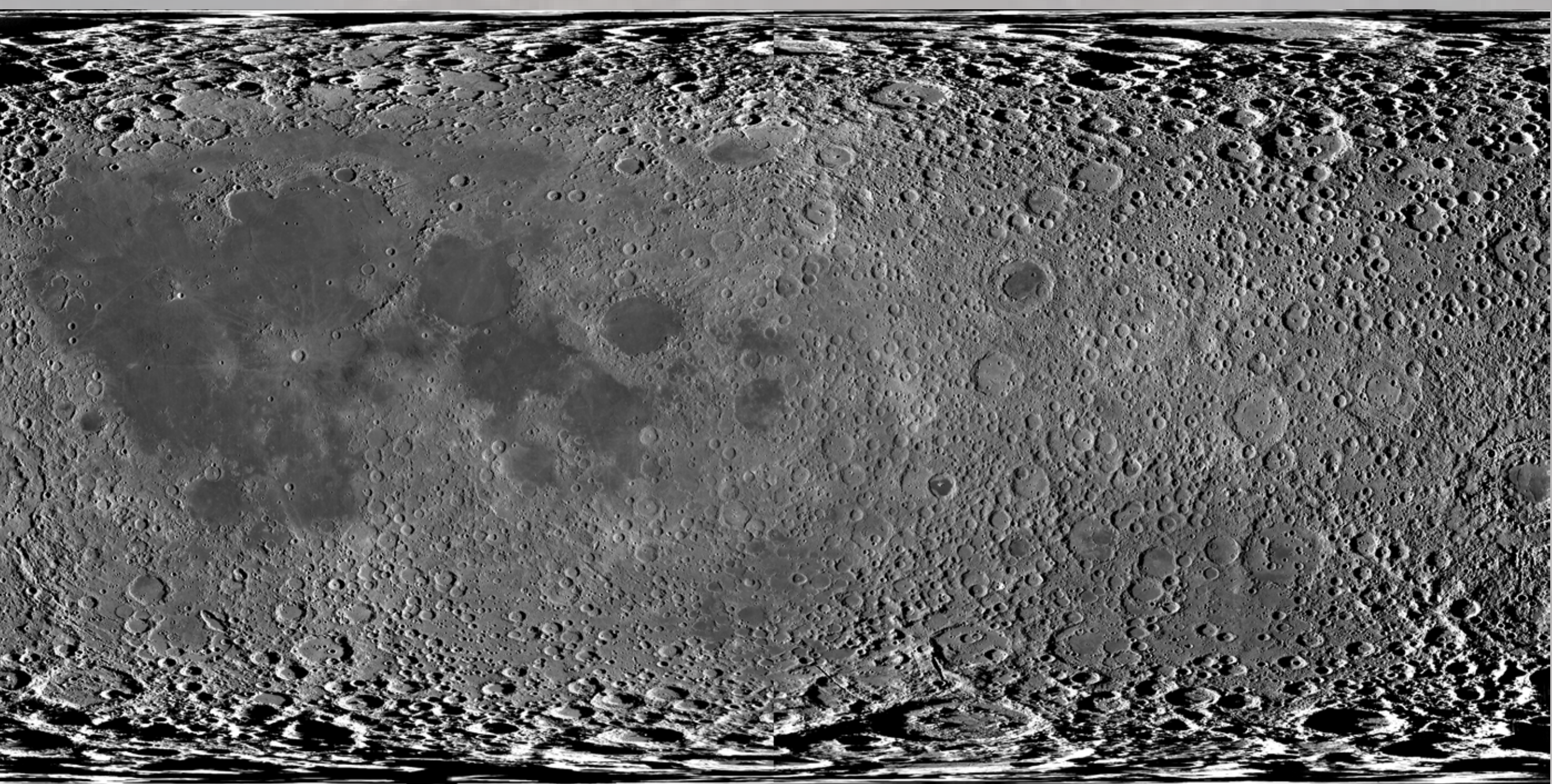



## Introduction

The LROC Science Operations Center has released over 1 million images since 2009. Subsets of these images enable creation of digital maps and mosaic products, publicly released through NASA's Planetary Data System (PDS), to aid scientists and engineers in planning future lunar missions and addressing key science questions. This poster covers new large mosaic reduced data record (RDR) products released since 2012 (previous releases are described in [1]). All WAC mosaics described here have been photometrically normalized using the equations described in [2]. The RDRs can be accessed from the LROC WMS server (<http://wms.lroc.asu.edu/lroc>) or downloaded at <http://lroc.sese.asu.edu/data>.




### Low-Sun Nearside and Farside WAC Mosaics

These two mosaics (90°W to 90°E and 90°E to 270°E) provide a dramatic view of the Moon with the Sun nearly on the horizon. The nearside mosaic is primarily composed of images from two weeks in Dec 2010, where the LRO spacecraft was held nadir-pointing to produce a nearly seamless low-Sun mosaic of the near side. The primary image sequence for the farside mosaic (June-July 2011) was chosen to match the incidence angle range (69°-85°), although due to the available lighting geometries, the lighting direction is opposite. Inter-image gores were filled with similarly-lit images from other time periods.



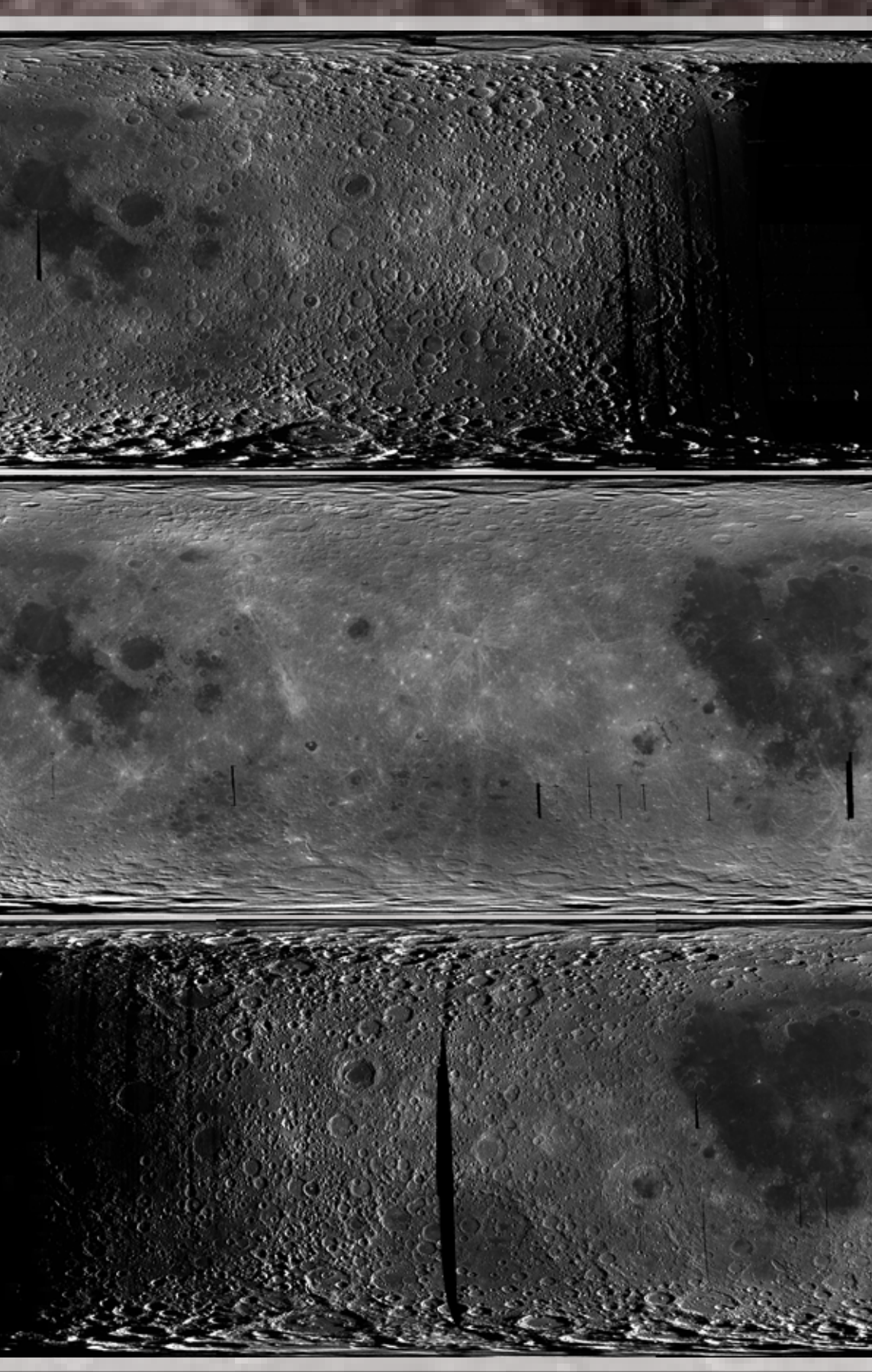
**Nearside Mosaic**  
Scan this QR code to view the 100 m/px product page



**Farside Mosaic**  
Scan this QR code to view the 100 m/px product page


### Monthly WAC Mosaics

Every 28 days LRO's orbit passes over every point on the Moon, and the LROC WAC images nearly continuously on the sunlit side. We have assembled most of the WAC images since 2010 into a set of 62 monochrome (643 nm band) global mosaics. Each mosaic contains all the illuminated nadir-looking images from ~1 month of orbits, mosaicked in precedence of lowest incidence angle (angle between Sun and zenith). These mosaics are archived in simple cylindrical projection at 1 km/px. These products are available at: <http://wms.lroc.asu.edu/lroc/>




## References

[1] Henriksen et al. (2013), LPS XXXXIII, Abstract #1676. [2] Sato et al. (2014), JGR, DOI: 10.1002/2013JE004580. [3] Speyerer et al. (2011), LPS XXXXII, Abstract #2387. [4] Waller et al. (2012), LPS XXXXIII, Abstract #2531.




**Abstract**  
Scan this QR code to view this poster's abstract (#1473).



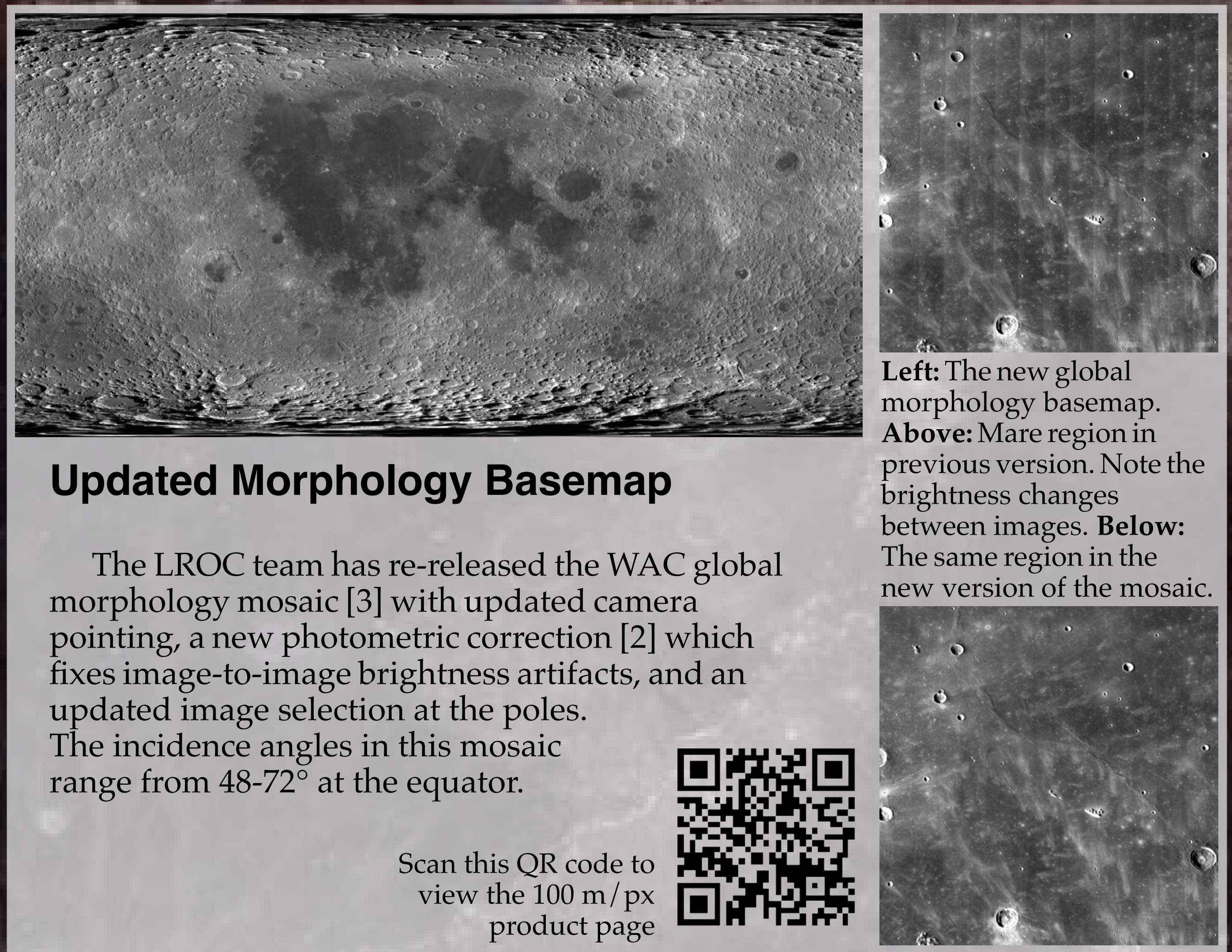
**E-poster**  
Scan this QR code to view the online version of this poster.

### Updated Morphology Basemap

The LROC team has re-released the WAC global morphology mosaic [3] with updated camera pointing, a new photometric correction [2] which fixes image-to-image brightness artifacts, and an updated image selection at the poles. The incidence angles in this mosaic range from 48-72° at the equator.




Scan this QR code to view the 100 m/px product page




### Updated NAC Polar mosaics

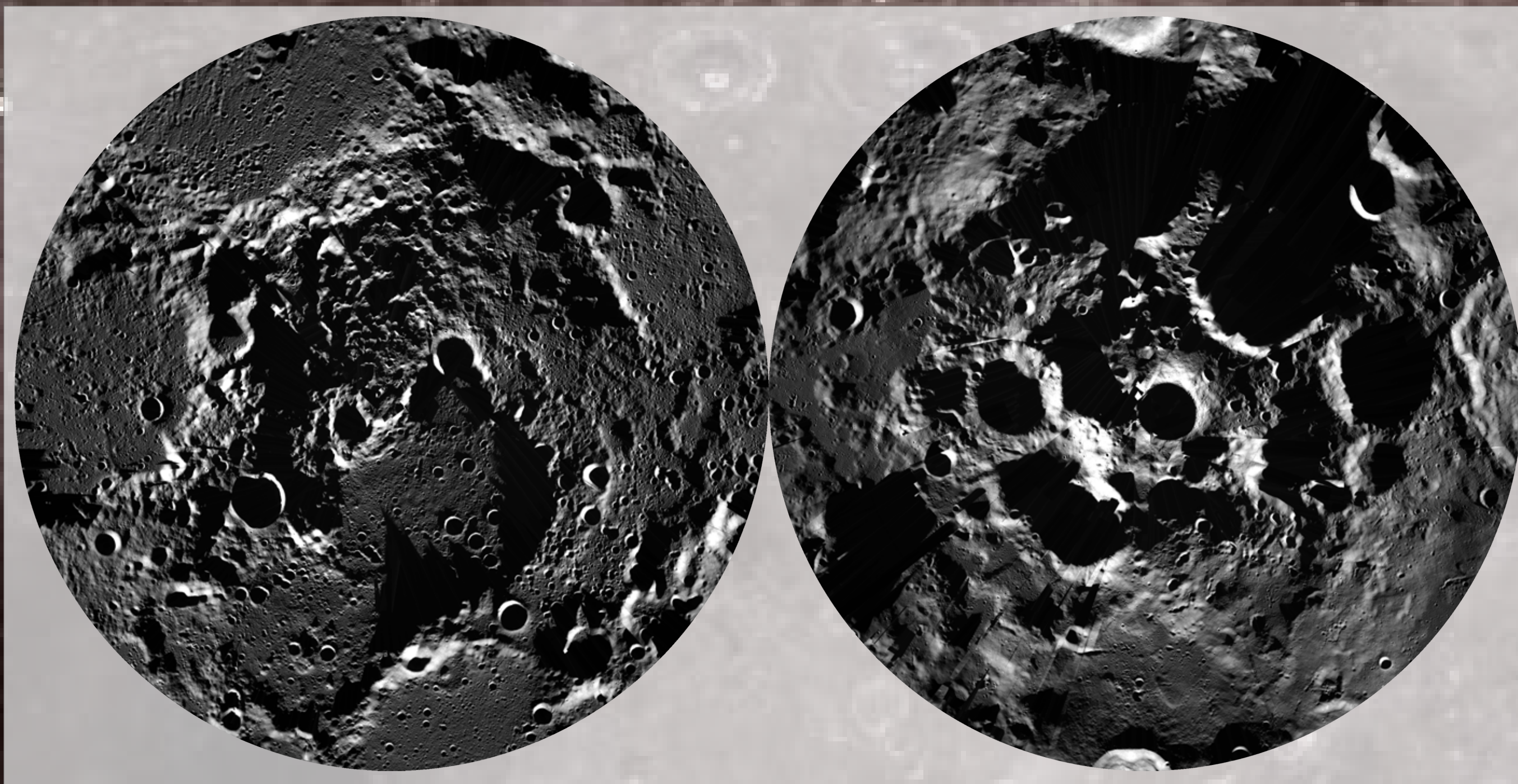
These mosaics are updates of the 90-85.5° NAC polar mosaics released in 2012 [1,4], with the resolution improved to 1 m/px and additional images added to improve lighting consistency. The mosaics use images from their respective summers, where the sub-solar latitude is on the pole-ward side of the equator. Image ordering was selected such that images with the Sun highest above the horizon are layered on top, with some manual adjustments to the order to improve image-to-image lighting consistency. Additionally, pole-crossing images were trimmed to remove the part of the image on the far side of the pole from the sub-solar point. Both the north and south pole mosaics are archived in 40 polar stereographic tiles at 1 m/px.



**North Pole**  
Scan this QR code to view the 1m/px product page



**South Pole**  
Scan this QR code to view the 1m/px product page




### Lunar North Pole Mosaic (LNPM)

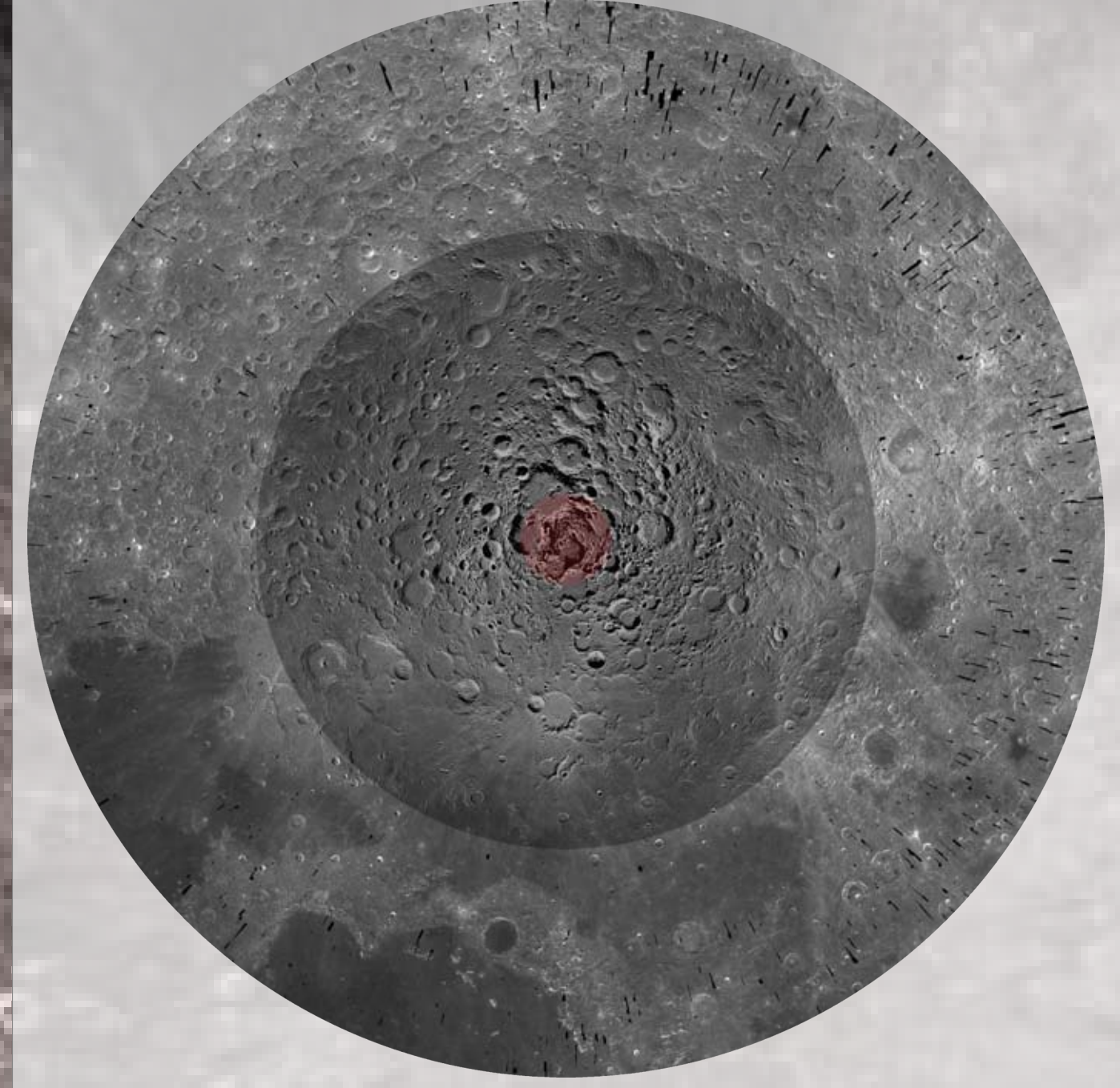
The 90-85.5° polar mosaic is a nice start, but the LROC SOC's image library allows us to go much further. Thanks to LRO's current elliptical orbit, with an apoapsis of ~200km over the north pole, NAC images from adjacent orbits will overlap down to a latitude of ~60°N, while still having a resolution better than 2 m/px. The LROC team has taken advantage of this with a series of "collar" imaging campaigns, which take images at the same latitude every orbit for a month to build up a circumlunar mosaic with uniform lighting. We have combined 17 complete and partial collars, along with the 90-85.5° north polar mosaic described above, to create a 2 m/px mosaic that stretches from the pole to 60°N.

This mosaic contains 10,581 images, mostly with the Sun as high above the horizon as possible for that latitude. The mosaic shows 681 gigapixels of the lunar surface, and if printed out at 300dpi (the quality of most of the figures in this poster), the non-null pixels would more than fill an American football field (~0.68 soccer pitches). The area covered is larger than Alaska and Texas combined. Two versions of the mosaic are published: one with a latitude/longitude grid and all official crater names shown, and one with no annotations. View the whole thing at: <http://lroc.sese.asu.edu/gigapan/>


**Future Expansions:** Below 60°N, NAC images on adjacent orbits no longer overlap, so collar campaigns are not possible. In order to expand the mosaic, we are selecting images from the large existing collection and targeting new observations to fill gores. We intend to produce a mosaic that extends from the north pole to 40°N, with a total of over two *terapixels* of non-null pixels. The gore-filling campaign is estimated to finish sometime in 2015. At the south pole, it is harder to extend the 90-85.5° polar mosaic, as the Extended Mission orbit is very low over the south pole (~30km). It is not possible to take collar image sequences, so any extension will use images acquired from many different time periods. Work is ongoing to select images and target gores for this extended south pole mosaic, with the intent of creating a 1 m/px product that goes out past 80°S, perhaps as far as 70°S.




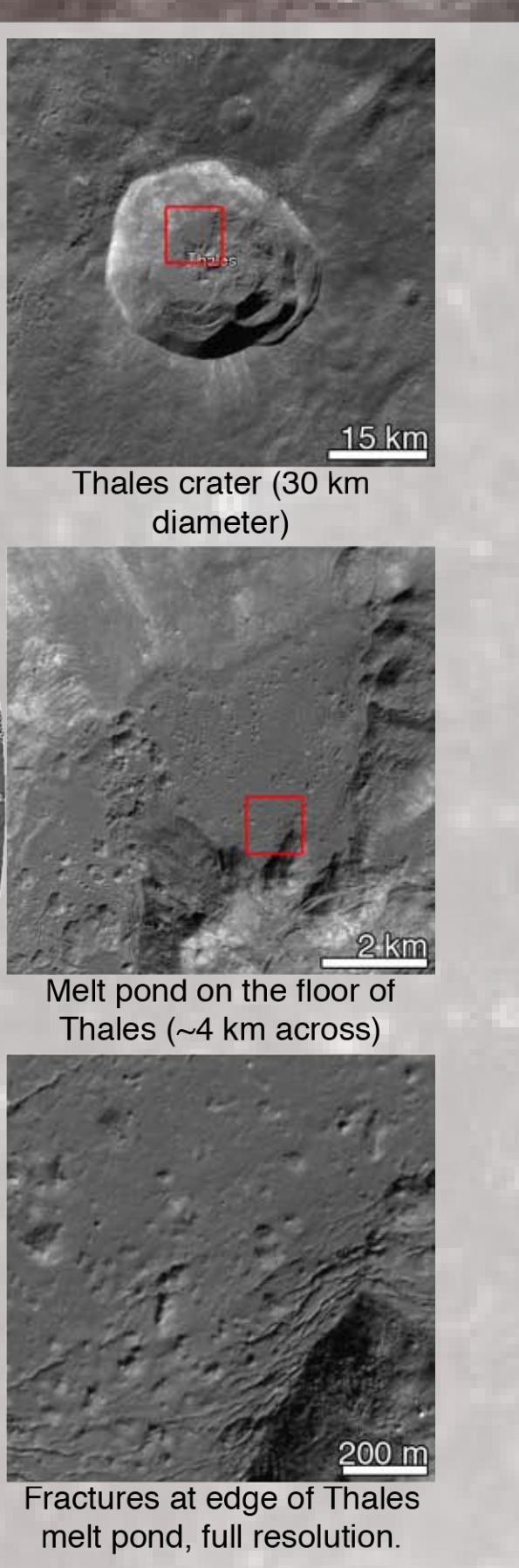
**Above:** The annotated version of the LNPM, zooming in to full resolution.



**Left:** Future expansion of the LNPM to 40°N. Dark area is the current LNPM, red area is the 90-85.5° NAC polar mosaic described above.



Scan this QR code to view the LNPM at full size. Fully functional on smartphones!



Artist's rendition of the LNPM printed at 300dpi, laid out in a football stadium.

### Other LROC products

LROC provides several other RDRs described in other publications:

- NAC Digital Terrain Models (2-5 m/px): Burns 2012: doi: 10.5194/isprsarchives-XXXIX-B4-483-2012
- GLD100 WAC-derived 100 m/px global terrain model: Scholten 2012: doi: 10.1029/2011JE003926
- NAC stereo pair anaglyphs: Mattson 2012: <http://meetingorganizer.copernicus.org/EPSC2012/EPSC2012-486-2.pdf>
- NAC regional mosaics
- WAC polar movies
- Henriksen 2013: 44<sup>th</sup> LPSC #1676
- Empirically normalized 7-band global WAC color mosaic (this poster's background): Boyd 2012: 43<sup>rd</sup> LPSC #2795
- Shapefiles of mare bounds and lobate scarps
- Nelson 2014: 45<sup>th</sup> LPSC #2861