Planetary Surface Analysis

Geologic History on Venus

1) Using the table on the following page, arrange the labeled features (A-D) in the radar image below from youngest to oldest. To do this, think about both the radar image properties (why surfaces look bright or dark) and also cross-cutting and stratigraphy relationships. Note that “A” refers to the fracture lines that streak across the image. “B” refers to the gray regions, “C” refers to the bright white regions, and “D” refers to the dark regions.
<table>
<thead>
<tr>
<th>Age</th>
<th>Feature</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Youngest</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Oldest</td>
<td></td>
</tr>
</tbody>
</table>

2) What kind of geologic process(es) are identifiable in this radar image (i.e., volcanism, tectonism, cratering, etc.)? How do you know?
Surface Features on Mars

For these questions, you will explore the data and images available at the following website:

http://www.google.com/mars/

After the page finishes loading, you see a colorful image of Mars’s topography, similar to the screen snapshot below (without the numbers). Depending on the size of your computer screen, you may need to use the zoom in/out buttons on the left side of the website to view Mars in its entirety. Note that you can also slide the topography image around on your screen by simply clicking and dragging your mouse over the image.

Next click on the link at the top of the webpage named “Stories”. A new column on the left side of the website should appear now providing a list of surface features on Mars
and related articles. Clicking on any of these links will produce a pop-up balloon with more information about the feature and a link to an associated article about the feature.

**DO NOT COPY DIRECTLY FROM WEBSITES**

*Martian Outflow Channels*

Click on the link named “Outflow Channel in Kasei Valles”. Then click on the link to the article in the pop-up balloon. Read the article and answer the questions below.

1. Which spacecraft landed closest to the location of this outflow channel?

2. The instrument that acquired the images provided in the article is named THEMIS (Thermal Emission Imaging System). On which spacecraft was/is THEMIS operating?

3. What do the colors in the THEMIS-produced images represent?

4. How do scientists think the outflow channel in Kasei Valles was formed? What substance is thought to be responsible for this?

5. According to the article, which direction did water flow through the channel?

6. When did the crater at the top of the image form? Before or after the channel was carved? Why?
Martian Lava Channels

Return to the main page, click on “Stories” again, and then click on the link named “Lava Channels on Ascraeus Mons”. Then click on the link to the article in the pop-up balloon. Read the article and answer the questions below:

1. What is the suspected source of the channels seen in this image?

2. On what large-scale volcanic region (on Mars) are these channels located?

3. What type of surface materials (ie., rocks, dust, etc.) do the different colors of the image represent?

   Blue:

   Yellow:

   Reddish-orange: