

Mars for Earthlings

LESSON 16: Weathering & Patterned Ground***In-Class Activity 2***

Weathering & Soils_MFE

Soils on Mars?

Purpose: Identify Earth soil horizons and extrapolate what characteristics of soil would be observable on Mars.

Is it a soil?

Study Figure 1 below (or the image provided by your instructor).

1. Does this picture represent a complete soil profile? If not, what horizons are present?

2. What criterion are you using to define a soil?



Figure 1: A Russian Chernozem (Mollisols in most cases) and the landscape NW of Kursk, in the Kursk Oblast, Russia.

Source: <http://web.utk.edu/~ammonst/research.html>



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What makes a soil?

1. Brainstorm at least 4 factors that would create a soil.
 - a. Factor 1:
 - b. Factor 2:
 - c. Factor 3:
 - d. Factor 4:
2. Which factor is the most influential?
3. After discussing the 5 soil forming factors with your instructor, determine which factors exist and/or have the greatest influence on Mars. List and describe below.

Identifying Soil Horizons

In Figure 2, draw lines and/or labels at horizon boundaries. Are any horizons absent?

- Horizon- thick organic-rich layer
- A Horizon- relatively thin organic layer with rooting
- E Horizon- leached layer (not always present)
- B Horizon- mineral layer
- C Horizon- parent material



Figure 2: Image Credit: NRCS Soils

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4. What characteristics of this profile might you observe on Mars? Can you observe it remotely? What do you think gives the yellow layer its color?

Mawrth Vallis

Observe Figure 3 of Mars at Mawrth Vallis, one of the landing site considerations of MSL Curiosity (captured via JMARS):

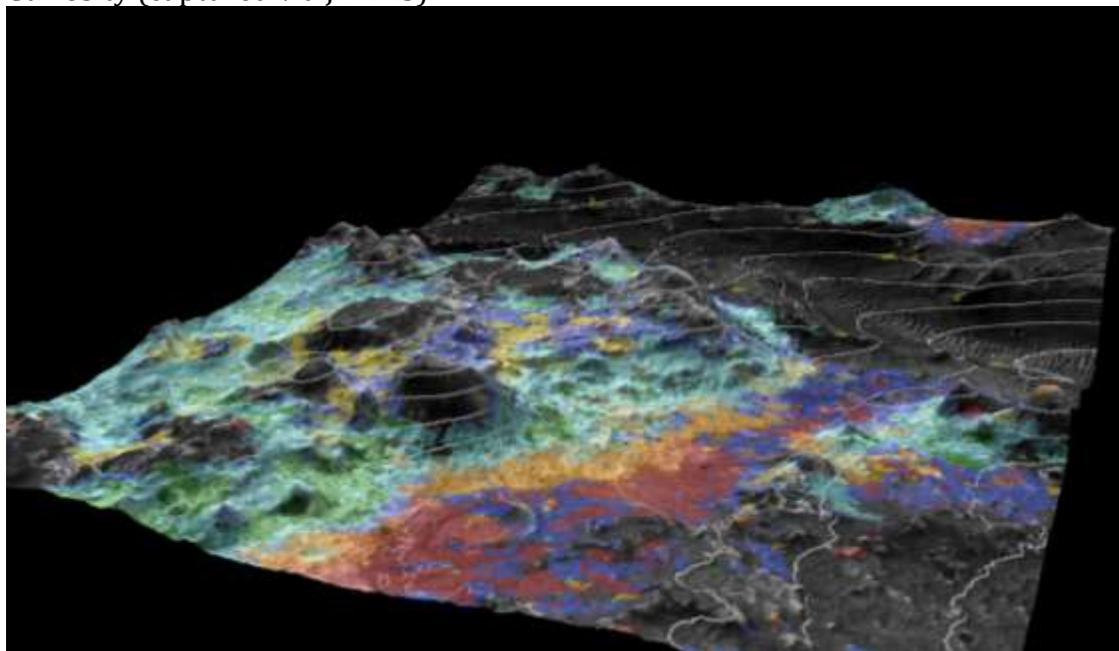


Figure 3: Mawrth Vallis CRISM image overlain on HiRISE imagery. Image Courtesy of Briony Horgan, ASU.

5. What do you observe in this image?
6. Do changes in color follow any other discernable pattern?
7. How would you recognize soils on Mars? What would be your criteria?