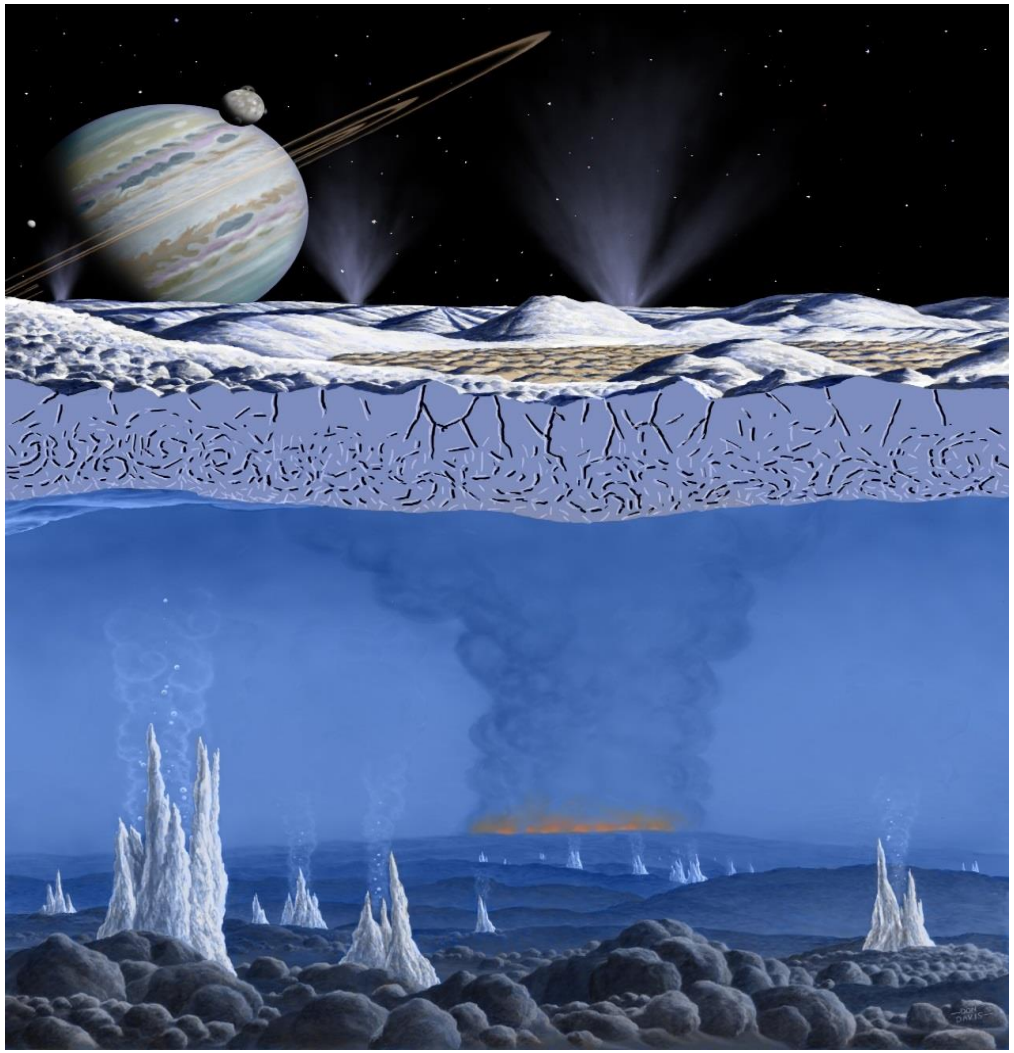
TIDAL FRICTION HEATING ENCELADUS FOR BILLION YEARS

BACKGROUND: Geophysical data from the late Cassini spacecraft implied the presence of global ocean underneath the icy surface of Saturn's moon Enceladus and huge amount of internal heating to avoid freezing. Analyses of ejected material from Enceladus measured by Cassini indicated ongoing hydrothermal activity similar to that existing on the terrestrial sea-floor. A model that could explain those observations was much needed.
After Cassini, searching for biomarkers will be one of the major scientific objectives of the planned robotic space exploration missions to Enceladus and other icy moons.

THE RESEARCH: A new study* by NAI Icy Worlds team predicts that tidal friction in Enceladus' porous rocky core could generate >10 GW of heat which not only favors intense water-rock interactions and the transport of hydrothermal vent products from the ocean/core interface to the plume but also could have operated for tens of millions to billions of years.

IMPACT: This research would increase Enceladus' potential as a habitable world. If the required conditions have been sustained long enough, the likelihood would increase for life to emerge within this distant icy world.



*: Choblet G., Tobie, G. Sotin, C. Behounkova, M., Cadek, O. Postberg, F, Soucek, O. *Nature Astronomy* **1**, 841–847 (2017). doi:10.038/s41550-017-0289-8