

29:52 Exploration of the Solar System
Class Notes for April 28, 2008
Solar System Satellites: Jupiter

Today we will discuss satellites of the solar system. We begin with Jupiter. The best-known satellites of Jupiter are the four *Galilean Satellites*. These are (in order of increasing distance from Jupiter) Io, Europa, Ganymede, and Callisto.

They all are distinct and look different. The fundamental physical processes at work in making these moons the way they are is the effect of tides from Jupiter, or more technically, *tidal stresses*. Appendix 7 gives the data on the satellites of Jupiter. Look at it. Let's look at these satellites in turn, starting with the furthest from Jupiter.

Callisto

Callisto is the most distant of the Galilean satellites. It has a heavily cratered surface, with a high crater density over the entire moon. This indicates that there has been relatively little surface activity during the history of the solar system.

Ganymede

Ganymede is the largest moon in the solar system, and has about twice the mass of the Earth's moon. The surface shows a combination of cratered areas and other areas where the crater density is much lower. Something has clearly been happening on the surface of Ganymede since the formation of the solar system. Look at the pictures of Ganymede in the textbook. There are grooves in the oldest terrain that have been interpreted as tectonic stresses (like continental drift here on Earth).

The greater variety in the terrain of Ganymede is due to the fact that it is closer to Jupiter, and the tidal stresses are stronger.

Ganymede has its own magnetic field, which indicates that it has an electrically-conducting core.

Europa

Europa is the moon of Jupiter that has attracted the most interest. This is because the surface is covered with a crust of water ice. More is discussed in the next lecture.

Be sure and read the sections in the textbook dealing with the different Galilean satellites.