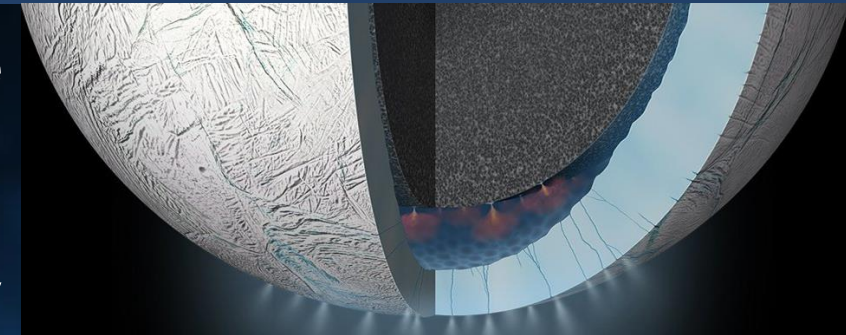


Interpreting Hydrogen and Carbon Dioxide Disequilibrium on Enceladus

The combination of hydrogen (H₂) and carbon dioxide (CO₂) in the ocean of Saturn's moon Enceladus represents chemical energy that could support life.

- The extent of H₂/CO₂ disequilibrium (a measure of seemingly 'unconsumed' energy) was shown to vary in Earth environments that host 'methanogens' -- organisms that actively consume H₂ and CO₂ in a metabolism that produces methane.
- The extent of this disequilibrium was shown to depend on rates of turnover in the methanogen population, along with the physiological properties of the organisms themselves.
- Because these environmental parameters are not currently knowable for Enceladus, the sizeable H₂/CO₂ disequilibrium observed there may be compatible with an inhabited ocean, and future exploration of Enceladus should continue to search for signs of habitability.

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Artist rendition of the interior of Enceladus showing a global liquid water ocean between its rocky core and icy crust. Image Credit: NASA/JPL-Caltech



Ames Research Center scientist Tori Hoehler collects a core of marine sediment at Cape Lookout Bight, NC, one of several 'methanogenic' ecosystems considered in this study.