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BOULDER DISTRIBUTION AND POTENTIAL GEOLOGIC TARGETS AROUND THE LUNAR
SOUTH POLE SITES 001 AND 004**Abstract**

Localization of accessible, and scientifically relevant features (e.g., boulders) is of key importance for future missions set to explore the lunar south pole. The National Research Council (NRC) has emphasized the importance of exploring the lunar south pole in their objectives. Future missions will help to address these objectives, and include the National Aeronautics and Space Administration's (NASA) Artemis program and Volatile Investigation Polar Exploration Rover (VIPER) mission, the European Space Agency's (ESA) Luna program, Indian Space Research Organisation's Lunar Polar Exploration (LUPEX) mission, and the Chinese Space Agency's Chang'e program, along with various commercial missions. Here, we present the findings of potential geologic targets within sites 001 and 004. Features were identified in images (with spatial resolution of 0.5 to 2 m/pixel) collected by the Narrow Angle Camera onboard the Lunar Reconnaissance Orbiter. We assessed the distribution of features in relation to Shackleton crater's formation and evolution. We find a decrease in boulder abundance as the distance from the rim of Shackleton crater increases. We propose that most of the boulders and rock exposures near Shackleton were deposited as ejecta from the Shackleton impact and from later impacts into the Shackleton ejecta deposit. Finally, we evaluated the slopes within regions 001 and 004 to determine the accessibility of mapped features. The results suggest that boulders and rock exposures are clustered on shallower slopes, particularly along the Shackleton crater rim and the Shackleton-Henson ridge. From this, we suggest that such features could be sampled by future missions to this region. Future work should

investigate the spectral properties of these features, and a more detailed evaluation of the regional and local accessibility. We make our catalog of mapped features available to the community.