A Sunlit Lake on Titan

- The Cassini spacecraft recently recorded a flash of sunlight off a region of the northern hemisphere.
- The reflection comes from a dark, smooth region suspected to be a large lake or sea.
- Infrared and radar observations previously revealed hundreds of likely lakes near the north pole, and a few lakes near the south pole.
- The lakes are filled with ethane, and probably methane.

Lakes without Water

- Titan is 94 K - too cold for liquid surface water, but not too cold for liquid methane and ethane.
- Sunlight should rapidly convert atmospheric methane to ethane and other species. But methane is abundant, so must be replenished.
- Methane and ethane should be exchanged between the atmosphere and lakes through evaporation and precipitation (similar to water on Earth).
- These processes can help maintain the high atmospheric methane abundance and contribute to observed seasonal variations in the lakes.

The Big Picture

- Earth and Titan are the only two objects in the solar system that have stable bodies of liquid at the surface.
- Similar processes help maintain surface liquids and atmospheric compositions, despite very different temperatures and materials at each body.
- Surface liquids facilitate erosion, and can create 'Earth-like' landscapes (e.g. sedimentary layers, river beds, ...)
- Surface liquids may exist on a variety of bodies orbiting other stars, and not be restricted to 'Earth-like' bodies.

For More Information...

Press

- NASA - 12/17/09 - "Sunlight Glint Confirms Liquid in Titan Lake Zone"
  http://www.nasa.gov/mission_pages/cassini/whycassini/cassini20091217.html
- Planetary.org - 12/17/09 - "Cassini VIMS sees the long-awaited glint off a Titan lake"
  http://www.planetary.org/blog/article/00002267

Images

- Slide 1 image courtesy NASA/JPL/Arizona/DLR
  http://photojournal.jpl.nasa.gov/catalog/PIA12481
- Slide 2 image courtesy NASA/JPL/USGS
- Slide 3 image courtesy NASA/USC
  http://tinyurl.com/DPSDisc-TitanLakes-Slide3

Source Articles (on-campus login may be required to access journals)

  http://www.nature.com/nature/journal/v445/n7123/full/nature05438.html
  http://www.nature.com/nature/journal/v454/n7204/full/nature07100.html

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