Mineralogical Properties of a Soil on the Puu Nene Cinder Cone in Hawaii: An Analog for Weathering on Mars? (S09-ming171652-Oral)

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Abstract:

Spectral properties of soil horizons on slopes of Mauna Kea Volcano in Hawaii are similar to the spectral properties measured by earth-based telescopes for Martian 'soils'. However, little information has been reported on the mineralogy of these Martian analog 'soils'. The primary objective of this study was to examine the mineralogical properties of an Andisol that has developed on the Puu Nene cinder cone, which lies on the 'saddle' between Mauna Kea and Mauna Loa Volcanoes. Samples were separated into sand, silt, and clay fractions by sedimentation and centrifugation. Mineralogical properties were characterized by XRD, SEM and TEM. The A and B horizons of sand and silt fractions were dominated by glass fragments, plagioclase feldspar, and minor olivine; whereas, hematite, amorphous glass, and allophane dominated the mineralogy of the clay fractions. The C horizons consisted primarily of unaltered tephra. Basaltic materials on Mars may have altered to allophane and hematite; although, allophane may not be stable under the current arid environmental conditions at the surface of Mars.

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