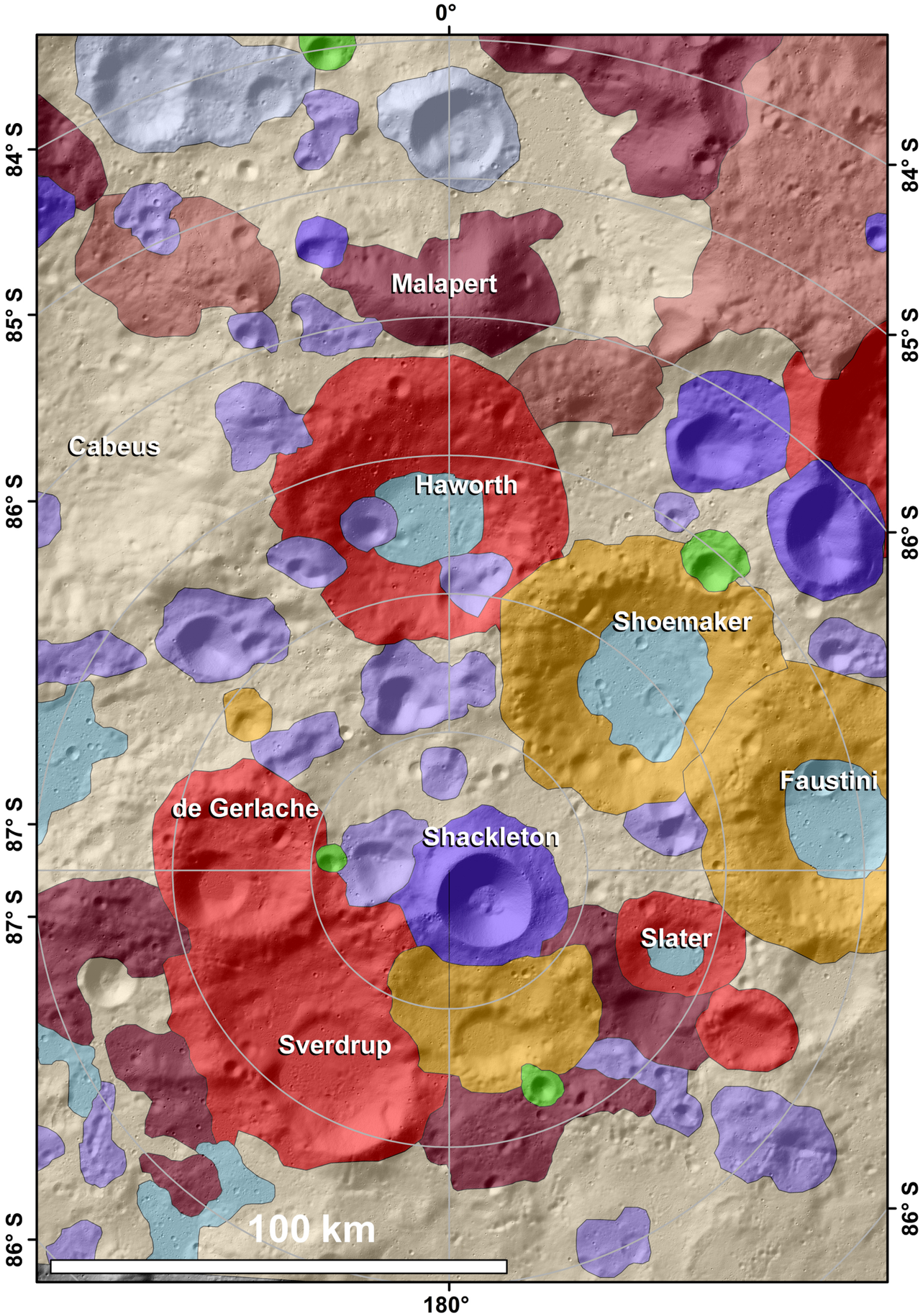

Shaded Relief Geological Map of the South Polar Region of the Moon

This map is based on the geology of Spudis et al. (2008). The map is overlain on data collected by the Lunar Orbiter Laser Altimeter (LOLA) on the Lunar Reconnaissance Orbiter (LRO). The data are the LOLA hillshade with solar azimuth 45°W and solar elevation 45° derived from a LOLA 20-m elevation product (NASA Goddard Space Flight Center; Smith et al., 2010, 2017). The map encompasses the region around the lunar south pole, which lies on the rim of Shackleton crater, and includes Sverdrup, Slater, de Gerlache, Cabeus, Haworth, Shoemaker, and Faustini craters. The map extends north onto the nearside of the Moon beyond Mons Malapert, also known as the Malapert massif. Spudis et al. (2008) mapped Shackleton crater with a 3.6 Ga Imbrian age, although Wilhelms et al. (1979) previously mapped it with an Eratosthenian age (~1.1 to 3.3 Ga), and, more recently, Zuber et al. (2012) and Tye et al. (2015) reported Imbrian ages of ~3.69 Ga, and 3.51(+0.05,-0.08) Ga, respectively, with the understanding that some surfaces within Shackleton have been modified by younger geologic processes. As mapped by Spudis et al. (2008), Shoemaker and Faustini have Nectarian ages, but Tye et al. (2015) report pre-Nectarian ages like that of Haworth. The Shaded Relief Geological Map of the South Polar Region of the Moon is a product of the 2016 Exploration Science Summer Intern Program: E. J. Allender, C. Orgel, N. V. Almeida, J. Cook, J. J. Ende, O. Kamps, S. Mazrouei, T. J. Slezak, A.-J. Soini, and D. A. Kring. LPI Contribution No. 2566.

Geological Units of Spudis et al. (2008)

- Eratosthenian crater materials
- Imbrian crater materials
- Orientale basin secondary crater material
- Imbrium basin secondary crater material
- Imbrian plains materials
- Nectarian crater materials
- pre-Nectarian crater materials
- pre-Nectarian massif
- pre-Nectarian platform massif material
- pre-Nectarian terra material

References

Smith, D. E., et al. (2010) Initial observations from the Lunar Orbiter Laser Altimeter (LOLA). Geophys. Res. Lett. 37, 6p., L18204, doi:10.1029/2010GL043751.

Smith, D. E., et al. (2017) Summary of the results from the Lunar Orbiter Laser Altimeter after seven years in lunar orbit. Icarus 283, 70-91, doi:10.1016/j.icarus.2016.06.006.

Spudis, P. D., B. Bussey, J. Plescia, J.-L. Josset, and S. Beauvivre (2009) Geology of Shackleton Crater and the south pole of the Moon. Geophys. Res. Lett. 35, 5p., L14201,doi:10.1029/2008GL034468.

Tye, A. R., C. I. Fassett, J. W. Head, E. Mazarico, A. T. Basilevsky, G. A. Neumann, D. E. Smith, and M. T. Zuber (2015) The age of lunar south circumpolar craters Haworth, Shoemaker, Faustini, and Shackleton: Implications for regional geology, surface processes, and volatile sequestration. Icarus 255, 70-77, doi:10.1016/j.icarus.2015.03.016.

Wilhelms, D. E., K. A. Howard, and H. G. Wilshire (1979) Geologic Map of the South Side of the Moon, Map I-1162, U.S. Geological Survey.

Zuber, M. T., J. W. Head, D. E. Smith, G. A. Neumann, E. Mazarico, M. H. Torrence, O. Aharonson, A. R. Tye, C. I. Fassett, M. A. Rosenburg, and H. J. Melosh (2012) Nature 486, 378-382, doi:10.1038/nature11216.

Center for Lunar Science and Exploration
Lunar and Planetary Institute
Houston, Texas, USA