Problem Set 9

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1 Final Project Abstract and Figures

Recent scientific efforts have observed ejection of ice plumes from geysers in the south polar region of Enceladus, a moon of Saturn. The likelihood of the existence of cryovolcanoes inside Enceladus along with planetary modeling along with other lines evidence suggests the presence of a liquid water ocean beneath the Enceladus. How likely is it for such an ocean to actually exist and can Enceladus live up to its name as the prime candidate for possibly hosting extraterrestrial life?

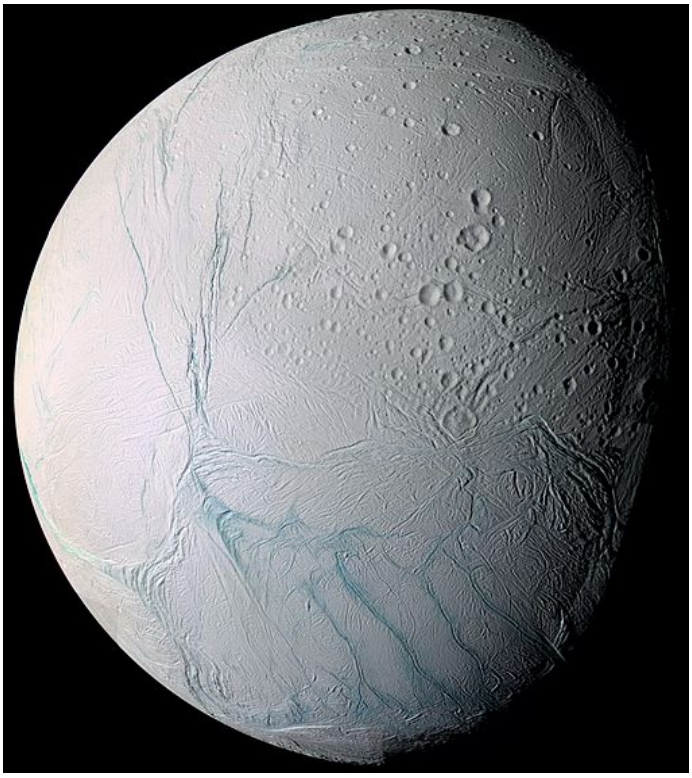

Figure 1: The infamous ridges of Enceladus shown here were first discovered by the Cassini-Huygens probe in 2005. The false-color lines denote the locations of the geysers from which ice was shown being spewn out and where ice and simple organic carbon compounds have been detected. Source: Wikipedia

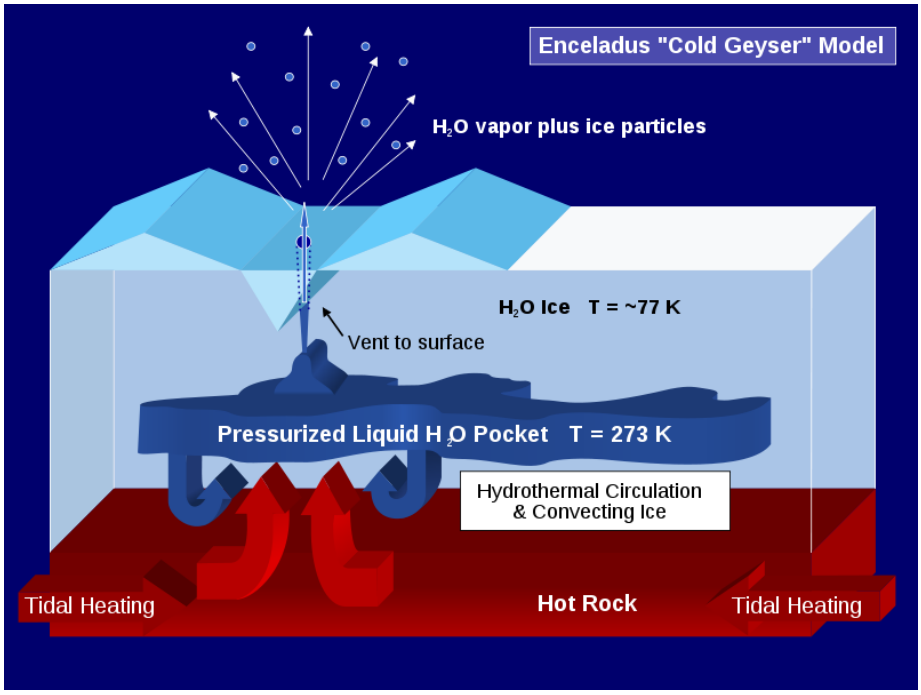

Figure 2: This diagram aims to explain the mechanism behind possible cryovolcanism and subsurface ocean. Tidal heating in the mantle, which can give rise to a geologically active subsurface world, likely exists due to Enceladus' position relative to Saturn and other moons of Saturn. The resulting circulation would produce the conditions for a liquid ocean water between the icy crust and the molten mantle. Source: Wikipedia

2 Magnetic Field Decay

See attached paper.

3 Pluto-Charon

See attached paper.

4 Science News Reporting

a. *www.sciencenews.org/article/speed − early − universe's − expansion − determined* b. 2-3 sentences / paragraph c. Astronomers used the radial velocities of early dust clouds, illuminated by background quasars, to determine the rate of expansion, with relative accuracy, of the universe when gravity was deccelerating the expansion rate.