GEOLOGICAL MAP OF THE SOUTH POLE OF MOON. S. S. Krasilnikov[1], M. A. Ivanov[1] and J. W. Head[2], [1]Vernadsky Institute of Geochemistry and Analytical Chemistry RAS, 119991 Moscow, Russia (krasilnikovruss@gmail.com), [2]Department of Earth, Environmental & Planetary Sciences, Brown University, Providence, RI, USA.

Introduction: Scientifically, the southern polar region is one of the most intriguing places on the Moon because of 1) the increased concentration of hydrogen in the regolith [1], 2) the possible presence of ground ice [2], and 3) the unquestionable presence of ejecta from the South Pole-Aitken basin (SPA). Several national space agencies such as NASA, Roscosmos, ESA and CNSA consider the southern polar region a primary target for future missions. Therefore, robust scientific support for these missions is needed. A significant component of this support would be a geological map of the region based on new data.

Geological mapping of the southern polar region: Only three geological maps of the southern polar region of the Moon were available until recently: the map for the Southside of the Moon compiled in 1979 at 1:5 000 000 scale [3], the map of the SPA at 1:500 000 scale [4] and the new global map 1:5 000 000 scale [5].

Here we present a new geologic map of the southern polar region that extends from the Pole up to 70°S and compiled at 1:300 000 scale. This map is based on photogeological analysis of the WAC images (100 m/px res.) and LOLA-based DTMs (80-20 m/px res.). The age correlations of the map units are based on ~200 measurements of the crater size-frequency distribution. Two main morphological units have been identified in the area studied (Figs. 1,2): impact-related materials (e.g., basin materials, primary and secondary crater materials) with uneven/hummocky surfaces and smoother, plains-like surfaces (various types of plains and landslides). The basin materials include the SPA remnants, secondary craters from the Orientale basin (Ioc) and the pre-Nectarian basin materials. The crater units are subdivided into the central uplift/peak rim, crater interiors, ejecta materials, and secondary craters. The geometry of the secondary crater flightpaths was analyzed in order to establish their parent craters. The plains units have been subdivided based on their inferred origin (e.g., the Cayley formation, impact melt, volcanic materials) and morphology (rough or smooth).

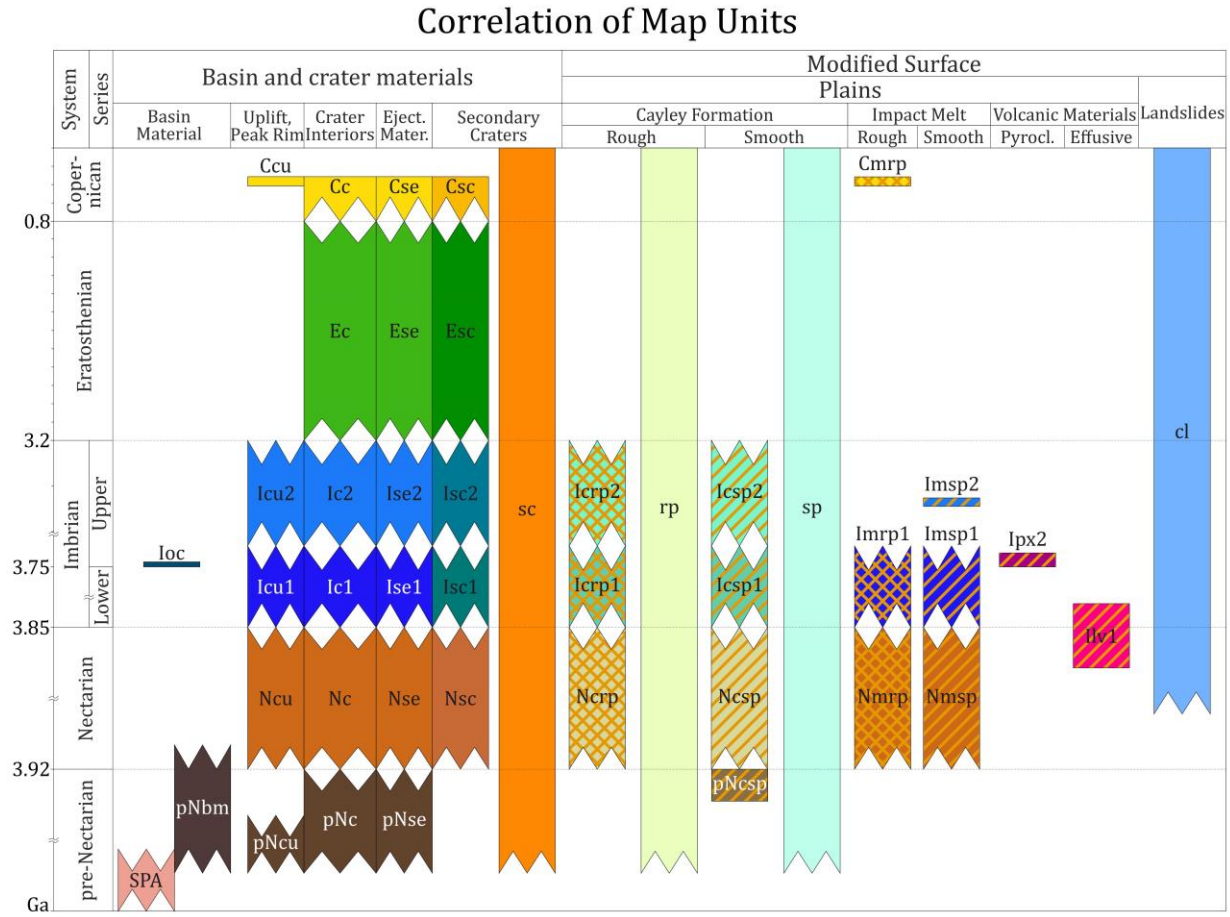

Fig. 1. Legend and correlation of map units.

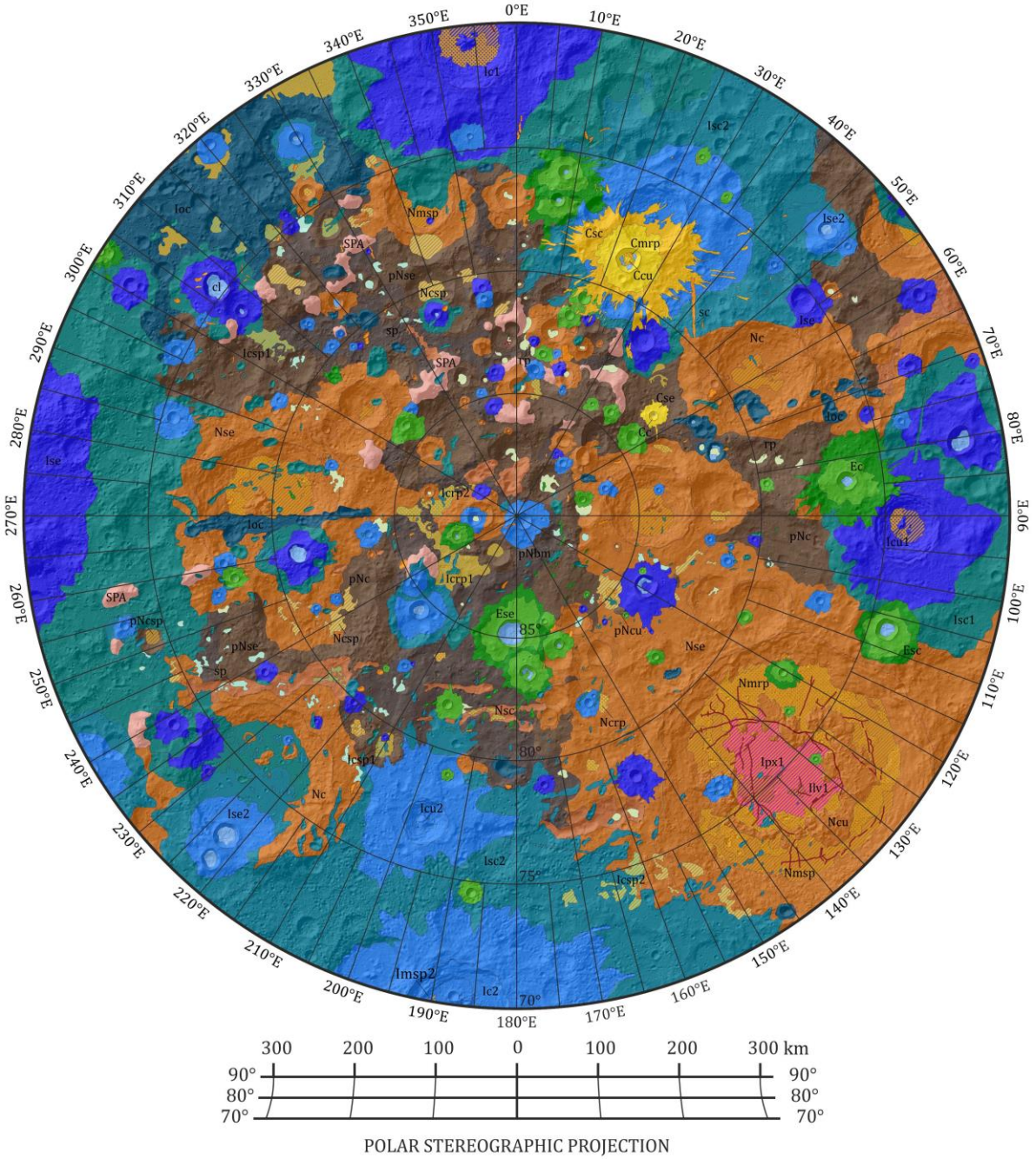

Fig. 2. Geological map of the south polar region (1:300 000 scale)

In the Schrödinger basin, two types of volcanic materials exist (Fig. 2), pyroclastic and effusive materials [6]. Landslides occur mainly in the Copernican-Imbrian craters (20 - 30 km diameter).

Future research: The next step of our research will be to analyze the crater ejecta thicknesses for the southern polar region [7], based on our map stratigraphy and ejecta thickness decay models.

References: [1] Sanin et al. (2017) *Icarus, 283*, 20. [2] Mitrofanov et al. (2012) *JGR, 117*, E00H27. [3] Wilhelms et al. (1979) *USGS Map I-1162*. [4] Poehler et al. (2020) *EPSC 2020, 14*, 19. [5] Fortezzo et al., (2020) *51th LPSC*, 2760. [6] Cramer et al., (2013) Icarus, 223, 131, 2913, [7] Krasilnikov A.S. et al. (2021) *52th LPSC, this issue*.