

1:1M-SCALE GEOLOGIC MAPPING INVESTIGATIONS OF ALBA MONS, MARS. David A. Crown¹, Daniel C. Berman¹, Stephen P. Scheidt¹, and Ernst Hauber³, ¹Planetary Science Institute, 1700 E. Ft. Lowell Rd., Suite 106, Tucson, Arizona 85719 (crown@psi.edu); ²Institute of Planetary Research, German Aerospace Center, Berlin, Germany.

Introduction: Two 1:1M-scale geologic maps of Alba Mons are being produced in order to document the volcanic evolution and geologic history of the northernmost volcano in the Tharsis region. We are using mapping of the summit region (32.5-47.5°N, 245-255°E) and western flank (37.5-47.5°N, 230-245°E) to characterize geologic processes and derive age constraints from cross-cutting relationships and crater size-frequency distributions. Mapping uses GIS software and analysis tools with THEMIS, CTX, and HiRISE images and MOLA and HRSC topography.

Geologic Mapping Results: Research to-date has produced detailed digital map layers that show the distribution of and interactions between geologic features [20-27] (Figure 1). Systematic mapping of volcanic, tectonic, erosional, and impact features throughout the western flank map area has been

completed. Preliminary mapping of volcanic, fluvial, and impact features has been completed for the summit and mapping of tectonic features is in progress. MOLA datasets (DEMs, slope maps, and derived curvature statistics) have been integrated into mapping to enhance topographic aspects of geologic features whose primary characteristics may be obscured by surface degradation or discontinuously defined.

References: [1] Crown DA et al. (2017) LPSC XLVIII, Abstract #2301. [2] Crown DA et al. (2017) 3rd Planet. Data Workshop, Abstract #7034. [3] Scheidt SP et al. (2018) LPSC XLIX, Abstract #1570. [4] Karimova R et al. (2017) EPSC 2017, Abstract #EPSC2017-207. [5] Crown DA et al. (2018) LPSC XLIX, Abstract #1638. [6] Crown DA et al. (2018) LPI Contrib. 2066, Abstract #7005. [7] Crown DA et al. (2019) LPSC L, Abstract #1417. [8] Scheidt SP et al. (2019) LPSC L, Abstract #2014.

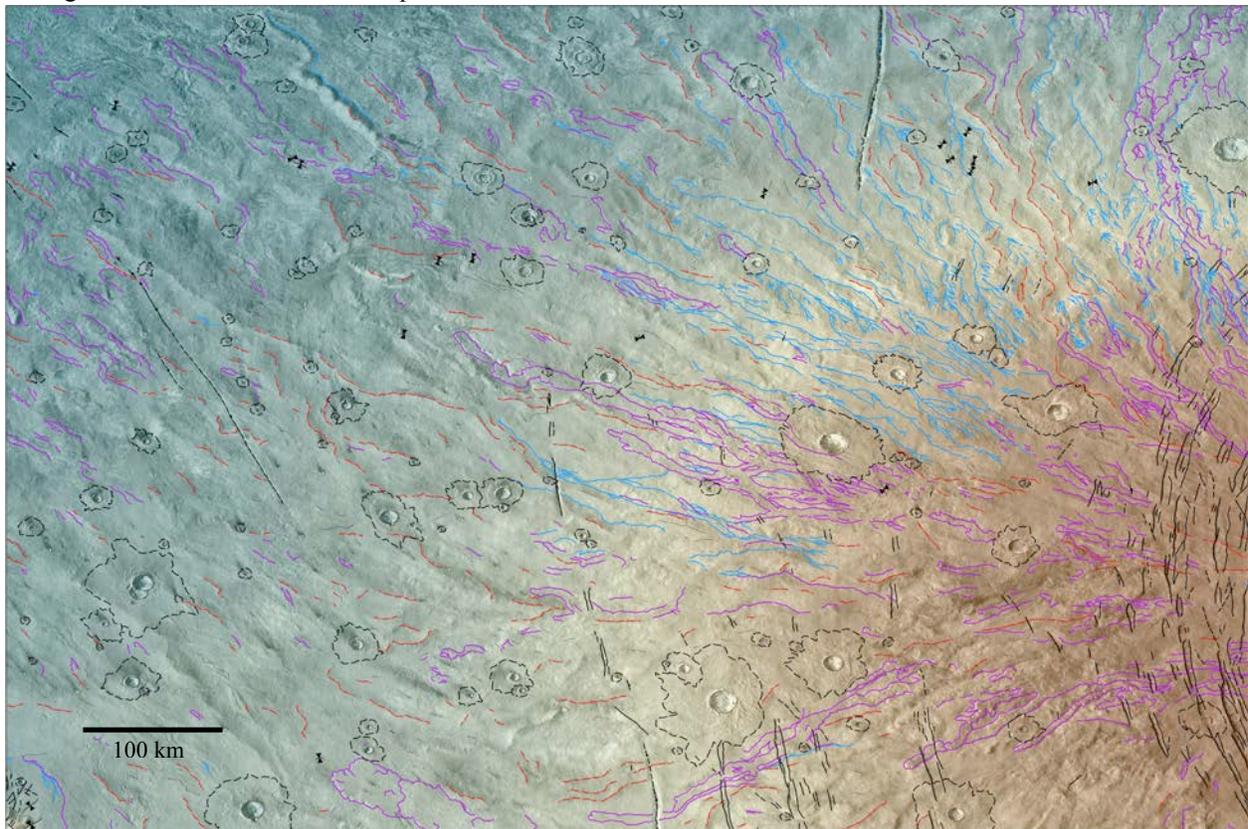


Figure 1. Maps of geologic features on the western flank (above) and in the summit region (next page) of Alba Mons shown over THEMIS IR daytime mosaic (100 m/pixel) merged with MOLA color topography (463 m/pixel) in Simple Cylindrical projection. Elevation range is -1969 - 6796 m. Blue = fluvial valleys, purple = lava flow margins, red = lava tubes (denoted by circular to elongate depressions), and black = various structural features. Impact crater materials outlined by dashed lines.

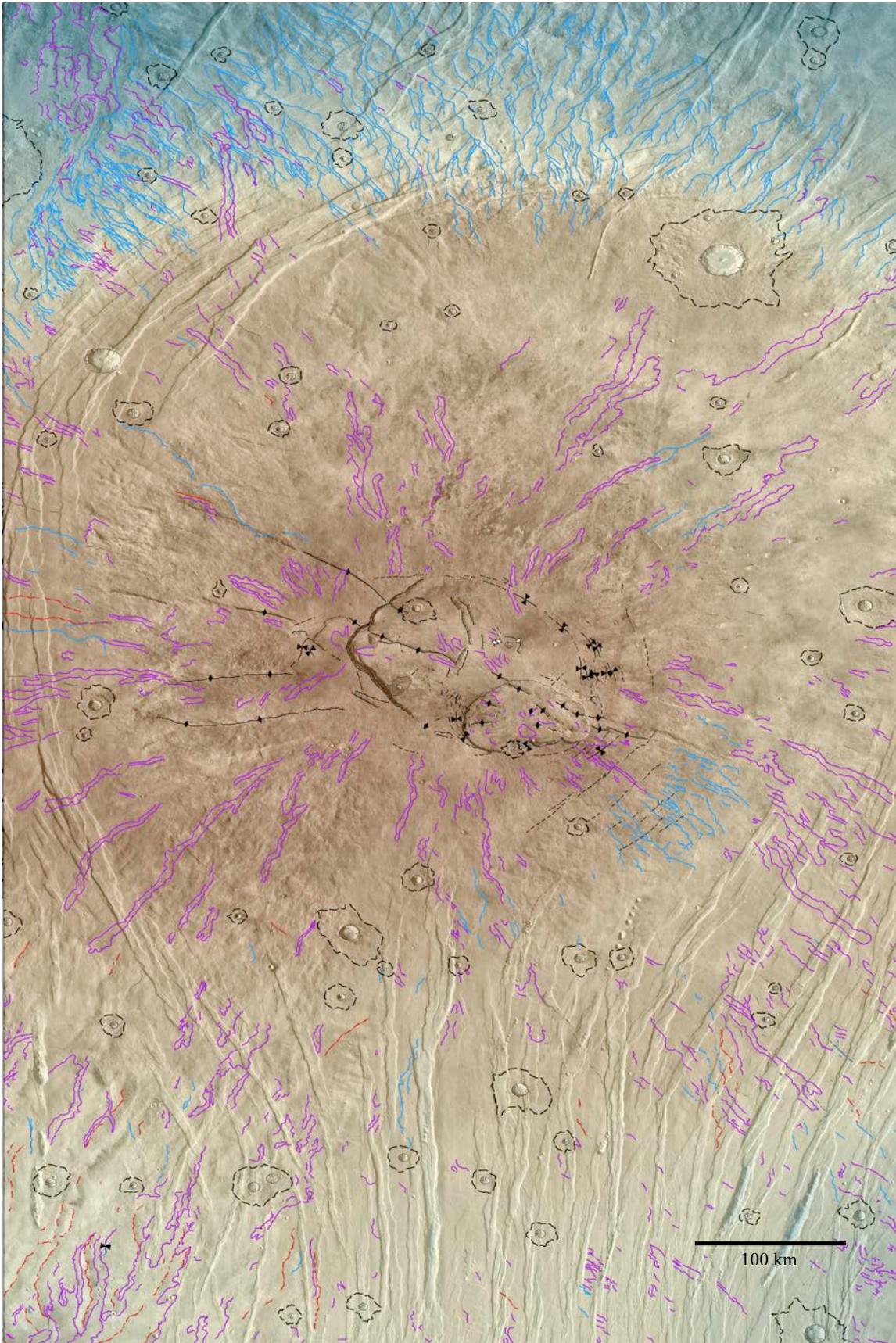


Figure 1 continued: Alba Mons summit region