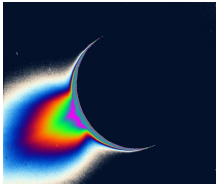


27 March 2008

By: Gabriel Gache, Science News Editor



Enhanced and colorized image showing the extent of the water plume of Enceladus
NASA/JPL

Cassini Finds Precursors for Life on Enceladus

Geysers of distant moon contain organic molecules

The results of the fly-by made by the Cassini orbiter around Saturn's moon Enceladus reveal that the plume of water vapor above its surface is rich in primitive organic molecules necessary for the appearance and evolution of life as we know it. On 12 March the probe was sent in a fly-by at an altitude of 50 kilometers above the surface, to make detailed measurements of the watery plume regarding composition, density and particles size, but its sensors remained non-functional for most of the time during the maneuver.

The only chance Cassini had to collect data was during the approach and departure phase of the swing. The water vapor plume above the surface of Enceladus was discovered by the orbiter about one year after it reached the Saturn system, albeit its nature remained undetermined. The organic molecules found during the fly-by on March 12 seem to resemble that of the organic molecules usually found in cosmic bodies such as comets.

Although scientists don't really know how life came to be on Earth, it is believed that water and such primitive organic molecules are most important for the appearance of life. "These findings will definitely get people to ask new questions about the formation of the Saturn system. The astrobiological potential of the Saturn system just went up a notch or two," said Cassini principal investigator at Southwest Research Institute, Hunter Waite.

During the fly-by, Cassini also made some measurements of the surface of the moon, revealing that some of the highest temperatures are experienced along tiger stripe-like fissures on the surface, exceeding even the previous highest temperatures in the south polar regions. The registered temperatures near the fissures register about -93 degrees Celsius, extremely cold in relation to the temperatures we are used to, however still 93 degrees Celsius warmer than the surrounding areas.

"This mean it has to be even warmer under the surface and raises the possibility of liquid water beneath the exterior," said Cassini researcher John Spencer. But the true surprise came when the orbiter probed the chemical composition of the moon. It resembles a comet, as Waite concluded. While comets produce tails while being heated by the energy provided by the Sun, Enceladus' tail is powered by the heat produced deep in its core.

Carbon dioxide, carbon monoxide and some other organic molecules such as methane, propane, acetylene and formaldehyde have been positively identified in the icy plume of water hovering over the surface of the moon. "Enceladus' brew is like carbonated water with an essence of natural gas. Astrobiologically speaking, this moon is one of the most interesting places in the solar system," Waite said.

All of the ingredients for the appearance of life could be buried under the surface of Enceladus: heat, water and organic molecules. On the other hand, the key element, liquid water, still remains to be found. Scientists cannot tell for certain now whether or not liquid water exists on Enceladus, or if it can provide with the right conditions for the appearance and evolution of life, but future fly-bys may be able to clear this matter.

The Cassini orbiter will return to Enceladus in August and October and in another five occasions in the next two years.

