

Mars, Venus, and Earth

- 10-28-2005

Opening Discussion

- Have you seen anything interesting in the news?
- The most significant aspect in planetary geology is size. Size determines heat and has a big impact on the atmosphere.
- I won't likely teach this class again for at least 3 years.
- Grader is apparently grading equally hard on intro physics homeworks.
- Unnamed minute essay.
- Why are extraterrestrial encounters called that?

Mars

- The next terrestrial planet up in size is Mars. Mars is roughly $1/10^{\text{th}}$ the mass of the Earth.

Features on Mars

- Mars has many similarities to Earth when viewed through a telescope. Most of these disappear when you get closer to the planet.
- The southern hemisphere of Mars is mostly covered in craters.
- The northern hemisphere was resurfaced by volcanism and has a number of very large volcanoes on it. Because of its small size, Mars is no longer very active if it is active at all.
- Valles Marineris is the most prominent tectonic feature on Mars. As we discussed yesterday though, there is evidence of more general plate

Erosion on Mars

- Mars has a thin carbon dioxide atmosphere and we have seen images of dust devils in it. The wind is constantly changing the look of the surface and contributing to minor erosion.
- There are also many features on Mars that indicate that there had at one time been significant water on the planet. It is possible Mars was warm and wet during the first 1.5 billion years of its life. About 3 billion years ago it dried up.
- <http://marsprogram.jpl.nasa.gov/mgs/msss/came>

Water?

- A major question is that of whether there is currently water on Mars. The atmosphere is too thin to support liquid water today. That doesn't mean there is no water, it just isn't liquid.
- There are many features that indicate the sudden release of large underground repositories of water more recent than 3 billion years ago.
- MGS has also returned images that indicate that there is underground water on Mars today. Mars Odyssey has shown other evidence of underground water.

Discussion Question

- What do you think happened to Mars to cause it to lose its water? Why didn't that happen to the Earth?
- What are your thoughts about the possibility of there being life on Mars?

Venus

- Geologically, we expect that Venus should be very similar to Earth given the similarities in size and distance from the Sun.
- Venus has very few craters and is covered mostly by plains. It has mountains, but not as many ranges as on the Earth. The largest features are the three “Terra”.

Specifics of Venus

- Crater counting indicates that the entire surface of Venus is about 1 billion years old.
- Venus has many lava flows and volcanic mountains.
- Venus has large fractured regions indicating significant tectonic activity. It does not appear that Venus has plate tectonics like the Earth does. A lack of water could explain this.
- Venus shows virtually no signs of erosion. There is certainly no water at the surface and the slow rotation means there is little wind either

Earth

- The Earth is different from the other terrestrial planets in that what we see is shaped mostly by erosion. Tectonics form mountains and there are occasional impacts, but features of both of these are eroded over time.

Minute Essay

- We will talk more about the possibility of life on Mars later in the semester. What are your personal thoughts and why do you believe them?
- Remember to go out and look at Mars tonight. If you have binoculars or a telescope handy, use those.