BASALT – A Science-Based Mars Con-Ops Astronaut Field Simulation

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BASALT (Biologic Analog Science Associated with Lava Terrains) was a NASA PSTAR funded field research program. The goal was to understand the habitability of terrestrial volcanic terrains as analog environments for early and present-day Mars.

A key objective was to merge the oftimes disparate field techniques and protocols of biologists, geologists and geochemists. Worked together on this project to understand microbial lifeforms, like bacteria, that grow on these rocks and the factors that allow them to thrive.

Deployments of 21 days at each of its three analog research sites performing field studies of the science operations and technology it had developed. The first field work was conducted at the Craters of the Moon National Monument, Idaho. In Hawai`i, operations were conducted twice at Hawai`i Volcanoes National Park (Mauna Ulu, Kilauea Iki and Keanakakoi). The science targeted active and relict magmatic fumaroles to examine the relationship between meteoric (a condition sampled for in 2016) and magmatic influences on basalt alteration and associated microbial diversity.

These were conducted under simulated Mars mission constraints (5/20 minute light-travel time delay and low/high communication bandwidth conditions) to evaluate strategically selected concepts of operations (ConOps) and capabilities with respect to their anticipated value for the joint human and robotic exploration of Mars.