

LINEAMENT ANALYSIS AND TECTONIC INTERPRETATION FOR THE CENTRAL THARSIS REGION, MARS; Robert C. Anderson, Old Dominion University, Norfolk, VA 23508

Lineament data obtained for the Central Tharsis Region of Mars (30°N to 30°S latitude; 45°W to 157.5°W longitude) was subjected to five analytical studies: 1) length-weight frequencies; 2) fracture intersection frequencies; 3) atypical fracture frequencies; 4) density distribution of dominant trends; and 5) radial reconstruction.

Length-weight frequency and fracture intersection frequency data constructed and contoured suggest the existence of seven lineament concentration zones (LCZ). It is believed that each lineament concentration zone was governed by one or more of the tectonic events that effected the Tharsis Dome.

Atypical fracture frequencies and density distribution projections indicate three trends dominate the Central Tharsis region: 1) North-South (355°); 2) East-West (275°); and 3) a minor North-West (310°) trend. Results indicates two major events controlled the overall formation of the Tharsis Dome: 1) a pre-Tharsis fracture system consisting of North-West (310°) trending fractures; and a 2) Tharsian fracture system containing North-South (355°) and East-West (275°) trending fractures. The North-West (310°) trending fractures represent a crustal weakness zone which controlled the early formation of the Dome.

Radial projections of lineaments along the three trends suggest four centers of uplift: 1) 8°N , 125°W ; 2) 1°N , 115°W ; 3) 4°S , 107°W ; and 4) 6°S , 103°W . Each of these centers is associated with a radial fracture pattern in the Tharsis region of Mars.

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