

Theory suggests source of icy moon's heat



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Story Highlights

- Radioactive decay inside Saturn's moon Enceladus may explain geysier activity
- Enceladus may possess the necessary ingredients to support life
- Probe photographed geysers spewing from Enceladus last year

LOS ANGELES, California (AP) -- Scientists believe heat from radioactive decay inside a tiny, icy Saturn moon shortly after it formed billions of years ago may explain why geysers are erupting from the surface today.

The Cassini spacecraft last year beamed back dazzling images of Yellowstone-like geysers spewing from a warm section on Enceladus, raising the possibility that the moon, which has an overall surface temperature of about minus 330 degrees Fahrenheit (minus 201 degrees Celsius), may have an internal environment suitable for primitive life.



Cassini captured this photograph of geysers spewing from a warm section on Enceladus.

However, scientists have been stumped by the origin of Enceladus' interior heat. Now a new model suggests ancient radioactive decay played a key role in shaping the moon's warm south pole region where plumes of water vapor and ice crystals periodically vent.

According to the theory, Enceladus formed some 4.5 billion years ago by the mixing of ice and rock containing the radioactive isotopes aluminum

and iron. Over a period of several million years, the rapid decay of the two radioactive elements produced a burst of heat that resulted in a rocky core enclosed by an ice sheet. Over time, the remaining decomposition in the core further warmed and melted the moon's interior.

If confirmed, the model suggests Enceladus possesses the necessary ingredients to support life -- a stable heat source, organic materials and liquid water.

"It tells us that conditions inside Enceladus either were or still are conducive to biochemical reactions," project scientist Dennis Matson said in a telephone interview.

Results were presented Monday at the annual Lunar and Planetary Science Conference in Texas and will be published in the April issue of the astronomical journal *Icarus*.

The Cassini team previously theorized that the geysers likely came from underground reservoirs of water close to the surface, indicating a lasting heat source inside. Matson said the latest model helps explain where the interior heat might have come from.

Last year, another research team published a study that cast doubt on the existence of water near Enceladus' surface. That study suggested that buried ice clathrates -- not liquid water -- were responsible for releasing the plumes through a tectonic shift in the crust. Clathrates are lattice-like molecular structures that trap other types of molecules.

Cassini scientists plan to measure the composition of the gas rising from the plume during an Enceladus flyby in 2008.

The Cassini mission is a project of NASA, the European Space Agency and the Italian Space Agency. Launched in 1997, the spacecraft entered orbit around Saturn in 2004, exploring its rings and moons.