the sample collection [*Haskin et al.*, 1998]. In general, it is highly desirable to have further measurement of pre-Imbrian basins on the Moon to allow firmer translation of the relative frequencies that we derive (e.g., Table 1).

[54] What sample return sites would be best to visit to get additional calibration of the absolute timescale for the lunar surface? Although more samples are undoubtedly better, one candidate of interest for future sampling is the Freundlich-Sharonov basin. It is one of the oldest basins with a well-preserved topographic signature and only moderate resurfacing, and it does not appear to have been cratered to saturation equilibrium. It also has crater statistics that are quite similar to Nectaris, so it would potentially provide a 'second check' on ages derived on the lunar nearside. Along with clarifying the ages of nearside basins, future lunar exploration should seek to expand the sample collection to the lunar farside and deep into the impact basin record. Samples from within South Pole-Aitken that could address its absolute age, as well as potentially provide dates for other basins that superpose it, would also provide new calibration of the early lunar cratering record [see also *Norman*, 2009; *Joliff et al.*, 2010].

4. Summary

[55] We derive impact crater size-frequency distributions for 30 certain or probable D > 300 km lunar impact basins, which provide insight into the sequence, timing, and history of the Moon. Major findings are as follows:

[56] 1. The sequence for lunar basins compiled by *Wilhelms* [1987] remains supported by newly measured crater statistics (Table 1). However, this agreement is qualitative, not quantitative, and we measure systematically higher crater densities than found by Wilhelms (e.g., Figure 3).

[57] 2. The superposed population of impact craters on ancient lunar surfaces (i.e., the lunar highlands, Pre-Nectarian-aged basins) and later terrains (mare, Imbrian-aged and Nectarian-aged basins) are different (Figures 4–6). The shift in the dominant impactor population between these two eras took place by the mid-Nectarian, before the end of the period of rapid cratering.

[58] 3. Many Pre-Nectarian basins, including SPA, have crater densities consistent with saturation equilibrium. In this condition, crater densities become decoupled from the basin's relative and absolute age. In the case of SPA, stratigraphy suggests that it is the oldest observed basin, and it has a higher density of large craters than the broader highlands, but for craters in the ~20 km-64 km diameter range, it has a lower density than a variety of other basins. This is likely to be due to a combination of more abundant early volcanic resurfacing within SPA than previously suspected, and an unusually large number of superposed impact basins.

[59] 4. Crater statistics and observational stratigraphy using the new LOLA data suggest that Humboldtianum may be younger than Crisium, and that Serenitatis may be older than Nectaris (Figures 7 and 8). If this interpretation of the relative stratigraphy of Serenitatis is correct [see also *Spudis et al.*, 2011], then assigned absolute ages for these nearside basins need to be re-evaluated. Additional sample return of lunar basins would be very valuable to provide additional calibration of the absolute ages of lunar basins and test our current understanding of its impact history.

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