PARENT BODY VENUS: A PRIMER FOR METEORITE RESEARCHERS.

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Introduction: Key goals in the study of achondrites are the identification of the geological processes that produced them and ultimately their geological context, including their parent body. In spite of only limited success (for the Moon, Mars and Vesta), reaching these goals has provided paradigm-shifting insight into the solar system. A key bridge between meteorites and potential parent bodies is abundant *in situ* data of the latter to provide a ground truth link. Here we describe the most recent ideas concerning Venus surface materials based on lander and orbital data, models of crustal evolution and laboratory experiments.

Spacecraft data: Ample geomorphological evidence from orbital imagery (primarily radar) demonstrate that Venus' surface is primarily volcanic and probably includes some igneous lithologies evolved beyond simple basalts [1, 2]. Ground truth from lander data (imagery and elemental abundances) is scarce but similarly suggest basalts; some of the elemental data hints at an "evolved" high-K signature evoking a rift-like setting [2, 3, 4]. the near-absence of craters infers ongoing volcanic resurfacing and that surface rocks are probably young (<0.5 Ga). Thermal anomalies associated with volcanic flows and shields may be consistent with ongoing activity [1, 5].

Crustal evolution: Venus' thick CO_2 atmosphere produces severe greenhouse warming and hellish surface conditions (490°C, 92 bar); simultaneously the presence of H_2O and SO_2 promotes reactions between Venus' atmosphere and crust. These have been implicated in many aspects of the planet's surface and climate history, from maintaining current atmospheric levels of CO_2 and SO_2 to the deposition of a radar-reflective surface material at altitude [6, 7]. There is general agreement that surface rocks experience severe chemical weathering (and re-equilibration) but debate continues as to which reactions and products are most likely and most important.

Experiments: A major goal of Venus simulation experiments has been to explore the expected secondary mineralization of surface rocks. Reactions involving Ca-carbonate or Ca-sulfate are the most commonly studied, but typically under constraints that differ from the messy conditions prevalent on Venus' surface, where the atmosphere is a supercritical fluid and trace components (such as H_2O) may dramatically change the behavior of a system through catalysis or electrochemical potential [6, 8]. To help clarify the relative importance of different reactions and improve existing models of Venus' surface composition, we are conducting a series of "naturalistic" experiments using GEER (the Glenn Extreme Environment Rig). These experiments expose representative volcanic phases (minerals, glasses and rocks) to highly realistic surface conditions, both chemical and physical.

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