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Oceanography

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Io and Tides

Io, the innermost of the four Galilean moons of the planet Jupiter, is the fourth largest and most dense moon. Io also has the least amount of water of all discovered astronomical figures in the Solar System. The moon was discovered in 1610 and was named after the mythological priestess Io. The first reported observation of Io was made by Galileo Galilei on the seventh of January in 1610. At the University of Padua, he used a 20x-power, refracting telescope; however, in this observation, Galilei could not visually segregate Io and Europa because of the weak power of the telescope he was utilizing, so the two moons were recorded as a only one body. The very next day, Io and Europa were seen for the first time as different figures, again by Galilei.

On Earth, ocean tides exist due to the moon’s gravity which pulls a little harder on the side of Earth closest to the moon, and slightly less hard on the side facing away from the moon; however, on Io, Jupiter’s gravity and the gravity of Jupiter’s other moons pull Io in several different ways. Despite there being no ocean on Io, it has tides on its solidified ground, like an elevator on the moon. Io's impressively and particularly elliptical orbit also heightens the tidal activity. Amazingly, these solid ground tides have the ability to rise even more than five times as high as the very tallest ocean tides on Earth.

Because of all of this pulling and bending that occurs on the surface of Io, heat builds up inside of the moon, melting and boiling material inside of Io. Because of this, many volcanoes form on Io, some of these volcanoes shooting their hot gas plume three-hundred kilometers, or two-hundred miles, into the atmosphere. Io is the most volcanically active world in the solar system. Today, Io has approximately four-hundred active volcanoes scattered across its surface.