Oceans in Enceladus? Scientists can’t decide

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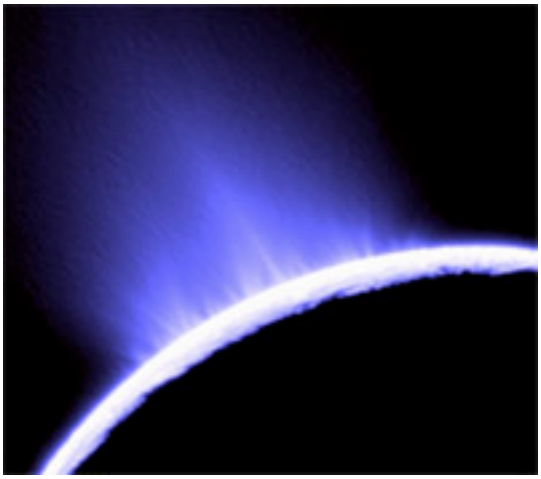

Two studies with contrasting results are leaving scientists scratching their heads as to whether there are underground oceans on Enceladus, a moon of Saturn.

One study suggests that there are; the other, that there aren’t, or at least that they are deeply buried if they exist, according to the researchers involved.

Underground oceans in Enceladus could mean the possibility of life, or at least its chemical precursors, there, according to scientists.

The two research teams, who published their findings in the in the 25 June issue of the research journal Nature, both investigated the possibility of oceans on Enceladus by studying sodium salt, or table salt, in its neighborhood.

Water vapor jets spewing from Enceladus are thought to point to subterranean oceans if they contain sodium. If they don’t, it suggests the vapor is instead escaping from underground ice, according to scientists working with the Cassini mission of NASA and the European Space Agency. This is because sodium isn’t released along with vapor in the process in which vapor escapes directly from ice, caled sublimation.

One of the studies, led by the University of Colorado at Boulder, found that there was little or no sodium in the jets, apparently damping hopes for an underground ocean.

However, there is one way left that the findings could be consistent with an underground ocean: “evaporation from a deep cavernous ocean,” said Nicholas Schneider of the university’s Laboratory for Atmospheric and Space Physics, who led the study. “Only if the evaporation is more explosive would it contain more salt.”

In this picture of slow evaporation from deep reservoirs, the vapor would turn into a jet at the surface because it leaks out of small cracks into the vacuum of space, causing a huge increase in pressure as it escapes.

Somewhat contradictory findings came from European scientists working on the Cassini mission.

They did detect salt – not in the plumes directly, but in the ice grains of Saturn’s E-ring, which is primarily believed to be replenished by material from the plumes of Enceladus. The makeup of the E-ring grains was determined through chemical analysis of thousands of high-speed particle hits registered by Cassini. Schneider’s team instead conducted their studies from the Keck observatory in Hawaii and the Anglo-Australian telescope in Australia.

Scientists couldn’t immediately explain the differing results, but Schneider didn’t rule out that there might be some sodium in the plumes, while the Cassini scientists said Schneider’s idea of slow release from deep water pockets could work.

“We believe that the salty material deep inside Enceladus washed out from rock at the bottom of a liquid layer,” said Frank Postberg, scientist on Cassini’s Cosmic Dust Analyzer at the Max Planck Institute for Nuclear Physics in Heidelberg, Germany, lead author of the Cassini study.

Image: Enceladus geysers. (Credit: Cassini Imaging Team, SSI, JPL, ESA, NASA)