

## Galilean Moons

by Jean Tate on November 15, 2009

The Galilean moons are the four largest moons of Jupiter, discovered by Galileo Galilei in January, 1610: Io, Europa, Ganymede, and Callisto. They are named after the lovers of Zeus, the king of gods in Greek mythology (Zeus is Jupiter's equivalent; Jupiter is from Roman mythology). Simon Marius named them in 1614 (he claimed to have seen them first, and Galileo had chosen different names, after his patron's family, the Medicis). It is entirely possible that at least the two outer ones – Ganymede and Callisto – were observed thousands of years before Galileo; they are certainly bright enough to be easily visible with the unaided eye (but for Jupiter's glare), and can be seen under the right conditions (e.g. dark, clear sky; blocking the light of Jupiter by the branch of a tree, or similar). There is at least one claim that an ancient Chinese astronomer recorded at least one of them.

Galileo's observations of the Galilean moons, through his small telescope, were one of the key things which convinced him that Copernicus' heliocentric model of the solar system was correct (though he was very circumspect about declaring this; for example, in *Starry Messenger*, where he announced his discovery, he made no mention of how these observations seem to contradict the Ptolemaic, Earth-centered, view).

Ganymede, with a diameter of 5260 km, is the solar system's largest moon, and is also larger than the planet Mercury (though not as massive), and Callisto the third largest (diameter 4820 km; Saturn's Titan comes second); Io comes next (3630 km), and Europa sixth (3125 km; our own Moon comes fifth). All have very tenuous atmospheres, the primary constituents of which are sulfur dioxide (Io), carbon dioxide (Callisto), and oxygen (in various forms, Ganymede, Europa).

Each of the Galilean moons is a remarkable world in its own right ... Io with its towering volcanoes and flux tube; Europa its smooth surface and deep ocean a mere hundred km or so beneath; Ganymede its magnetosphere, subsurface ocean and (possibly) liquid iron core; and Callisto its intensely cratered surface and giant impact basin (Valhalla, 3000 km wide). Perhaps the most exciting is Europa, whose ocean may harbor life.

NASA's Galileo mission, launched in 1989, had detailed studies of the Galilean moons as one of its primary objectives; most of what we know about these moons comes from the observations Galileo (the spaceprobe, not the Italian!) made. Perhaps the most dramatic discovery, though, was made Linda Morabito, who saw the plume of one of Io's active volcanoes above its rim, in an image sent back by Voyager 1 (in 1979).

Universe Today has many stories on the Galilean moons; for example [Jupiter's Fiery Moon Io Could One Day Break Free, Go Dormant, Gas Giants Gobbled Up Most of Their Moons](#), [Europa Capable of Supporting Life, Scientist Says](#), [Next Big Planetary Mission: To Jupiter and Its Moons](#), and [Melt Through the Ice to Find Life](#).