



Evidence for explosive volcanism in Arabia Terra, Mars

Joseph Michalski (1) and Jacob Bleacher (2)

(1) Natural History Museum, London, United Kingdom (michalski@psi.edu), (2) NASA Goddard Spaceflight Center

Several irregularly shaped craters located within Arabia Terra, Mars, represent a new type of volcanic construct and together constitute a previously unrecognized Martian igneous province. Similar to terrestrial supervolcanoes, these low-relief paterae exhibit a range of geomorphic features related to structural collapse, effusive volcanism and explosive eruptions. They were likely active in the Late Noachian or Early Hesperian and would have affected the climate, atmospheric composition, and regional surface geology at that time. Lavas extruded from these calderas contributed to the formation of enigmatic highland ridged plains in Arabia Terra, but these volcanoes do not exhibit shield-like topographic profiles related to the sustained, localized effusive eruption of basaltic lava. We suggest that the lack of a single edifice, the large volume of collapse within an associated with the calderas, and the association of the calderas with vast deposits friable clastic deposits all indicate that these volcanoes were dominated by explosive activity. Layered, friable deposits found throughout Arabia Terra have enigmatic origins, though these materials have been suggested to represent volcanic ash. Attempts to link the locations of various friable deposits in equatorial regions to known volcanic sources have demonstrated that this hypothesis is plausible, but a link between friable deposits and known volcanic sources in this particular region (Arabia Terra) has yet to emerge. We suggest that some of the layered, friable materials were sourced from calderas in Arabia Terra. Outgassed sulphur and water from these calderas would have contributed to the alteration of layered clastic materials in Arabia Terra, and perhaps throughout the equatorial region.