuclide map (K [ppm], Th [ppm], U [ppm], Ca [wt%])

The mass concentration distribution of K/Th/U/Ca based on observations by the SELENE Gamma-Ray Spectrometer (GRS) at an altitude of ~100 km. The product covers the entire lunar surface with an intrinsic spatial resolution of ~150 km. For an overview of the instrument, see below:
https://www.kaguya.jaxa.jp/en/equipment/grs_e.htm
Data source:
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-grs-5-nuclide-map-v1.0/data/

Reference:

Kobayashi, S., Hasebe, N., Shibamura, E. *et al.* Determining the absolute abundances of natural radioactive elements on the lunar surface by the Kaguya Gamma-ray Spectrometer. Space Science Reviews 154, 193–218 (2010). https://doi.org/10.1007/s11214-010-9650-2

TC morning, TC evening

Surface reflectance map acquired by SELENE Terrain Camera (TC) under low solar illumination from the east (morning) and from the west (evening). This product covers most of the globe at a resolution of 10 m/pix, except for some high-latitude areas longitudinal areas. For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/tc_e.htm

Data source:

https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-tc-5-morning-map-v4.0/

Reference:

Haruyama, J., Ohtake, M., Matsunaga, T., et al. Data products of SELENE (Kaguya) Terrain Camera for future lunar missions. 45th Lunar and Planetary Science Conference, p. 1304 (2014).

https://ui.adsabs.harvard.edu/abs/2014LPI....45.1304H

TC orthoimage

TC ortho data acquired by SELENE Terrain Camera (TC). This product covers most of the globe at a resolution of 10 m/pix, except for some high-latitude areas longitudinal areas. For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/tc_e.htm

Data source:

https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-tc-5-ortho-map-v2.0/

Reference:

Haruyama, J., Ohtake, M., Matsunaga, T., et al. Data products of SELENE (Kaguya) Terrain Camera for future lunar missions. 45th Lunar and Planetary Science Conference, p. 1304 (2014).

https://ui.adsabs.harvard.edu/abs/2014LPI....45.1304H

TC DTM[m]

DTM map based on the SLDEM2013 product which combined observations from the SELENE Terrain Camera (TC), Multiband Imager (MI), and NASA Lunar Orbiter Laser Altimeter (LOLA). The DTM was primarily generated from TC (10 m/pix), with gaps filled using MI (20 m/pix) and LOLA (60 m/pix). The product covers the entire Moon.

Data source:

https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-tc-5-sldem2013-v1.0/

Reference:

Haruyama, J., Ohtake, M., Matsunaga, T., et al. Data products of SELENE (Kaguya) Terrain Camera for future lunar missions. 45th Lunar and Planetary Science Conference, p. 1304 (2014). https://ui.adsabs.harvard.edu/abs/2014LPI....45.1304H

Bouguer gravity anomaly [mGal]

Bouguer gravity anomaly model based on the SGM100h lunar gravity field model with degree 100. The gravity model was derived from the 4-way Doppler observations using SELENE RSAT and VRAD Satellite. The bouguer gravity anomaly is calculated from SGM100h and a LALT topographic model (STM-359_grid-03) assuming the crustal density of 2800 kg/m^3. The high-frequency "spotty" signatures are likely due to the less accurate gravity coefficients above degree 70. For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/rsat_e.htm

Data source:

SGM100h grid data, RISE Project

(https://www.miz.nao.ac.jp/rise/en/node/348.html)

Reference:

If you use this product, please cite the following paper.

Matsumoto, K., Goossens, S., Ishihara, Y., et al. An improved lunar gravity field model from SELENE and historical tracking data: Revealing the farside gravity features. Journal of Geophysical Research: Planets, 115, E06007 (2010), https://doi.org/10.1029/2009JE003499

Free air gravity anomaly [mGal]

Bouguer gravity anomaly model based on the SGM100h lunar gravity field model with degree 100. The gravity model was derived from the 4-way Doppler observations using SELENE RSAT and VRAD Satellite. For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/rsat_e.htm

Data source:

SGM100h grid data, RISE Project

(https://www.miz.nao.ac.jp/rise/en/node/348.html)

Reference:

If you use this product, please cite the following paper.

Matsumoto, K., Goossens, S., Ishihara, Y., et al. An improved lunar gravity field model from SELENE and historical tracking data: Revealing the farside gravity features. Journal of Geophysical Research: Planets, 115, E06007 (2010), https://doi.org/10.1029/2009JE003499

Crustal thickness [km]

Lunar crustal thickness map derived from the SGM100h lunar gravity field model and STM-359_grid-03 lunar topography model. The gravity model was derived from the 4-way Doppler observations using SELENE RSAT and VRAD Satellite. The topography model is derived from SELENE LALT observations. This product was created with the condition that the Bouguer gravity anomaly is explained by Moho topography without having the mantle exposed at the lunar surface. Assumed densities of the crust, mantle, and mare basalt layer are 2800 kg/m^3, 3360 kg/m^3, and 3200 kg/m^3, respectively.

Data source:

Grid data of crustal thickness model, RISE Project

(https://www.miz.nao.ac.jp/rise/en/node/354.html)

References:

If you use this product, please cite the following paper.

Ishihara, Y., Goossens, S., Matsumoto, K., et al. Crustal thickness of the Moon: Implications for farside basin structures. Geophysical Research Letters, 36, L19202 (2009).

https://doi.org/10.1029/2009GL039708

Magnetic anomaly (X, Y, Z, F) [nT]

Lunar magnetic anomaly mosaic data acquired by SELENE Lunar Magnetometer (LMAG) observations at an altitude of 100 km. This product shows the components of the lunar magnetic anomaly vector (X: east–west; Y: north–south; Z: radial; F: total magnetic field intensity). For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/lmag_e.htm

Data source:

https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lmag-5-ma-map-v1.0/

Reference:

Tsunakawa, H., Shibuya, H., Takahashi, F., et al. Lunar magnetic field observation and initial global mapping of lunar magnetic anomalies by MAP-LMAG onboard SELENE (Kaguya). Space Science Reviews, 154, 219–251 (2010). https://doi.org/10.1007/s11214-010-9652-0

Magnetic anomaly OP (X, Y, Z, F) [nT]

Lunar magnetic anomaly mosaic data derived from SELENE Lunar Magnetometer (LMAG) observations at an altitude of ~30 km. This product shows the components of the lunar magnetic anomaly vector (X: east–west component; Y: north–south component; Z: radial component; F: total magnetic field intensity). For an overview of the instrument, see below:

https://www.kaguya.jaxa.jp/en/equipment/lmag_e.htm

Data source:
https://data.darts.isas.jaxa.jp/pub/pds3/sln-l-lmag-5-ma-map-option-v1.0/

Reference:

Tsunakawa, H., Shibuya, H., Takahashi, F., et al. Lunar magnetic field observation and initial global mapping of lunar magnetic anomalies by MAP-LMAG onboard SELENE (Kaguya). Space Science Reviews, 154, 219–251 (2010). https://doi.org/10.1007/s11214-010-9652-0

If you use this product, please cite the following paper.

Tsunakawa, H., Takahashi, F., Shimizu, H., et al. Regional mapping of the lunar magnetic anomalies at the surface: Method and its application to strong and weak magnetic anomaly regions. Icarus, 228, 15, 35–53 (2014). https://doi.org/10.1016/j.icarus.2013.09.026