SEARCHING FOR NECTARIS BASIN IMPACT MELT ROCKS. B. A. Cohen, NASA Marshall Space Flight Center, Huntsville AL 35812 (barbara.a.cohen@nasa.gov).

Introduction: The formation of the Nectaris basin is a key event defining the stratigraphy of the Moon. Its absolute age, therefore, is a linchpin for lunar bombardment history. Fernandes et al. [1] gave a thorough account of different samples thought to originate in Nectaris, with the upshot being there is little agreement on what samples represent Nectaris, if any. We are revisiting the effort to identify Nectaris basin impact-melt rocks at the Apollo 16 site, to model their emplacement, and to use these parameters to examine other sites where Nectaris impact melt is more abundant and/or more recognizable for further study.

Nectaris melt in Apollo 16 soil? The formation of the Imbrium basin was undoubtedly the last major modification to the surface, forming the Cayley plains and possibly also the Descartes formation [2]. However, as the largest, it would also have the greatest depth of mixing, dredging up and mixing with material deposited by all previous impacts. We are using an updated regolith ejecta and melt model [3-5] to better constrain the amount of impact-melted material in the ejecta from successive basins contributing to the Apollo 16 regolith. Our preliminary results show a significant amount of Nectaris melt should also be present. However, since each ejecta emplacement event mixes and dilutes previous material, we are also trying to understand mixing and dilution with each successive ejecta blanket. Gechemically, the anorthositic Group 4 samples (low KREEP) [6] are a logical candidate for Nectaris origin. These impact-melt breccias have a variety of textures including some described as “fragment laden,” which may have old ages due to incomplete outgassing.

Nectaris melt in situ? Although the Nectaris basin itself has experienced both basaltic infill and impact erosion, its original morphology is still recognizable. Small plains near inner basin ring massifs and inter-massif “draped” deposits were identified as remnants of the Nectaris basin impact melt sheet [7]. We are revisiting these interesting exposures with other remote-sensing datasets. Comparisons of the composition of this unit with other known sample sites help constrain the Nectaris melt characteristic even further. It is hoped that through these combined approaches, we will be able to better recognize Nectaris impact melt and target it for detailed geochronology.