Abstract

The Mare Orientale impact basin is a multi-ring impact structure located in the Southern equatorial region of Earth's Moon and covers 2.48 million square kilometers of the lunar surface. The rocks in the area are composed of basaltic lava flows and basement rock displaced by impact events that range in age from 4.5 to 1 Ga. In order to interpret the geology of the area, multiple datasets were compiled in ArcMap and ArcGIS Pro. The topography of the region was constructed by the combination of two high resolution lunar digital elevation model from the NASA Goddard Space Flight Center. Analyses of the Unified Geologic Map of the Moon from the United States Geological Survey Astrogeology Science Center provided data used to determine lithology and ages of the geologic formations in the area. These data allowed for a more informed cartography based on age relationships and morphology. The union of the topography and Unified Geologic Map of the Moon were used to construct hypothesized geologic cross sections of the multi ringed impact basin. The asymmetric ejecta blanket boundaries provided the key to understanding the subsurface structure of the basin, as well as the hypothesized trajectory of the meteorite that created the Mare Orientale impact basin.