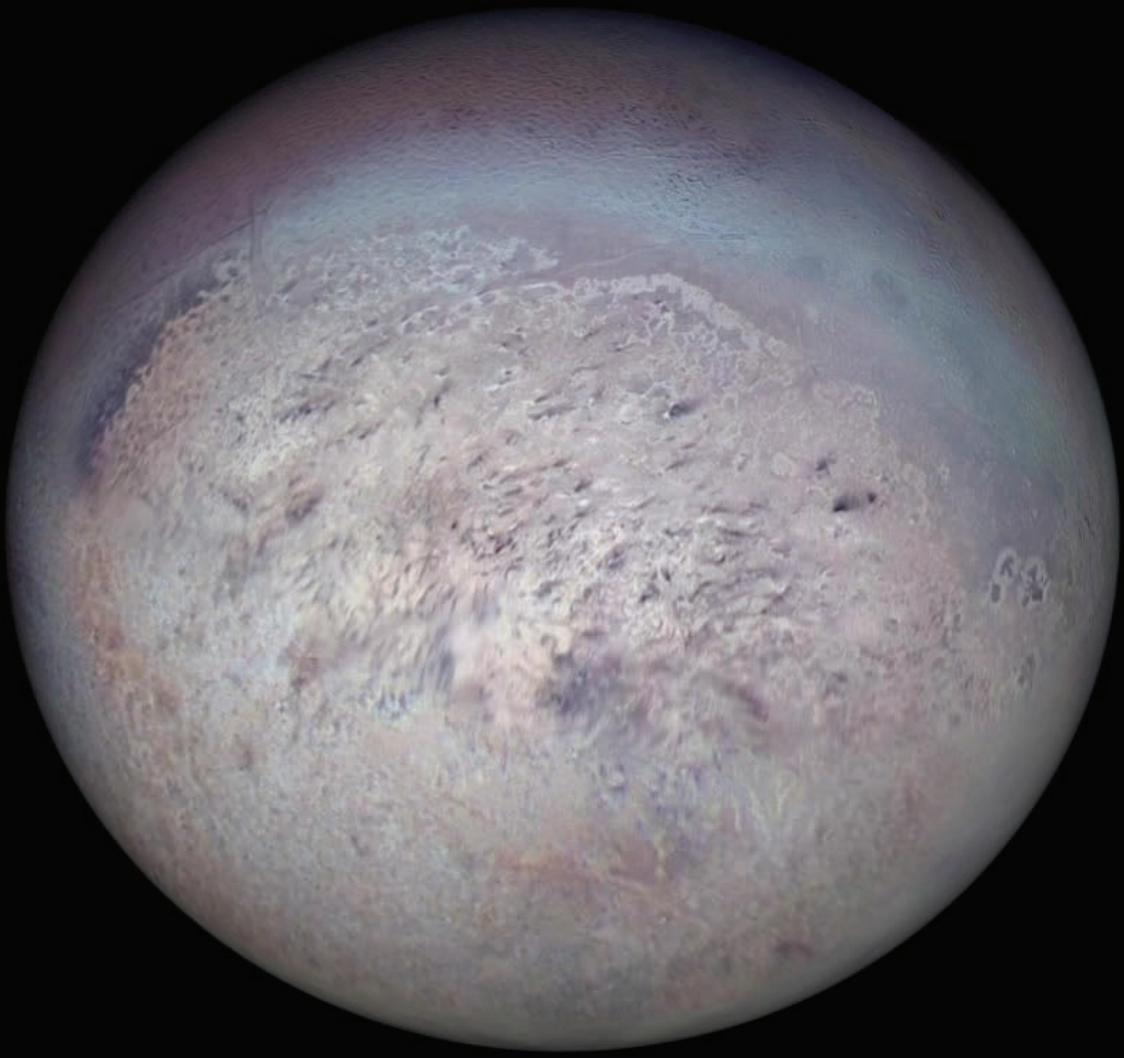
Triton: The Twin of Pluto ?



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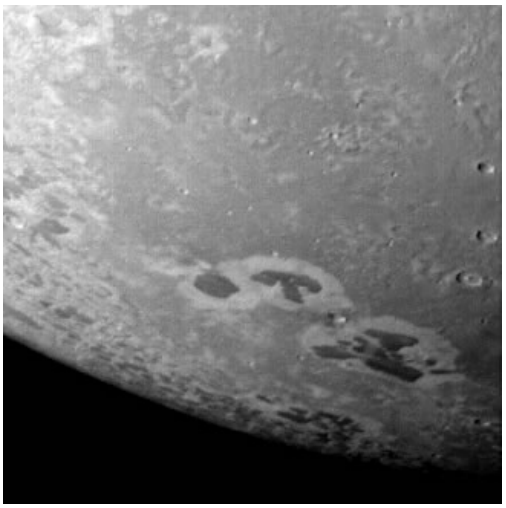
	Pluto	Triton
Diameter:	**2,368 km**	**2,700 km**
Mass:	**1.3×10^{22} kg**	**2.1×10^{22} kg**
Density:	**2,000 kg/m^3**	**2,100 kg/m^3**
Temperature:	**33 k - 55 k**	**38 k**



Close-up of Triton's surface (NASA/Voyager)

Solar system bodies, like Ceres or our moon, typically have craters as much as 10 km deep. Triton originally may have had such a lumpy surface 4 billion years ago. But now it looks smooth. It is possible that over millennia, Triton's surface was mostly covered by emissions from cryovolcanos. It is possible that Pluto's surface could be featureless, too, if its surface is as active as Triton's!

Over the decade that it took for NASA's New Horizons spacecraft to fly to Pluto, scientists have been hypothesizing about what they might discover there. We've already learned enough about Pluto to know that a near-twin-world exists in our solar system: Neptune's largest moon, Triton.

Triton is only slightly larger than Pluto. Both worlds have similar surface materials, such as nitrogen, methane and carbon monoxide. Their diameters, masses and densities are amazingly similar. Both Triton and Pluto may also have originated within the Kuiper Belt. The capturing of Triton by Neptune probably melted a large part of its surface.

Voyager 2 images show that Triton is still geologically active, with geysers called cryovolcanos emitting water ice plumes. Being so close to the massive planet Neptune, gravitational forces acting on Triton may generate enough internal heat to cause geysers of liquid water along cracks in Triton's surface. Pluto is not thought to be as active as Triton, because it doesn't share the same capture history. However, Pluto's moon Charon tugs and pulls on the dwarf planet's surface, perhaps causing some form of cryovulcanism to resurface Pluto over billions of years.

Space Math Challenge!

What would be the average rate at which the Triton craters were filled-in over this period of time in units of millimeters per millennia? **Now try this:** Triton's surface area is 23 million km^2. If it was covered to a depth of 10 km, what percentage of Triton's total volume had to be recycled onto the surface by the cryovolcanoes?

Answer: 10 km deep/4 billion years = 10,000,000 millimeters/4,000,000 millennia = 2.5 mm/millennia.Now try this: $V = 4/3\ \pi\ R^3$ so for R = 1,350 km, V = 10 billion km^3, so the percentage = 100% x (10 km x 23 million km^2)/10 billion km^3 = 2.2%