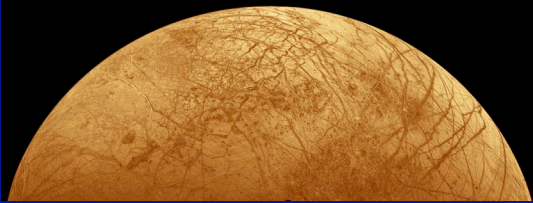


## Exploring Europa



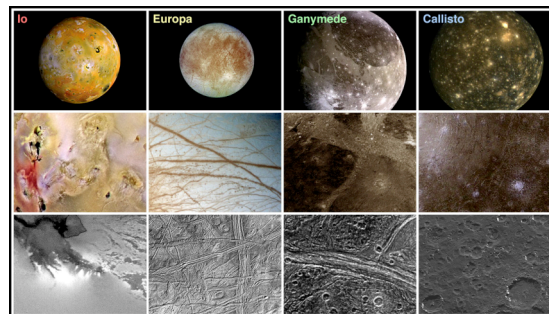
What is under its ice-covered plains?

## What you would have seen in a small telescope about 5AM this morning

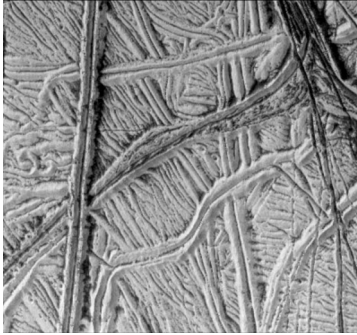


Last time we saw that Europa is slightly smaller and less massive than our Moon. It is of interest because the entire moon is encased in ice. There are cracks and other features that hint at liquid water at some point below the surface,

## The Galilean satellites of Jupiter (cont)



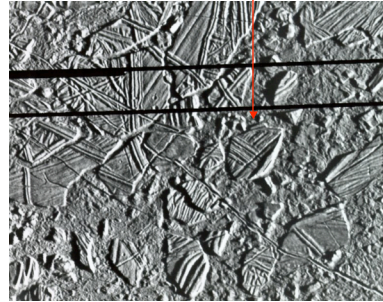
### Views of the cracks from Galileo



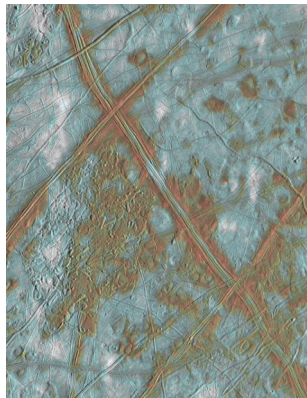
Picture about 100 miles on a side

### A related phenomenon. The ice rafts of Europa

Similar features seen in arctic ocean and are due to flows of ocean underneath

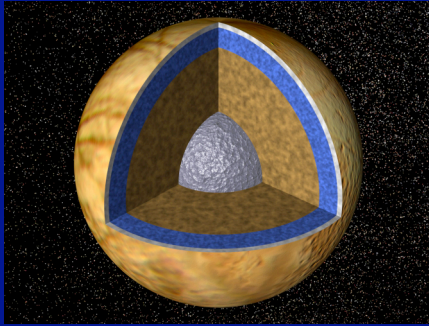


Evidence for flows from beneath the surface of Europa



There is evidence (circumstantial) for liquid water under the surface, but how far down is it? What is below the water?

Speculations on interior structure of Europa



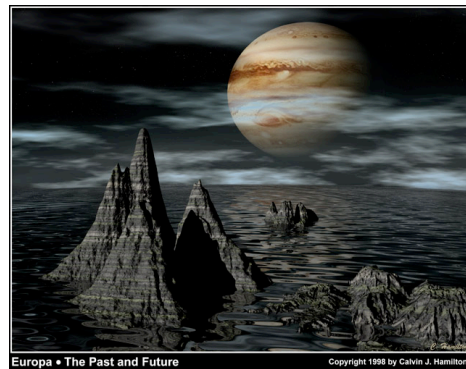
A future Europa Lander could tell us much about the possible subsurface ocean of Europa



Speculations on Europa of 4.5 Gyr ago



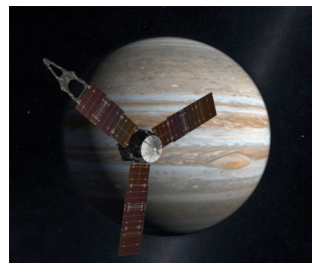
Another vision of a once-and-future Europa



### A summary of what we know about Europa

- Slightly smaller in mass and diameter than the Moon
- Surface covered with water ice casing
- Evidence for surface “activity” from cracks and grooves, and ice rafts
- Small numbers of craters implies surface has reformed in last 10 million years
- Estimates that liquid layer, “sealed ocean” is between 10 - 50 kilometers below the surface, with possible rocky sea floor

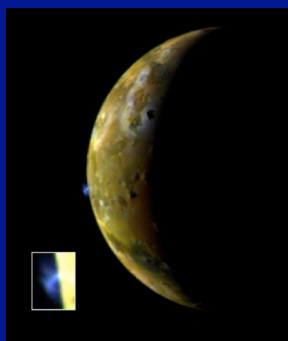
### The next step in exploration of Jupiter: the Juno spacecraft mission



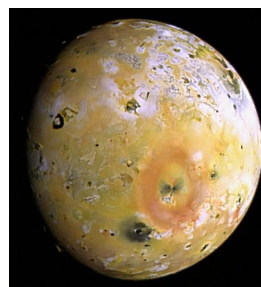
Launch: August 2011, arrival at Jupiter: July 2016

### Io ... world of rapid changes

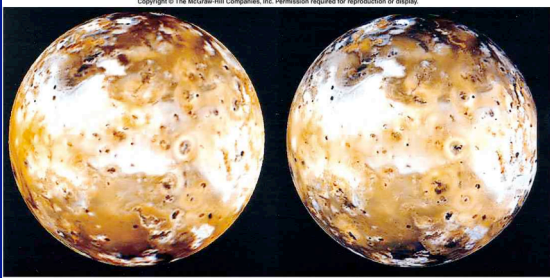
Distance from  
Jupiter = 422  
thousand  
kilometers,  
diameter = 3640  
km



### Io



### Changes on Io: 1979-1999



The lesson from study of the Galilean satellites: the primary geophysical process is tidal flexing or squeezing due to the strong tides of Jupiter. The tides aren't strong enough to disrupt these satellites, but they do control their geology