SURFACE TEXTURES AND FEATURES INDICATIVE OF ENDOGENOUS GROWTH AT THE MCCARTYS FLOW FIELD, NM, AS AN ANALOG TO MARTIAN VOLCANIC PLAINS

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Basaltic lavas typically form channels or tubes, which are recognized on the Earth and Mars. Although largely unrecognized in the planetary community, terrestrial inflated sheet flows also display morphologies that share many commonalities with lava plains on Mars. The McCartys lava flow field is among the youngest (~3000 yrs) basaltic flows in the continental United States. The southwest sections of the flow displays smooth, flat-topped plateaus with irregularly shaped pits and hummocky inter-plateau units that form a polygonal surface. Plateaus are typically elongate in map view, up to 20 m high and display lineations within the glassy crust. Lineated surfaces occasionally display small < 1m diameter lava coils. Lineations are generally straight and parallel each other, sometimes for over 100 meters. The boundaries between plateaus and depressions are also lineated and tilted to angles sometimes approaching vertical. Plateau-parallel cracks, sometimes containing squeeze-ups, mark the boundary between tilted crust and plateau. Some plateau depressions display level floors with hummocky surfaces, while some are bowl shaped with floors covered in broken lava slabs. The lower walls of pits sometimes display lateral, sagged lava wedges. Infrequently, pit floors display the upper portion of a tumulus from an older flow. In some places the surface crust has been disrupted forming a slabby texture. Slabs are typically on the scale of a meter or less across and no less than 7-10 cm thick. The slabs preserve the lineated textures of the undisturbed plateau crust. It appears that this style of terrain represents the emplacement of an extensive sheet that experiences inflation episodes within preferred regions where lateral spreading of the sheet is inhibited, thereby forming plateaus. Rough surfaces represent inflation-related disruption of pahoehoe lava and not a'a lava. Depressions are often the result of non-inflation and can be clearly identified by lateral squeeze-outs along the pit walls that form when the rising crust exposes the still liquid core of the sheet. The plains of Tharsis and Elysium, Mars, display many analogous features.