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SPACE

Giant ice volcanoes may have sculpted Pluto's mysterious landscape

Cryovolcanic activity was ongoing beneath the dwarf planet's surface in the recent geological past, data from NASA's New Horizons mission suggests

A series of peaks, domes and troughs found on Pluto's undulating surface may have been created by icy material being pushed up to the surface by cryovolcanic activity, analysis of data collected by NASA's New Horizons mission has found.

The so-called hummocky terrain runs across Sputnik Planitia, an area found southwest of Pluto's icy heart, and consists of a network of icy formations ranging from one to seven kilometres tall and 30 to 100 kilometres across.

"The particular structures we studied are unique to Pluto, at least so far," said lead author Dr Kelsi Singer, New Horizons deputy project scientist from the Southwest Research Institute, Boulder, Colorado. "Rather than erosion or other geologic processes, cryovolcanic activity appears to have extruded large amounts of material onto Pluto's exterior and resurfaced an entire region of the hemisphere [that] New Horizons saw up close."

BELOW The blue regions illustrate icy volcanic action on Pluto. The ring to the left is a growing volcanic dome, while the areas to the right show general flows of material to the surface

The researchers believe this region of Pluto is relatively young, geologically speaking, as there are few craters – meaning it hasn't had much time to have been hit by asteroids. Because of this, and the fact that the formations contain large amounts of material, the researchers say it is possible that Pluto's interior structure retained heat into the relatively recent past, enabling materials rich in water ice to be deposited onto the surface.

The structures could've been created by water rising up from beneath the surface and being rapidly frozen by the dwarf planet's extremely low temperatures and atmospheric pressures, the researchers say.

This could've occurred if the material had a toothpaste-like consistency, or flowed in a similar way to how solid ice glaciers flow on Earth, or consisted of a frozen shell covering material that was still able to flow underneath.

"One of the benefits of exploring new places in the Solar System is that we find things we weren't expecting," said Singer. "These giant, strange-looking cryovolcanoes observed by New Horizons are a great example of how we are expanding our knowledge of volcanic processes and geological activity on icy worlds."