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MARS RECONNAISSANCE ORBITER (MRO) CONTEXT CAMERA (CTX) OBSERVATIONS REGARDING VOLCANIC LANDFORMS ON MARS.

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The MRO CTX acquires panchromatic images of Mars at ~6 m/pixel. The majority of images cover areas 30 km wide by 43 to 313 km long. CTX has imaged > 43% of Mars; 3% of Mars is covered by CTX stereopairs. CTX has been used to document a broad range of volcanic landforms. Several key observations regarding Mars volcanism have emerged from the CTX investigation: (1) Erosion-resistant surfaces, such as lava flows, retain small (sub-kilometer diameter) impact craters better/longer than surfaces less resistant to erosion (e.g., sedimentary rocks); this relation is useful for identifying previously unrecognized lava surfaces. (2) Lava flows occur in the Sinus Meridiani region within 130–170 km of the Opportunity rover landing site; these flows are stratigraphically lower than the eolian sandstones investigated by the rover team but overlie still older, light-toned sedimentary rocks; other such flows occur to the north in similar stratigraphic positions in the intercrater terrain of western Arabia Terra. (3) Nearly complete 6 m/pixel coverage of the Valles Marineris rift system shows little evidence for volcanism (in the form of lava flows and/or vents/edifices) in the eastern and central chasms; however, volcanism did occur at the west end in the Labyrinthus Noctis, including within some of the depressions. (4) With CTX and with the Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) that preceded it, an effort was made to find evidence for active or very recent volcanism; none was found, but the darkest and least-cratered lava flows on Mars occur in the Aeolis/south Elysium Planitia region near 5°N, 221°W; some or all of these flows may have been buried and exhumed. (5) CTX has documented nearly all small (< 1–5 km across) shield volcanoes in various settings on Mars, including Syria, Tempe/Mareotis, Tharsis, and eastern Elysium Planitia. (6) CTX has also been used to test hypotheses regarding features interpreted to be volcanic edifices in papers written on the basis of Mariner 9 and Viking orbiter observations; in most cases, the landforms in question are either not volcanoes or some combination of deposition and erosion has obscured features that would facilitate an unambiguous interpretation. CTX data are released to the NASA Planetary Data System every 3 months and provide a rich data set regarding volcanic features on Mars.

Key Words: Mars, volcanism, Meridiani Planum, Valles Marineris, MRO