Mars for Earthlings

LESSON 5: Why Matter & Minerals Matter

Homework 1

Matter and Minerals_MFE

Identifying the Clay: Endeavor Crater

Objective: To further utilize the tools offered within the software JMARS and investigate mineralogies observed at Endeavor Crater.

Introduction: In order to accomplish this lab you will need to register and download JMARS. By this point, you should be familiar with JMARS software and how to navigate to regions of interest on Mars.

1. Using the Nomenclature Layer, navigate to Endeavor Crater (approx. 354.7705°E, -2.2480°N).
    a. For best viewing results, Zoom to 1024 and center your main screen on the western rim of Endeavor Crater
    b. If you still have your nomenclature layer turned on, you will see the labeled "Endeavor" to the right of the rim we are exploring

2. Choosing HiRISE stamps to explore Endeavor Crater with the highest resolution possible.
    a. Using the stamps layer choose either HiRISE DTMS or HiRISE full stamps. Make sure you zoom in close so that when you search for HiRISE stamps hundreds do not try to load. Use the "main view" to limit the search of HiRISE stamps. Choose stamps rendered by ASU.
    b. Compare and contrast the HiRISE DTM images and the HiRISE Full stamps images. Which do you prefer and why?

    c. Consult the webpage: http://hirise.lpl.arizona.edu/dtm/about.php . After consulting the webpage, which set of imagery would you rather use, DTM or Full stamps? Did your choice change? Why or why not?

    d. Decide which HiRISE imagery you will choose to display and explore the western crater rim.

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3. Exploring the mineralogy of Endeavor Crater using CRISM
    a. Add the CRISM stamps layer and use a different outline color to differentiate CRISM and HiRISE stamps. To display CRISM stamps, use the "Main View" to set the bounds of the image search.
    b. Provide a rough estimate of the number of CRISM stamps: _____
    Do they outnumber the HiRISE DTM stamps or full stamps? Why do you think this is (think of current/past mission objectives)?

    c. Start exploring some of the CRISM stamps intersecting the HiRISE DTM stamps. Choose any stamp and the ASU-rendered images. When using ASU images, use the *color overlay*. ASU provides you with a number of options. List at least three below (i.e. Ferric Mineralogy):

    d. Find a CRISM stamp that is rendered for phyllosilicates. Where are the phyllosilicates located in the crater (the rim, the rim wall, or the bottom of the crater)? What does this tell you? *Note: the warmer the color the higher content of the respective mineral.

    e. Compare the sulfate CRISM overlays. Are sulfates found in the same region as the phyllosilicates? Why or why not?

    f. Select another crater on Mars that has CRISM stamps available. Compare and contrast the phyllosilicates abundance between the two craters below. Please name the crater and its coordinates for verification.