IS VENUS VOLCANICALLY ACTIVE TODAY? P. Mouginis-Mark, Hawaii Institute Geophysics and Planetology, SOEST, University of Hawaii, 1680 East-West Road, Honolulu, HI, 96822 (pmm@hawaii.edu).

Introduction: Over the past 30 years, several studies have hinted that Venus is volcanically active today, but none have been definitative. Episodic injection of sulfur dioxide into the atmosphere [1], high radar emissivity at elevations >2.5 km above the 6,051 km planetary radius [2], thermal emissivity measurements of the surface [3], and enhanced microwave thermal emission [4] have all been proposed as indicators of recent volcanic activity. This abstract calls for a new orbiting imaging radar system to search for present day eruptions.

Science Goals: Trying to resolve if volcanoes are currently active on Venus meets several of VEXAG's "Goals, Objectives and Investigations" key objectives:

Goals I.C.1 and I.C.2: Pertain to the abundance of volcanic SO_2 and aerosols in the atmosphere;

Goal II.A.1: Assesses the evolution in volcanic styles;

Goal II.A.4: Seeks to determine contemporary rates of volcanic activity;

Goal III.B.2: If new volcanic materials exist, it would allow the rock-weathering process to be set to zero, enabling subsequent rate changes to be quantified.

Types of Eruptions: Numerous styles of volcanic activity have been predicted for Venus [5], and most landforms produced by these new eruptions could be detected by an orbital imaging radar mission. New lava flows, collapse craters, the products of explosive (e.g., Plinian or Vulcanian) eruptions, and intrusions could all be identified. Critical would be the comparison with existing Magellan image data base, allowing the detection of new eruptions over the last ~25 years.

Targets: Two different types of study areas should be imaged to search for volcanic eruptions. Maat Mons (Fig. 1) provides an excellent example of a target area centered on a volcano summit. Ideally, the size of each area to be imaged should be ~200 km by ~200 km and centered on the summit caldera. Volcanoes to search for new eruptions should include:

Gula Mons 358°E, 22°N	Maat Mons 194°E, 1°N
Sacajawea Patera 336°E, 65°N	Sapas Mons 186°E, 8°N
Sif Mons 352°E, 22°N	Tuulikki Mons 275°E, 10°N

Targeting lava flow fields offers a second opportunity to detect a new eruptions. While numerous areas on Venus could be investigated for new flow fields, two of the most appropriate would be:

Mylitta Fluctus, 350° – 360°E, 50° – 60°S
Tuli Mons, 312° – 318°E, 12° – 17°N

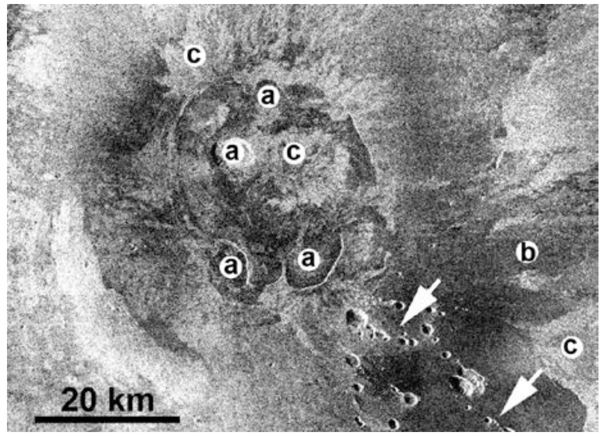

Fig. 1: The summit of Maat Mons displays multiple collapse craters ("a"), lines of pit craters that indicate rift zones (arrows), and both radar-dark ("b") and radar-bright ("c") lava flows, and would be a prime site to search for recent activity.

Data Needed: The new radar mission would need a spatial resolution at least comparable to Magellan (i.e., ~75 m/pixel). However, were a new feature to be detected, a higher spatial resolution (~10 m/pixel) would be important for the identification and accurate measurement of the width of lava channels and levees, the morphologic analysis of the vent(s), the planimetric shape of ash deposits, and the geometry of the floor of any new pit crater; these features all directly relate to the VEXAG Goals outlined above. Repeat-pass radar interferometry is a complementary technique for the analysis of intrusions and associated ground deformation [6, 7]. In addition, coherence mapping via radar interferometry [8] has enabled the spatial extent of new lava flows to be determined. New radar-derived topographic data (obtained either by radar stereogrammetry [9] or by interferometry) would provide fundamentally new information on the eruptions [5], particularly if elevations could be measured to a few meters in order to determine volumes and slopes.

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