

Geological Society of America Annual Meeting
Geological Society of America Abstracts with Programs, 23, p. 157, 1991.

EMPLACEMENT AND MODIFICATION OF THE THARSIS MONTES SHIELD VOLCANOES ON MARS: VARIATIONS ON A THEME

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The three broad shield volcanoes comprising the Tharsis Montes on Mars have many similarities, but in detail each volcano gives a unique picture of shield volcanism on Mars. All three volcanoes have gentle flank slopes ($< 5^\circ$) marked by shallow terraces, embayments in northeastern and southwestern lower flanks which were the source of volcanic plains, degraded western flanks, summit caldera(s), and enigmatic lobate deposits northwest of each volcano. The three volcanoes display differing degrees of circumferential graben development in the summit regions, complexity of preserved caldera collapse events, secondary constructional volcanism in the summit regions, and the extent of basal erosion along the lower western flank. The similarities and differences between the volcanoes, coupled with stratigraphic information from superposition relationships, indicates a generalized sequence of evolution for the three martian shield volcanoes. The modification evident on the shield flanks indicates that the prolonged history of these volcanoes extends well beyond the emplacement of the calderas at their summits.