Teaching Notes for Mapping Mars lab

Materials required for this lab:

- 12 images of Chryse Planitia (laminated)
- 12 images of Apollinaris region (laminated)
- 48 transparencies (2 per student)
- transparency pens
- geologic history of Earth
- geomorphic map of Earth
- global image of Mars
- sample geologic maps of Mars (3)

For this lab the most important concept is deriving a geologic history from a geologic or geomorphic map. The introduction lecture to this lab should include an example geologic history for the Earth (provided). Let the answers to the questions posed in the written lab introduction be your guide to nudging the students through understanding what a geologic/geomorphic map is and how we make one.

What will be done in this lab is a *very simple* geomorphic map. A geologic map includes the relative time where each of the different features fit on a global timeline for the planetary body. Geologic maps have units that denote these specific time periods. A geomorphic map just looks at the different features' appearance and characteristics. It compares the relative timing of the features only in relation to the small section that is being viewed - not globally.

Show in the lab introduction what a real geologic map looks like and what kind of information can be derived from it. Show the difference between a true geologic map and a geomorphic map of Earth. Be sure to show a global map of Mars to show where the regions the students will be mapping are located.

The craters used for the students' map depict different degrees of erosion or degradation. Type 1's have no erosional features at all and therefore have fully intact, sharp rims. Type 2's have been degraded somewhat and therefore have rims with mostly circular, mostly sharp rims. Type 3's are the craters that look the most eroded or degraded - possibly completely wiped out by channels, other impacts, or aeolian processes.

When the students are done with their maps help them get started on how to go about deriving a history for the regions. Use the law of superposition to tell younger craters from older craters (younger craters are on top of older craters like paint splotches on a canvas. If a blue splotch is under a red splotch the blue splotch came first and is therefore older). Use the channels to tell where there might have been water present and if that occurred before or after the impacts.

The geologic history should be a written explanation (a plain english description) of what happened, in what order, and how it affected the surrounding region. The students will need to do this for both of the given regions of Mars. Be sure to give them guidance through the process but let them determine their own geologic history of the regions. Go over any questions they have before they move onto the wrap-up questions.

