
Some mixture of crustal processes is necessary to adequately explain the spatial distribution of volcanic activity on Venus. The model simulates the production of volcanoes on Venus by using the observed mass distributions of Earth- and Venus-crossing asteroids and comets [4]. Crater rim heights are calculated from a power law fit to observed depth/diameter ratios. The growth of a variety of volcanic features is simulated in the model. The areal extent of shield fields, large volcanos, and lava flows is determined in the simulations by sampling the appropriate distributions for the feature type from Magellan data. Since a greater number of modified craters is found in the Alpha-Beta-Themis region, the spatial distribution of volcanic activity is skewed in the model to represent regions of greater or lesser volcanism. Lava flows are modeled by an energy minimization technique to simulate the effects of local topography on the shape and extent of flows. Some mixture of the three endmember models described may be necessary to adequately explain the observed paucity and distribution of partially embayed impact craters. The model is run under a wide range of assumptions regarding the scale and time evolution of volcanism on Venus. Regions of the parameter space that result in impact crater distributions and modifications that are currently observed will be explored to place limits on the possible volcanic resurfacing history of Venus.

On Earth, landslides on volcanic edifices can be triggered by a number of different processes, including those occurring as a result of aseismic crustal deformation, such as oversteepening of slopes due to deformation (possibly resulting from dyke emplacement of magma rise), overloading of the slope (by lavas), excess weight at the top of the slope (due to a large cone or a large area of summit lava), removal of support by explosions on the flanks, and caldera collapse. Failure occurring coseismically can result from structural alteration of the constituent parts of the slope leading to failure, dislodgement of otherwise stable slopes, and fault movement resulting in an increased slope angle [4]. Seismic pumping may also be a major control on slope stability during an earthquake [5].

On Venus, similar processes may operate. The high ambient temperatures may result in development of a weak carapace, which in turn may allow relatively rapid dome growth to occur. If the effusion rates are high, as suggested by the size of the features, then oversteepening would be a likely consequence resulting in failure and collapse. Landslide scars may be modified by continued dome growth. The existence of fractures around the base of some of the collapsed domes and of debris aprons cut by fractures suggests that there has been seismic activity and surface deformation occurring during the period of modification of the dome.


MIXED-VALENCE IRON MINERALS ON VENUS: Fe²⁺-Fe³⁺ OXIDES AND OXY-SILICATES FORMED BY SURFACE-ATMOSPHERE INTERACTIONS. Roger G. Burns and D'Arcy W. Straub, Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge MA 02139, USA.

Background: The oxidation state and mineralogy of iron on the hot surface of Venus are poorly understood [1-3], despite qualitative in situ measurements of oxygen fugacity during the Venera 13/14 missions [4], some reflectance spectral data derived from the