Volcanic Moons



Obi-Wan Kenobi and Darth Vader fight on the volcanic moon of Mustafar.

Star Wars, Episode III, "Revenge of the Sith"

Jupiter's family portrait



Io Europa Ganymede Callisto

Io in action



Io - Jupiter's Volcanic Moon

Nowhere else in the Solar System do volcanic processes so dominate everything we see as on Io



100 times more volcanic than Earth!!

Ground temperature: 110K

Bright areas: Fresh sulfur frost

Yellow-Brown areas: older sulfur compounds

Tides



The side closer to the Moon experiences a greater pull than the side further out.

The effective result is a *differential* force we call **Tidal Force**.

Orbital Clockwork



Swinging Io







Periodic tug of Europa makes Io's orbit slightly elliptic (e ~ 0.004)

Tidal Heating



Difference in tidal bulge from closest to farthest from Jupiter: 100 m (~300 ft)

MASSIVE FRICTION!!!

Tidal heating keeps Io's interior molten



Thin silicate crust

Molten silicate interior

Iron rich core

Active plumes



Summarizing



Moons of Jupiter

Activity: What is the orbital period of each moon?

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Images captured from http://www.shallowsky.com/jupiter/

