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Cryovolcanism on Pluto and Charon

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When NASA's New Horizon spacecraft encountered the Pluto system on July 14, 2015 it revealed worlds with distinctive geologic histories and features. Signs of icy volcanic resurfacing are apparent on Pluto and Charon in the form of both smoother terrains and hummocky/blocky textured units, sometimes associated with very large topographic features.

On Charon, the majority of the volcanism appears to have occurred early in its history, forming an extensive new surface on the southern part of the encounter hemisphere that erased most of the pre-existing topography. There are some signs of potential later, smaller episodes of volcanism on Charon (e.g., areas with lower crater densities).

Pluto has several examples of more recent activity (with few-to-no superimposed craters), the most prominent being two enormous domes with deep central depressions. The informally named Wright Mons stands ∼4 km high and the main mound spans ∼150 km. The informally named Piccard Mons is ∼7 km high and 225 km wide. Only a few potential distinct flow features are evident, but the morphology of the areas surrounding Wright and Piccard indicates there may have been multiple episodes of terrain emplacement. There is also an extensive plateau to the west of Wright Mons with a relatively flat surface. This plateau exhibits many large depressions with various morphologies, most of which do not appear to have an impact origin.

Each potential example of cryovolcanism found in the outer solar system is unique, and Pluto and Charon's features expand the information we have to understand this enigmatic process. We will present image, topographic, and composition data for these feature along with geologic mapping results. We will discuss potential formation mechanisms in light of available empirical and model constraints.