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SYSTEMATIC GEOLOGIC MAPPING OF VENUS: EQUATORIAL HIGHLANDS OF WESTERN APHRODITE REGIO

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Systematic 1:5m scale geologic mapping of (he. Western Aphrodite region of Venus using radar images acquired by the Magellan mission is revealing a complex history of tectonism and volcanism. initial mapping records surface characteristics providing input for geophysical inferences from the topography and gravity. "I-hc formation of tessera (highly deformed crustal rocks) is the earliest mapped event. Following tessera deformation, the tectonic style. changed from pervasive deformation to vertical movement and fracture belt formation. Vast volcanic plains were emplaced. Plains materials interpreted to be flood basalt lap onto the equatorial highlands of Western Aphrodite Regio. Geologic sections across the Ovda region reveal that the contacts between highlands and plains tilted up toward the highlands following plains emplacement. Although complex structural models (plate convergence, for example) for the plains-highland margin can be considered, the simplest model has plains emplaced as nearly level geoidal surfaces. Subsequently the highlands of Ovda rose. relative to the plains. Later, systems of closely spaced fractures formed in belts that cut all the materials of plains and highlands. Except for scattered remnants of highly deformed crust that stand like islands in the. volcanic plains, little is preserved in the tessera of the earliest mappable epoch, which ended 300-500 my ago (based on global impact crater abundance). As on Earth, most of the decipherable geologic history of Venus is contained in the rocks formed within the last 300-500 my. That relatively quiet period on Venus is marked by sporadic volcanism forming shields and local flow fields. Systematic global geologic mapping will provide a basis for tying together the stratigraphic development of diverse regions and allow correlation of the events,