

MONS RÜMKER



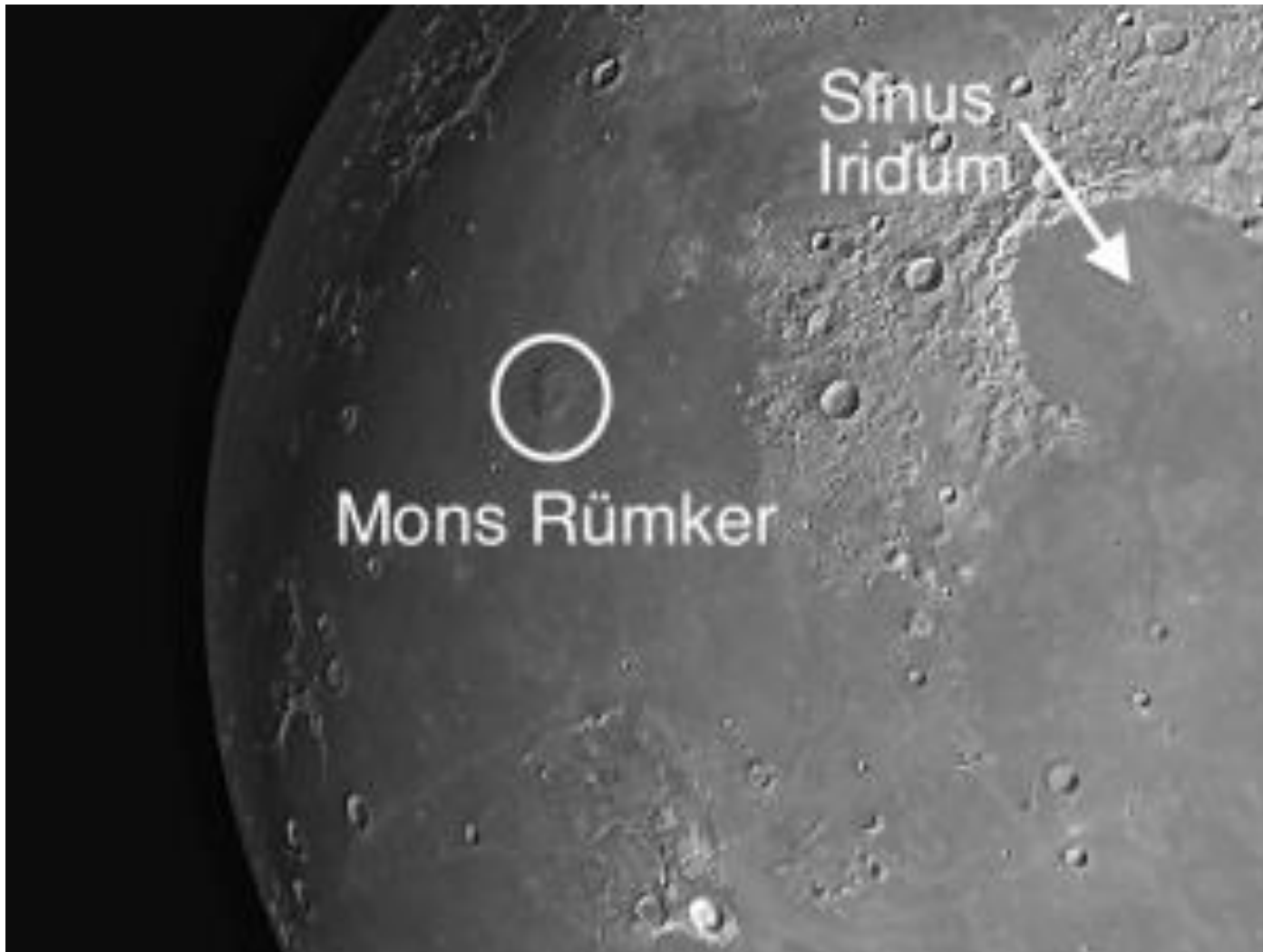
2. Chang'e flees to the moon (Joga hongetsu tsuki)

According to one version of this Chinese legend, the Queen Mother of the West rewarded the husband of Chang'e with the elixir of immortality. She stole and drank it, and fled to heaven where she became the spirit of the moon. (printed October 1885)

- Frontispiece – Tsukioka Yoshitoshi (1839 – 92)
woodblock print from “One Hundred Views of
the Moon.”

- Mons Rümker is a volcanic plateau found in the northern part of Oceanus Procellarum at 40.8 N 58.1 W.
- Aligned with Aristarchus Plateau and Marius Hills
- 70 km dia, roughly circular, 200-1300 m above mare surface, approx 4000 sq. km
- Low relief, 75% of Rümker has slopes less than 3 deg
- Marginal scarps steeper at 5 – 9 deg.

Image by Andrew Planck



Apollo 15 Orbital View



APOD Dec 5, 2020 J-Y LeTellier



At the Eyepiece

- Subdued feature difficult to make out under high illumination, needs to be near the terminator
- Seen at 12 days and 26 days
- Bumpy appearance
- Not part of Explore the Moon Program
- Isabel Williamson #130
- Lunar 100 list #62

Waxing Moon Dec 26 Midnight 2020



Waning Moon Jan 10, 2021 7am

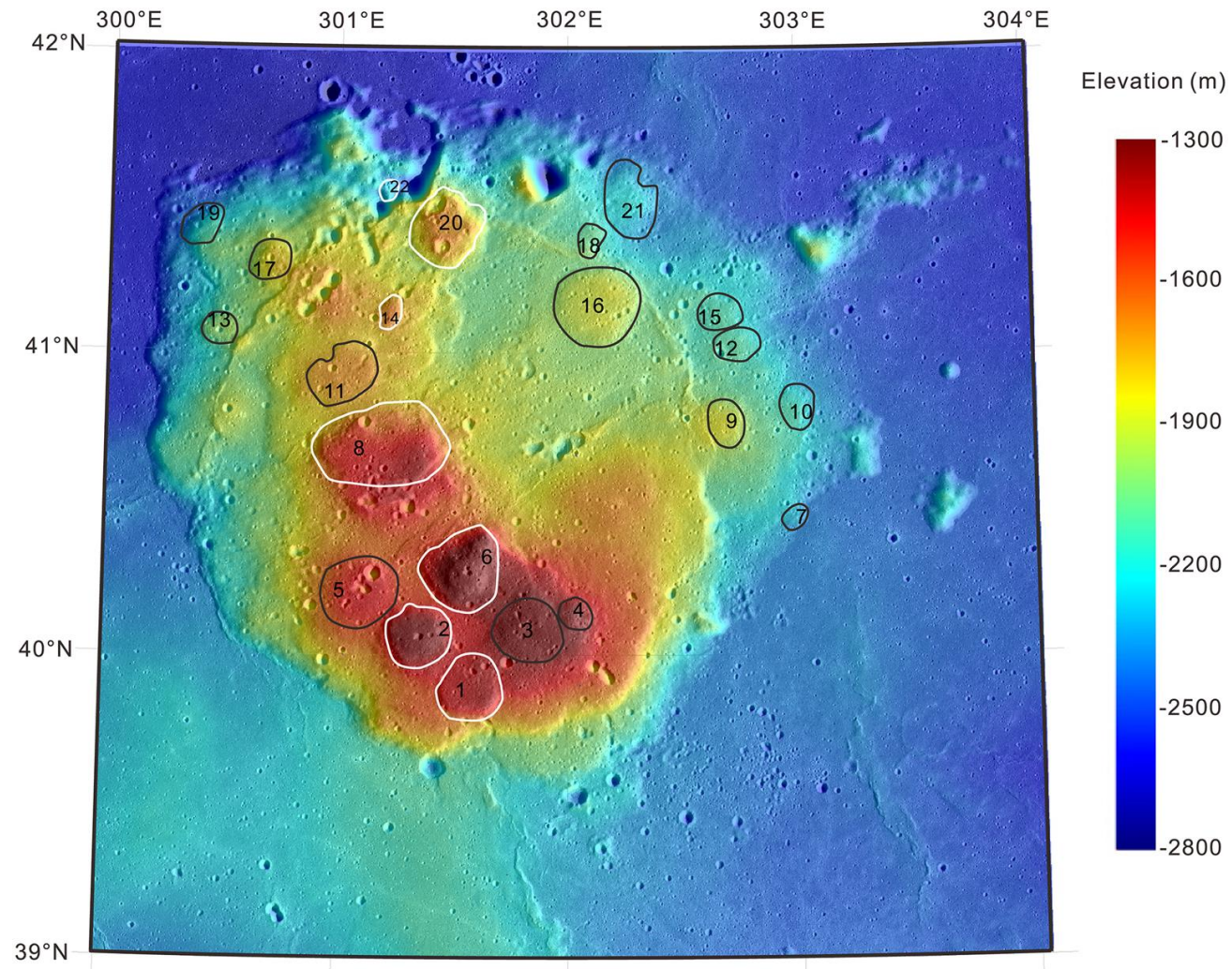


From Zhao et al, June 2017 The Mons Rümker Volcanic Complex of the Moon, A Candidate landing site for the Chang'e 5 Mission

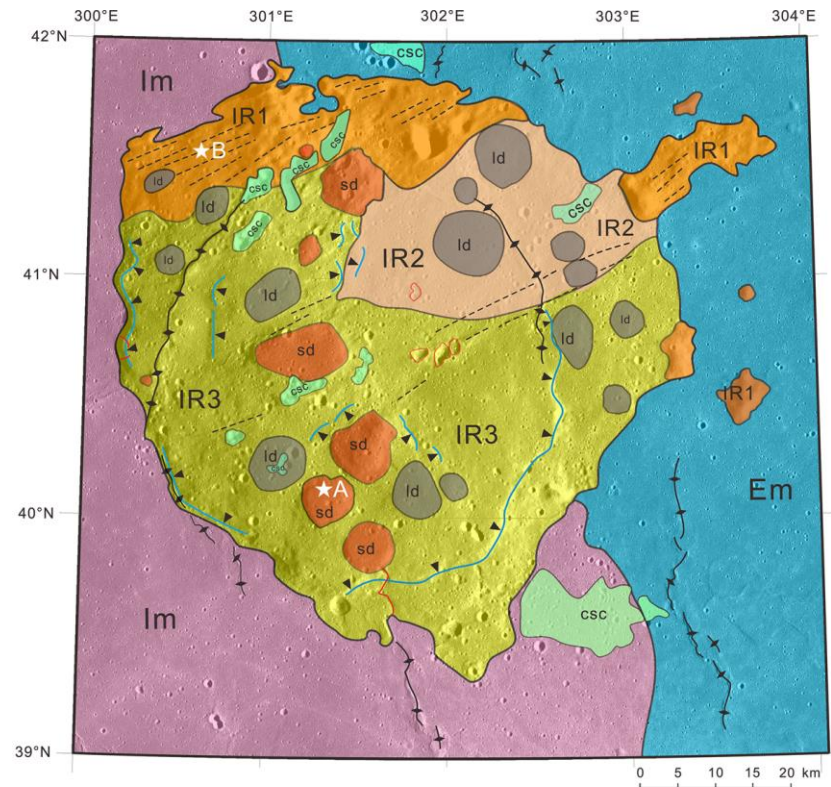
- Contains 22 volcanic domes, elliptical, relatively smooth surfaces, median 3.9 x 4.5 km, median 130m above plateau
- Steep sided domes, slopes greater than 5 deg, heights higher than 150m, always have associated volcanic features such as summit pits and flow features
- Shallow domes have less than 5 deg slopes, lower than 200m, only 2 of 15 have volcanic features

- Embayed by Imbrian mare unit to the west, age 3.47 Ga
- Eratosthenian unit to the east, age 1.33 Ga
- Composition is mostly basaltic (90%), low Ti basalt with low silica content
- Domes almost identical in composition to surrounding plains
- Consists of 3 geologic units, dated to upper Imbrian 3.71, 3.58 and 3.51 Ga

Zhao et al, 2017



Zhao et al, Geologic Map



Mare Materials	Rümker Plateau Materials	Dome Materials	Crater Materials		
			csc	Copernican	
Em		sd		Eratosthenian	
Im	IR3 IR2 IR1	id		Upper	Imbrian
				Lower	

Geomorphological Features	
	Scarp
	Lineament
	Sinuous rille
	Contact
	Wrinkle ridge
	Rimless depression
	Suggested landing site

2020 USGS UNIFIED LUNAR GEOLOGIC MAP

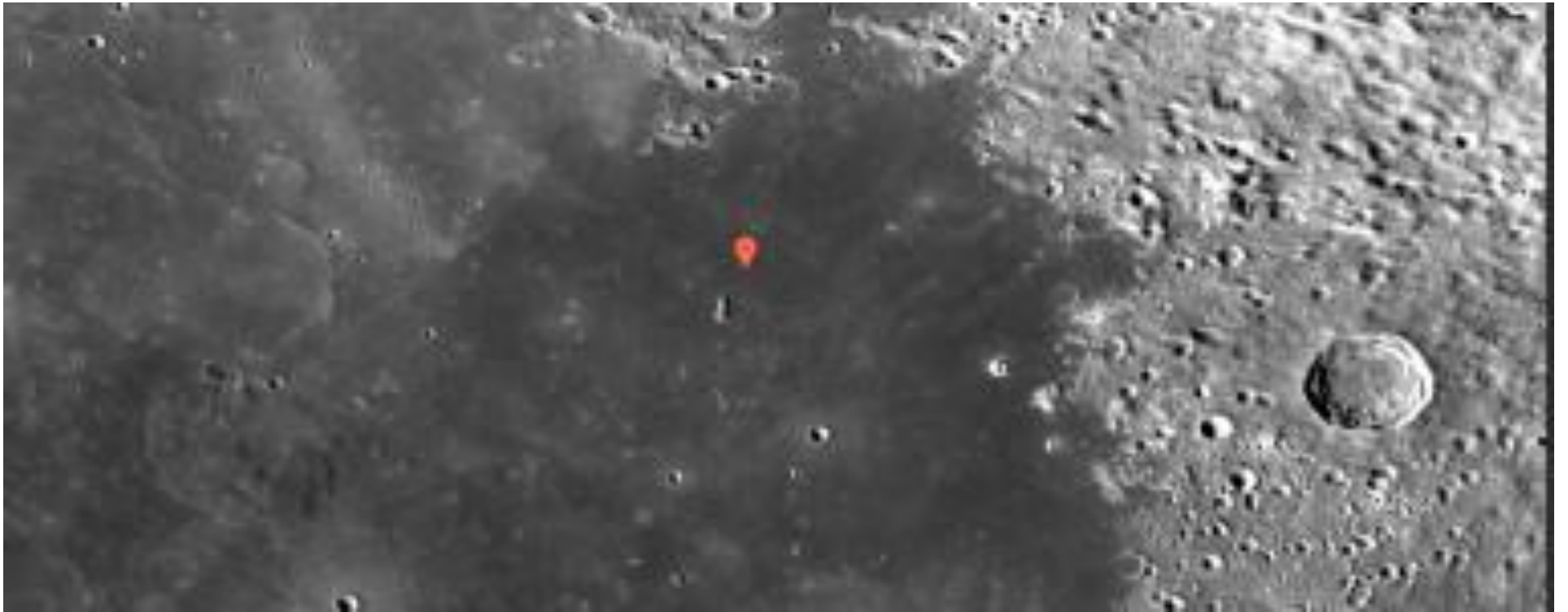


LIU & GUO JAN 2018

Lunar Geological Timescale, Table 2 A newly recommended lunar geological timescale (Guo et al. 2014, 2016)

Time-stratigraphic/geochronologic units		Geological events	Age (b.y.)	
Neolunarisan (NL)	Copernican (Cp)	Craters with preserved ray system were formed	0.0~0.8	
Paleolunarisan (PL)	Eratosthenian (Er)	Young craters with ray system subdued were formed; Small-scale basalts filled in basins and craters	0.8~3.16	
	Imbrian (Im)	Late Imbrian	Large-scale basalts filled in basins and craters	3.16~3.80
		Early Imbrian	Three basins including Imbrium, Orientale, and Schrödinger were formed	3.80~3.85
	Nectarian (Nc)	Twelve basin-scale impacts happened, with the start from the Nectaris basin	3.85~3.92	
	Aitkenian(AK)	Thirty basin-forming impacts happened, with the start from the South Pole-Aitken (SPA) basin	3.92~4.2(?)	
Eolunarisan (EL)	Pre-Aitkenian (PAK)	Crystallization of the magma ocean, solidified to form the anorthosite crust	4.2(?)~4.52	

Chang'e 5 Landing Site 43.0576 N 308.0839 E (51.916 W)



Lpi.usra.edu Lunar Distance Calculator

Lunar Distance Calculator

	Latitude	Longitude		Distance:
Point 1	<input type="text" value="40.8"/>	<input type="text" value="-58.1"/>	<input type="button" value="Calculate >>"/>	<input type="text" value="155.3463698046506"/> km
Point 2	<input type="text" value="43.0576"/>	<input type="text" value="-51.916"/>		

Enter coordinates in degrees

calculates the distance between two points on the Moon, using the [spherical law of cosines](#), and assumes a 1737.4 km radius. Distance calculations provided with this tool do not take into consideration variations in terrain or altitude. This is a quick way to obtain reasonably close estimates of the distance between two points on the Moon.

Coordinate values should be entered in decimal degrees. Latitudes should be between $\pm 90^\circ$, and longitudes should be between 0° and 360° .

From Qian et al 2020 THE YOUNG MARE BASALTS IN CHANG'E MISSION LANDING REGION, NORTHER OCEANUS PROCELLARUM

E12007. [5] wieczorek M. A. et al. (2013) *Science*, 339, 671-675. [6] Hiesinger H. et al. (2011) *GSA Special Paper*, 477, 1-51. [7] Morota T. et al. (2011) *EPSL*, 302,

Head, J. W. and Wilson, L. (2017) *Icarus*, 285, 110-2
[17] Wilson, L. and Head, J. W. (2020) *51st LPSC*.

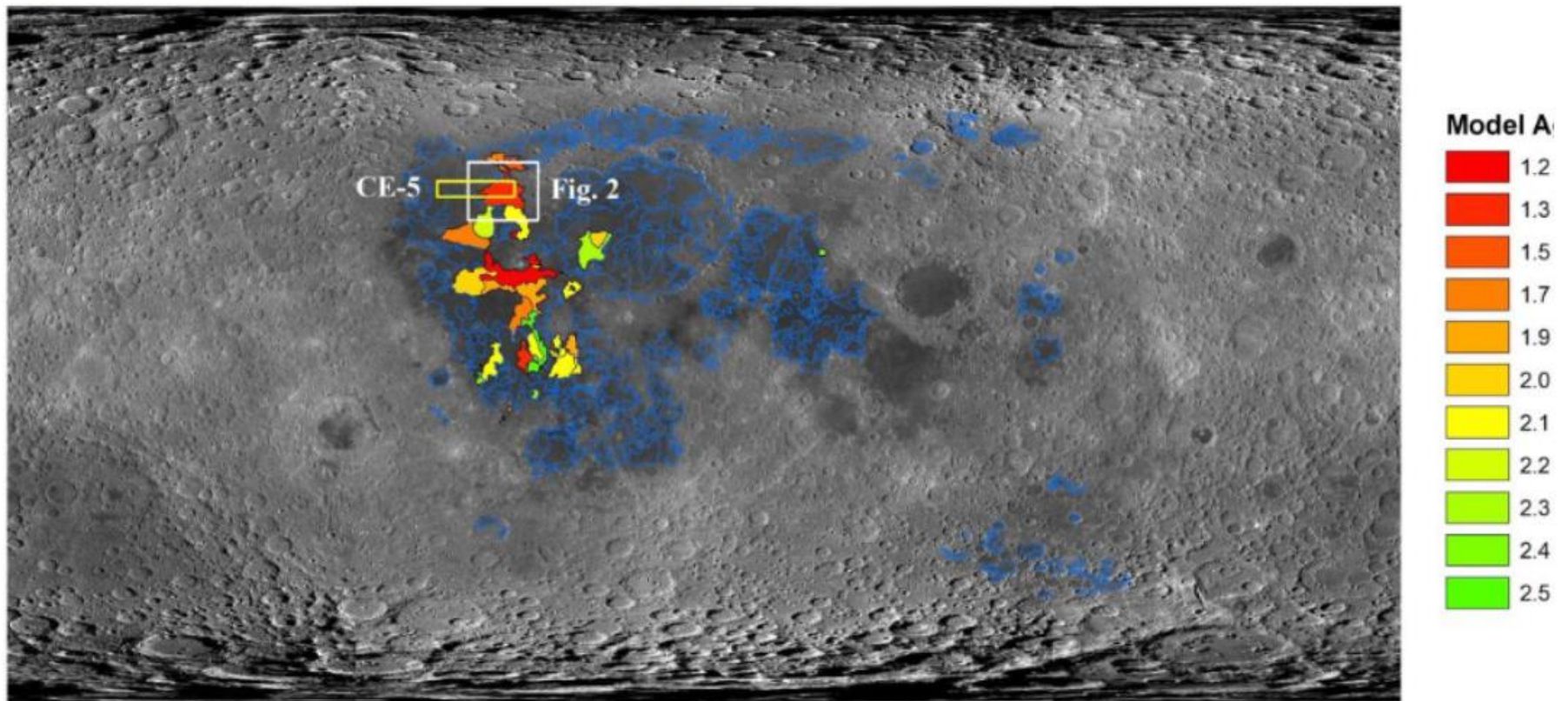
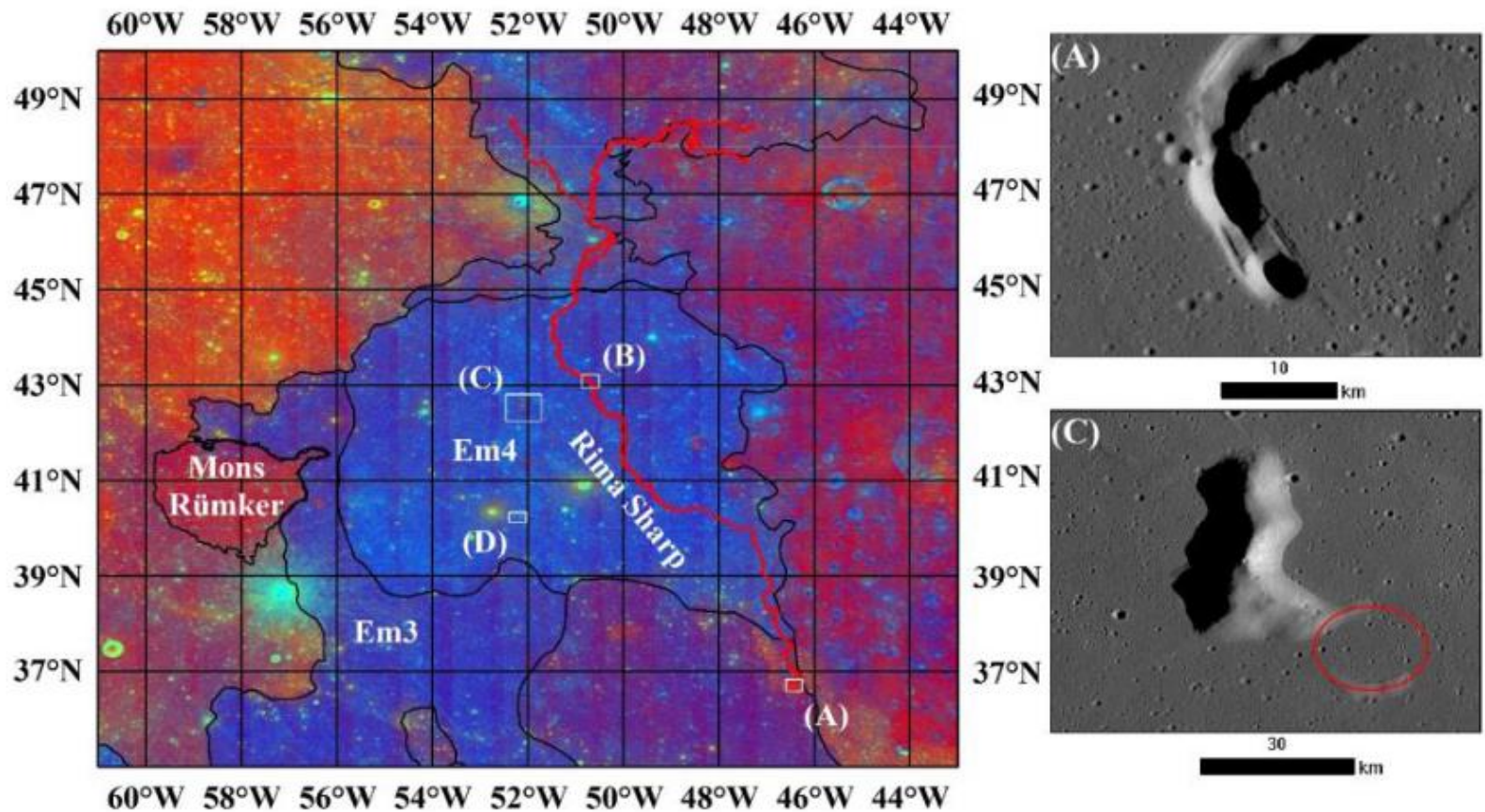


Figure 1: Locations of CE-5 landing region (yellow box, 41-45 °N, 49-69 °W) and young mare units on the Moon | ↘

EM 4 Youngest Mare Unit

Figure 1: Locations of CE-5 landing region (yellow box, 41-45 °N, 49-69 °W) and young 1



EM 4 Unit

- Youngest mare unit in region, covering all pre-existing units including EM 3, est 40 m thick
- Late stage lunar volcanism occurred mainly in OP and MI, producing unique hi Ti basalts with abundant olivine
- What is the heat source?
- Why Ti and Olivine rich and why does Ti content increase with time?
- Do basalts have high Th content like the soils or are soils preferentially enriched?

THANK YOU
HAPPY HOLIDAYS
CLEAR SKIES AND GOOD HEALTH