

The background of the entire image is a deep space scene. It features a dark blue and black sky filled with numerous small, bright stars of various colors, including white, yellow, and blue. In the lower-left quadrant, the curved, brownish-tan horizon of a planet or moon is visible, curving upwards towards the right. The overall lighting is dim, with the stars providing the primary light source.

LUNAR AND PLANETARY 2023 SCIENCE CONFERENCE

New Horizons: Distant Discoveries in the Outer Solar System

Press Conference

March 14, 2023

New Horizons and Planetary Exploration

Becky McCauley Rench

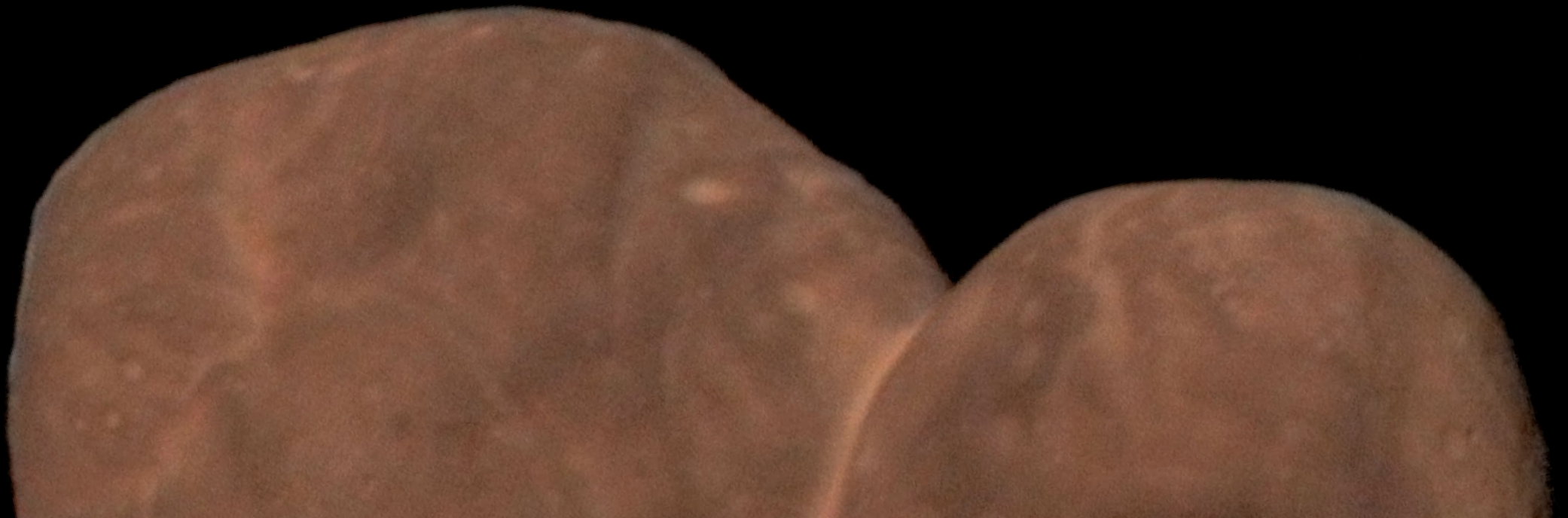
New Horizons Program Scientist, NASA Headquarters



The Formation of Kuiper Belt Object Arrokoth

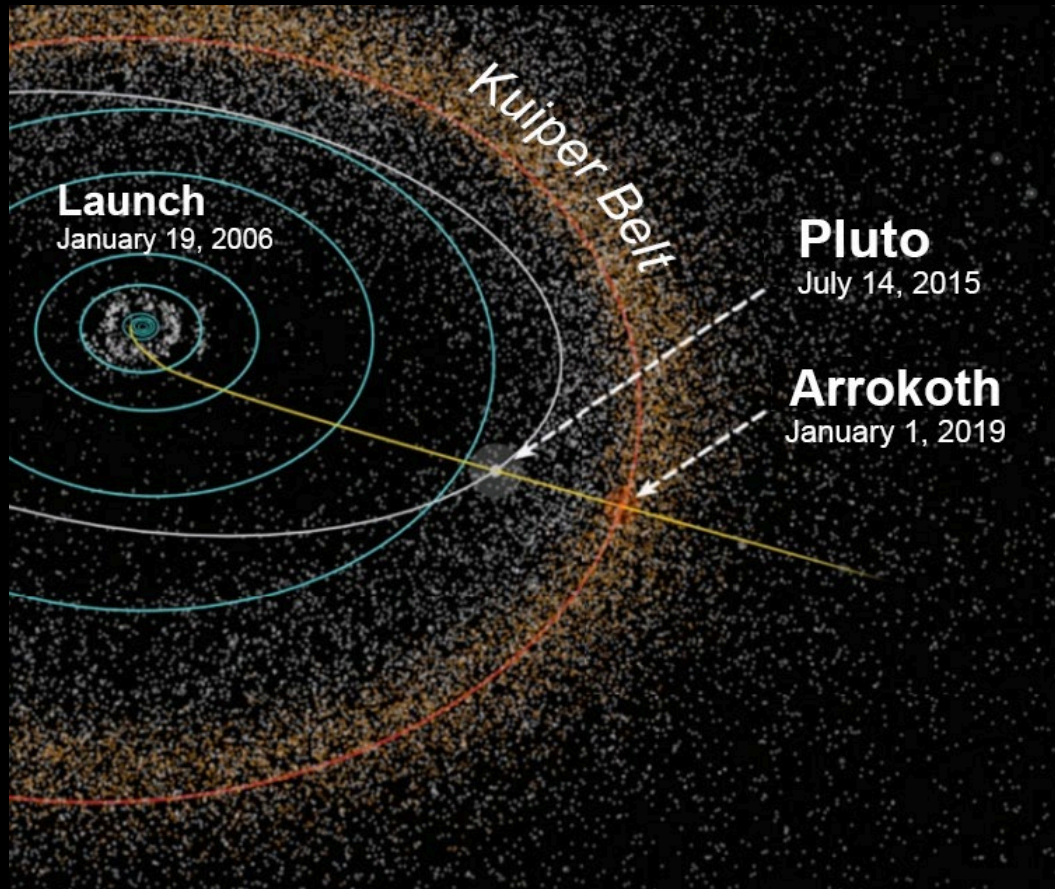
Alan Stern

New Horizons Principal Investigator, Southwest Research Institute



The Exploration of Arrokoth

- Most primitive body ever explored.
- It is a contact binary planetesimal.
- Formed by gentle accretion.

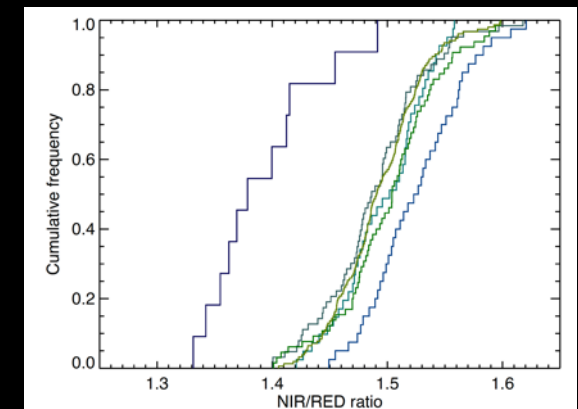
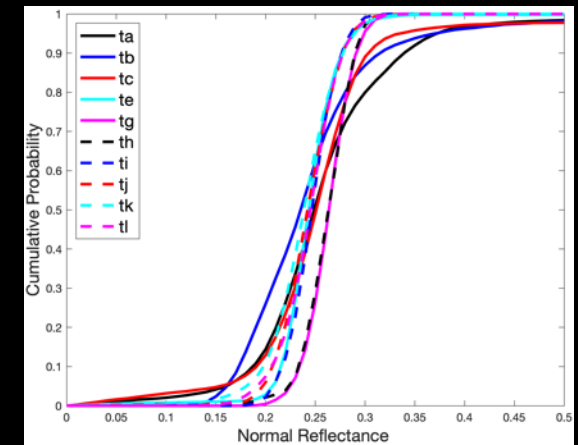
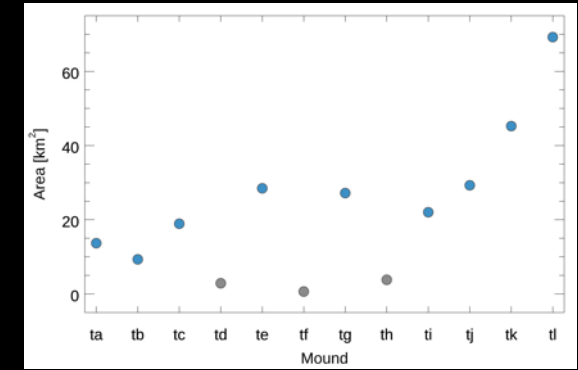
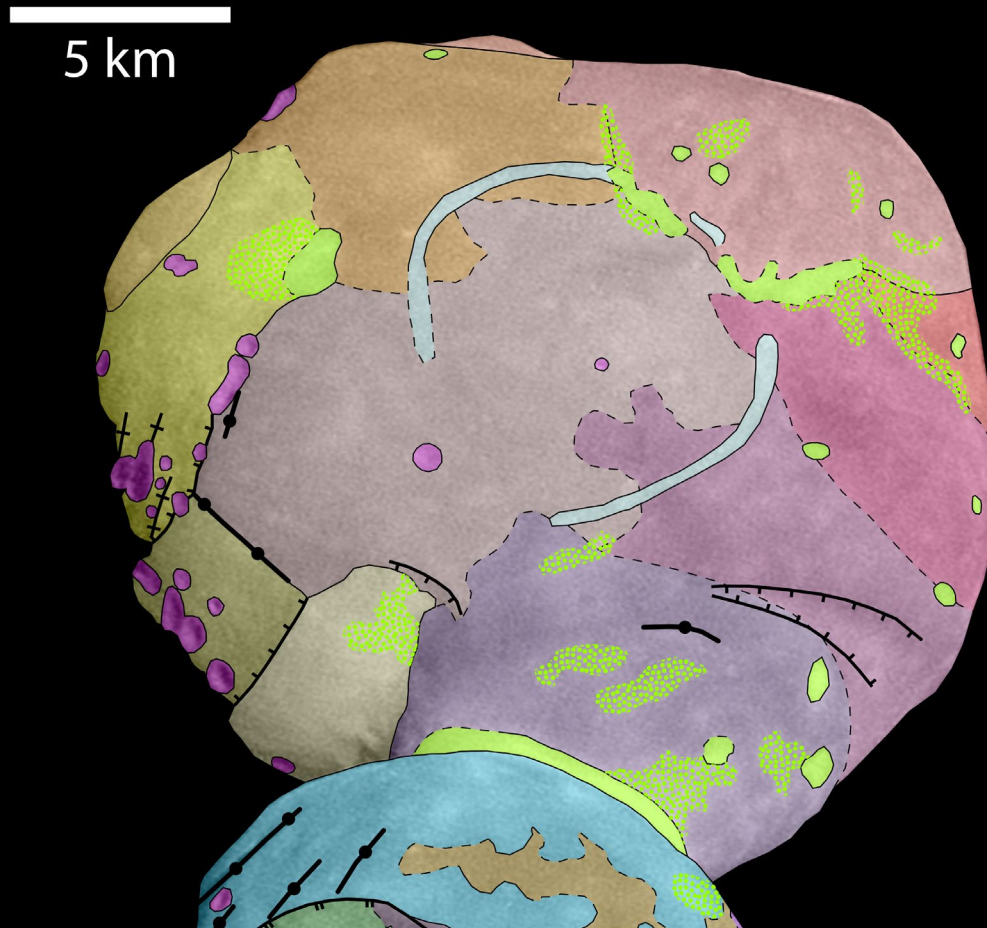


33 km
21 mi



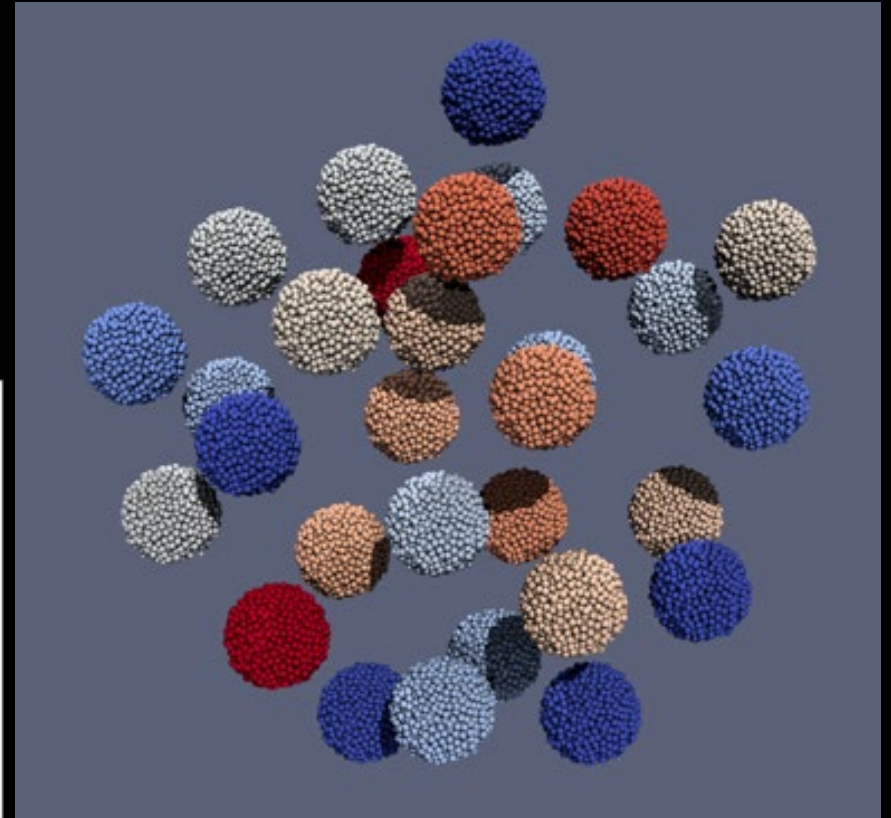
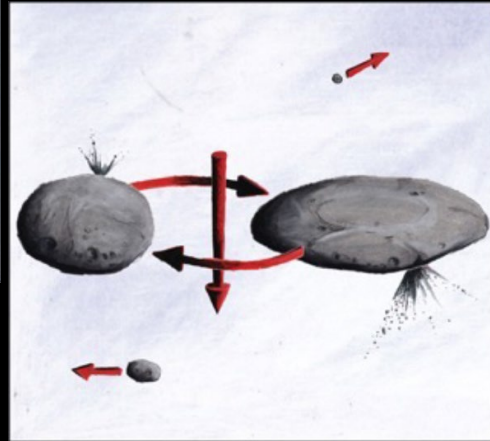
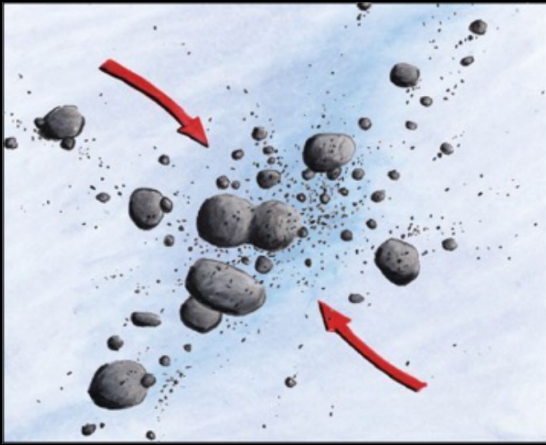
Arrokoth's Large Mounds

- We have studied Arrokoth in a variety of new ways.
- We focused on the enigmatic, large “mounds” on its larger lobe.
- And found them to be remarkably similar.



Origin of the Mounds

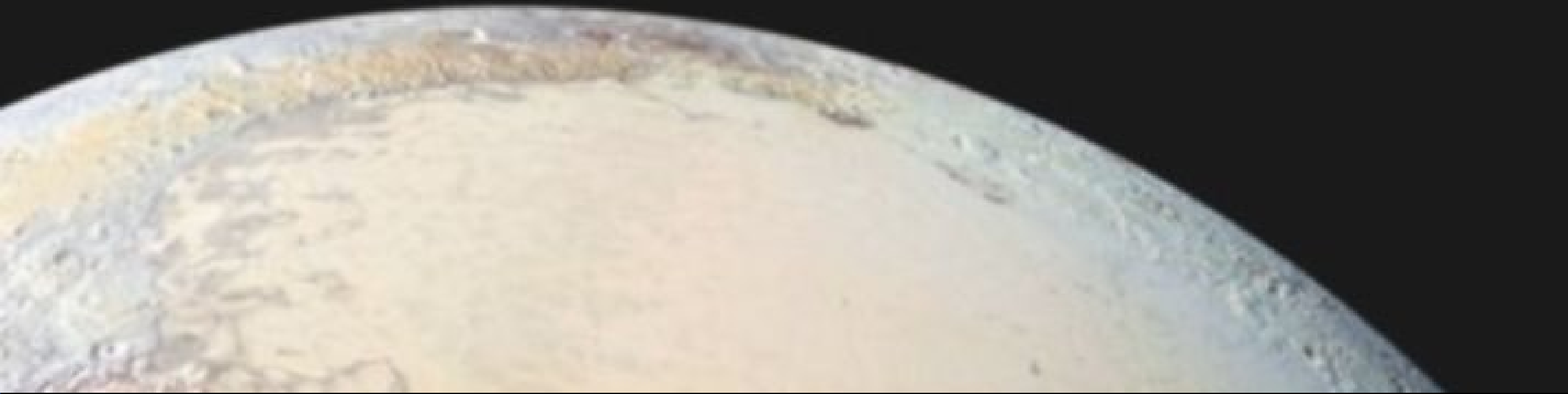
- The mounds appear to be consistent with evidence of like-sized accretionary subunits.
- Providing crucial new clues to understanding how planetesimals formed.



Unraveling True Polar Wander on Pluto

Oliver White

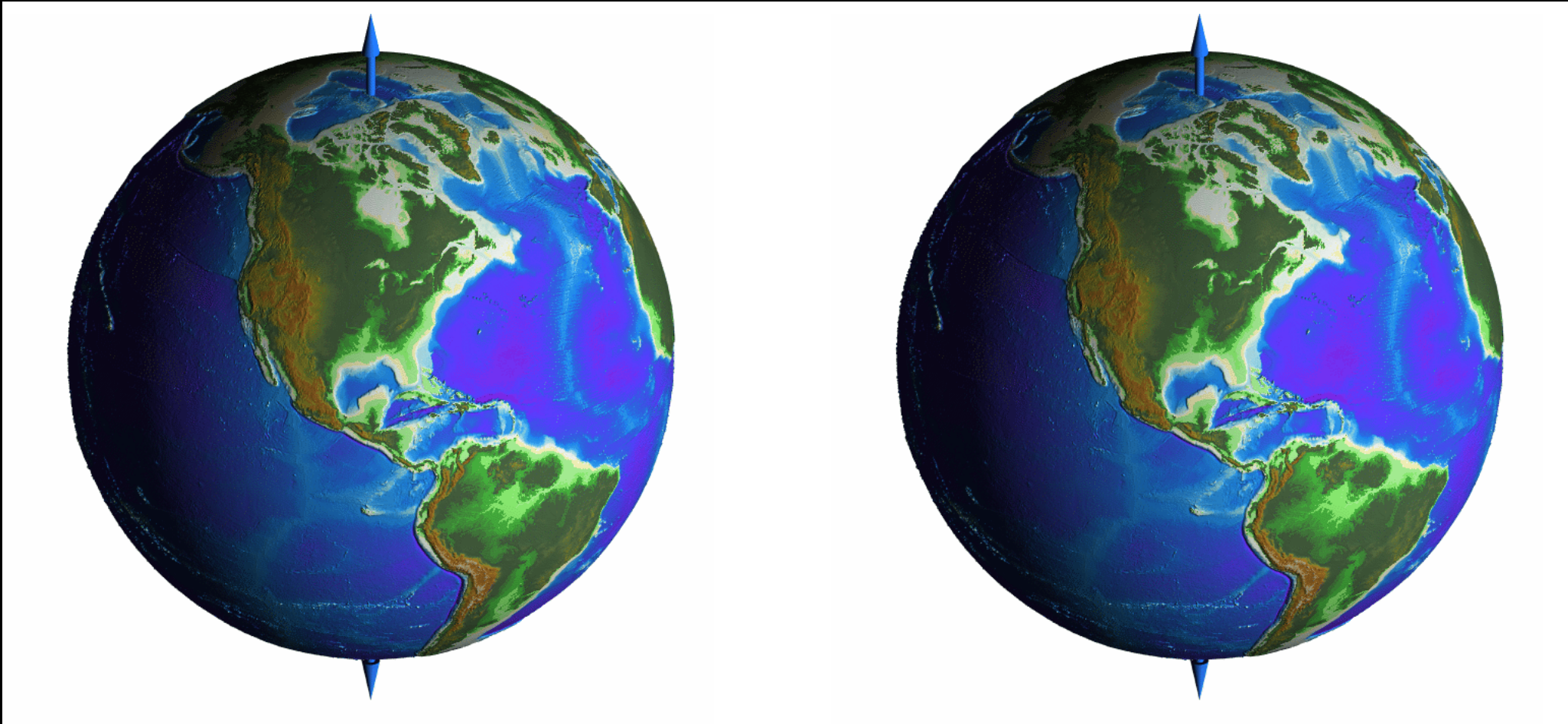
New Horizons Co-Investigator, SETI Institute/NASA Ames Research Center



True Polar Wander on Earth

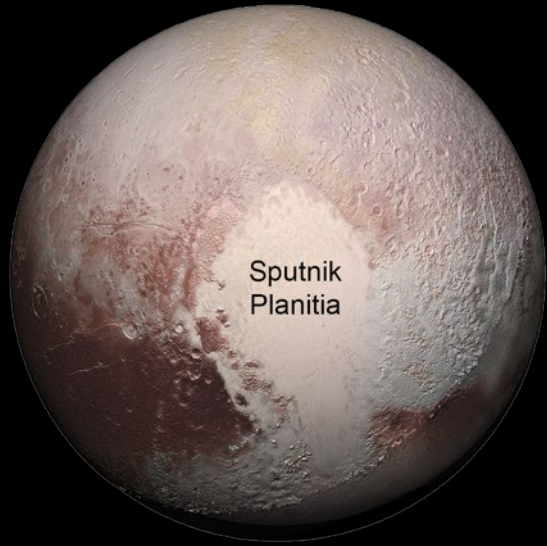
A “positive mass anomaly” like a bulge will reorient the planet to be closer to the equator.

A “negative mass anomaly” like a basin will reorient the planet to be closer to the pole.

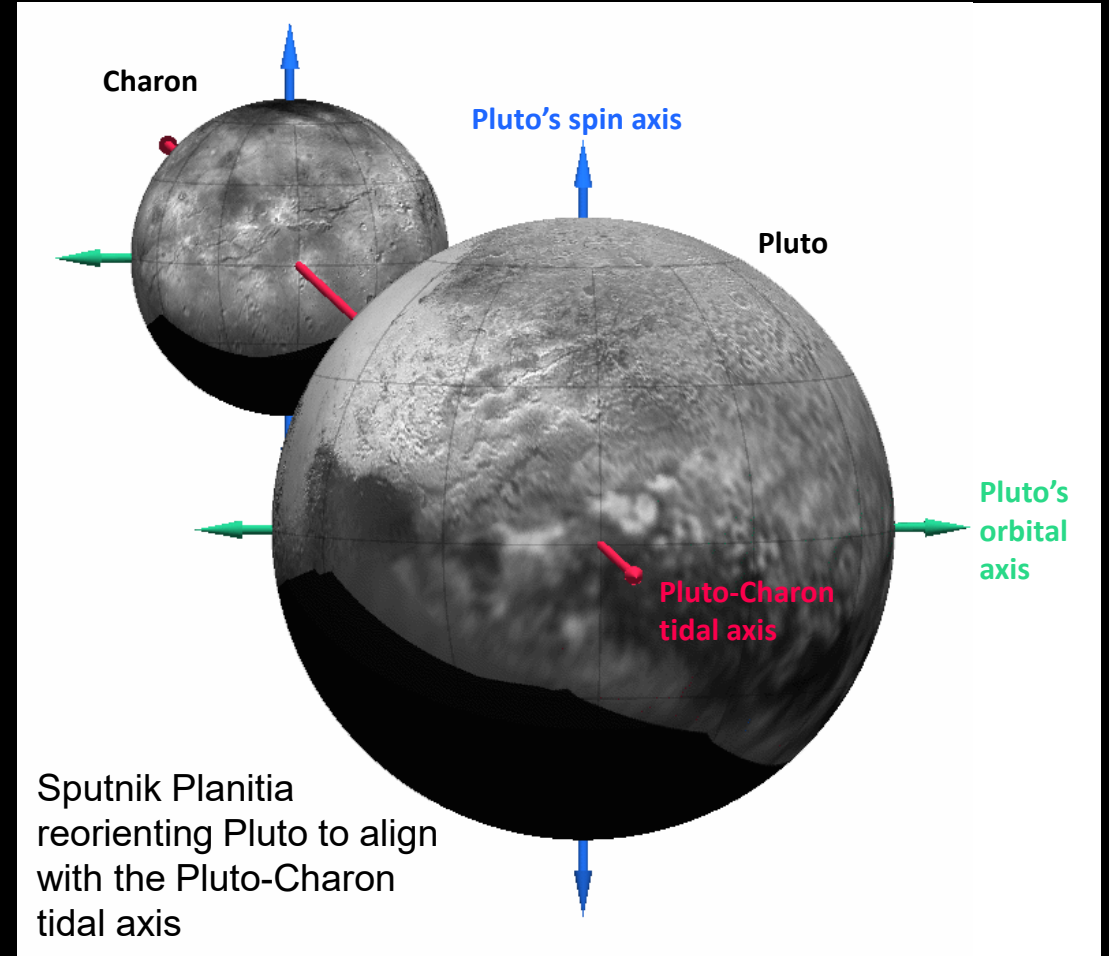
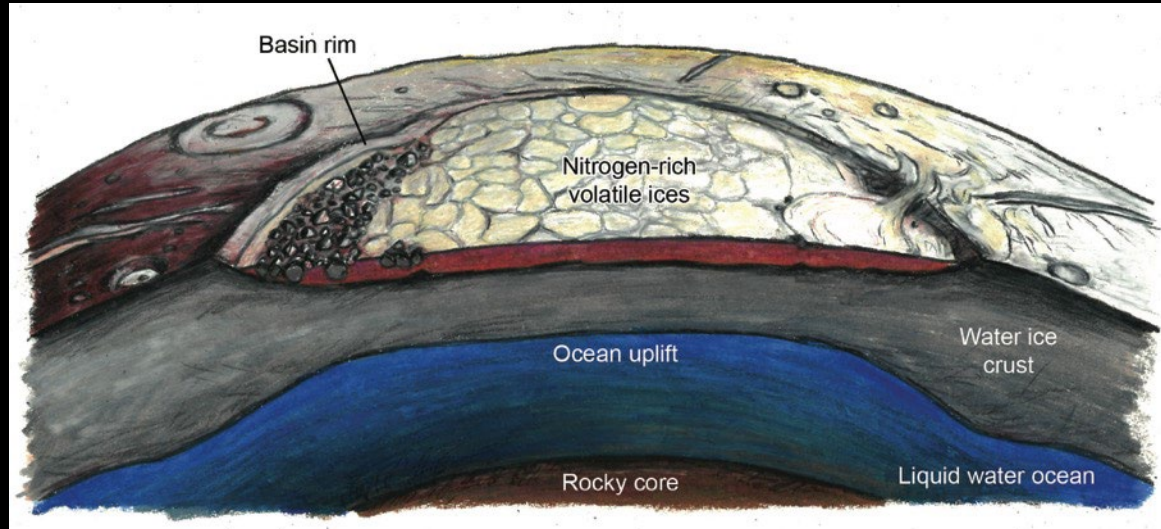
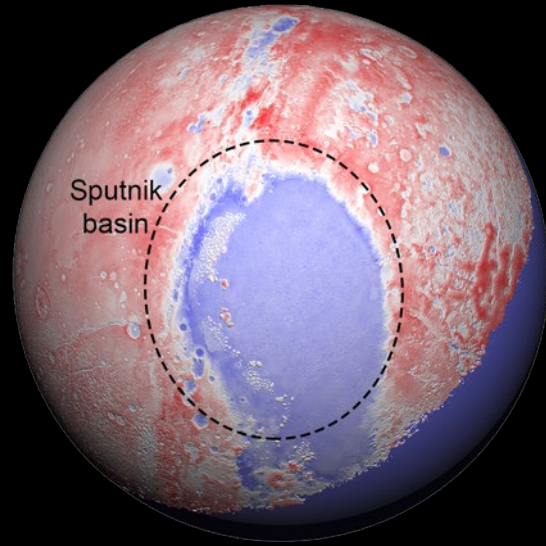


Sputnik Planitia Holds the Clue to Polar Wander on Pluto

Enhanced Color Imaging

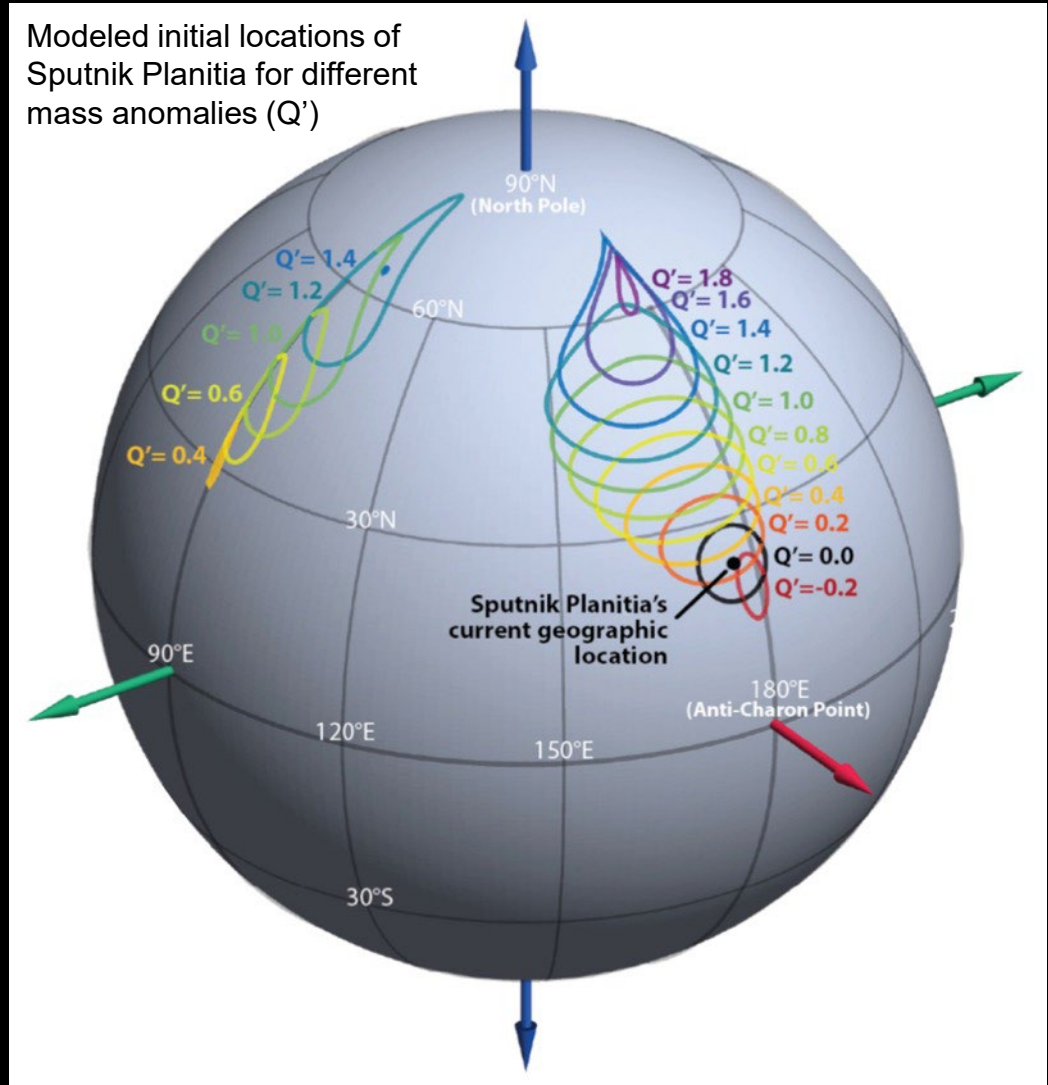


Topography



Factors in True Polar Wander on Pluto

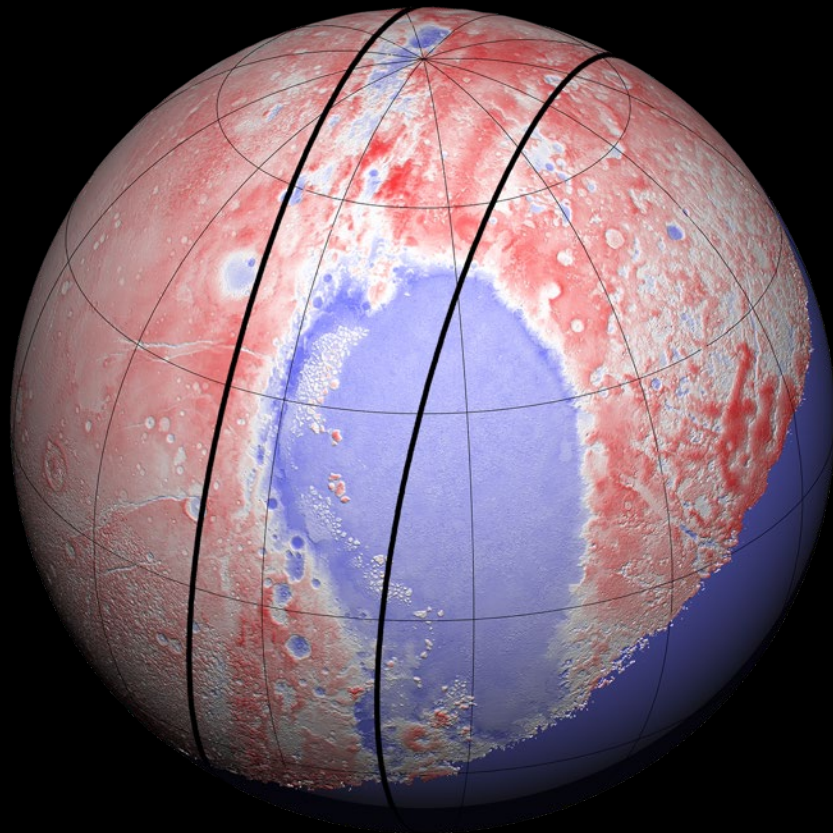
- Pluto's pre-Sputnik orientation.
- The size of Sputnik Planitia's mass anomaly.
- The amount of nitrogen ice filling the basin.
- The effect of Pluto's axial tilt on infilling of the basin.



Credit: James Tuttle Keane (JPL/Caltech)

Clues in Pluto's Ancient Geology

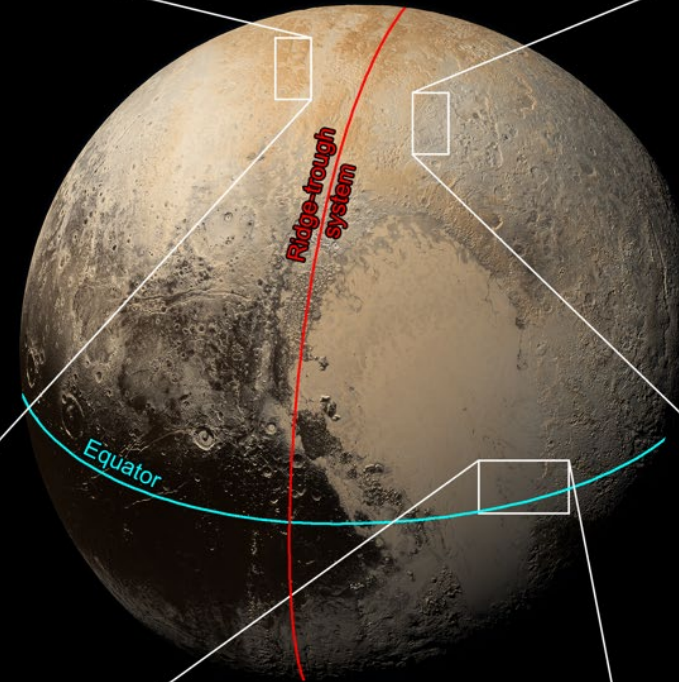
Boundaries of Pluto's
ridge-trough system



Deeply eroded valley walls
in Lowell Regio



Dense, branching channel
networks in Pioneer Terra



Nitrogen ice
valley glaciers
flowing into
Sputnik
Planitia





Shedding Light on Pluto's Bladed Terrain

Ishan Mishra

Postdoctoral Researcher, NASA Jet Propulsion Laboratory

Bladed Terrain Represents an Active Response of Pluto's Landscape to Its Changing Climate

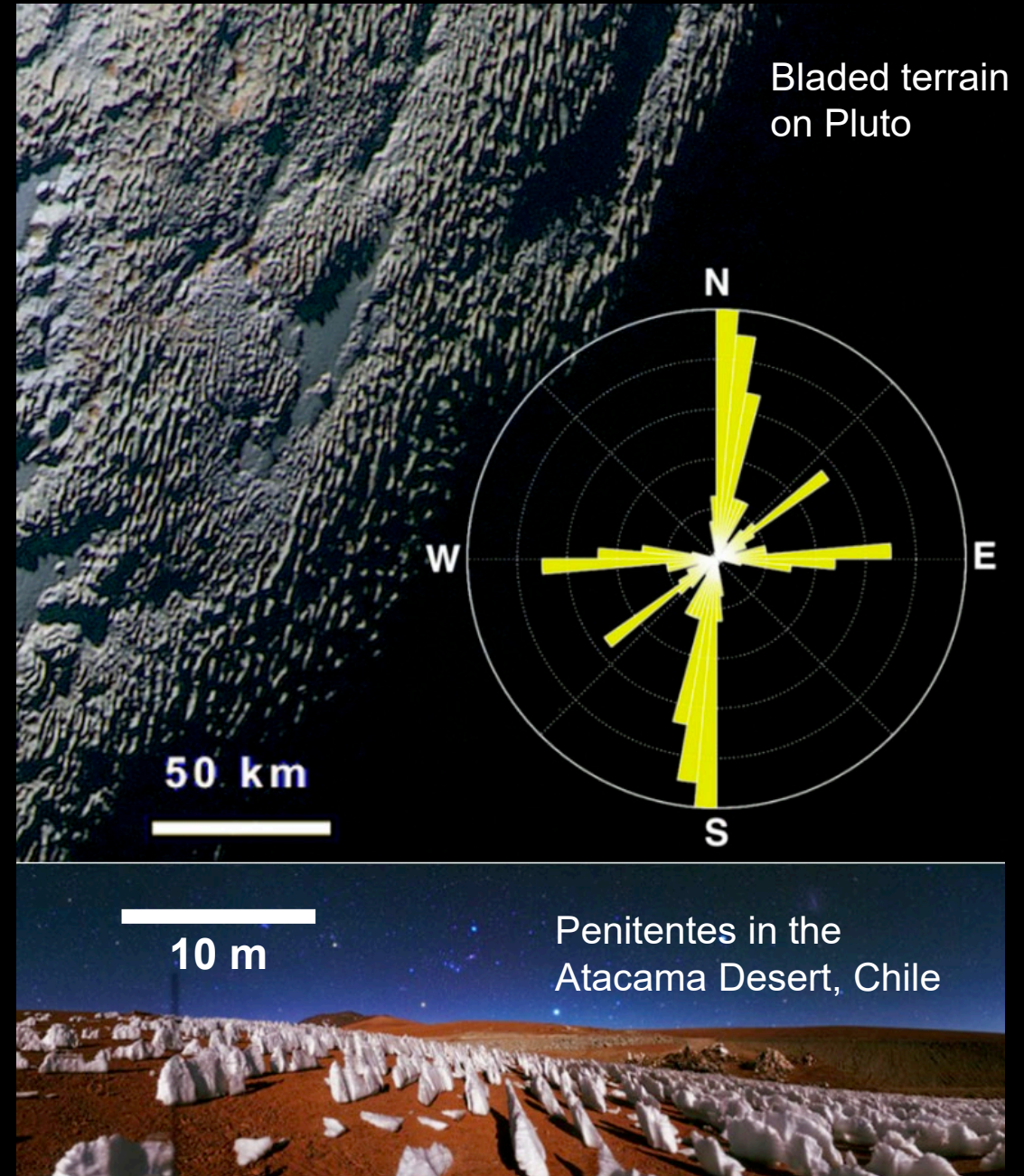


Figure from Moore et al. (2017)

Bladed Terrain Stretches Across Pluto

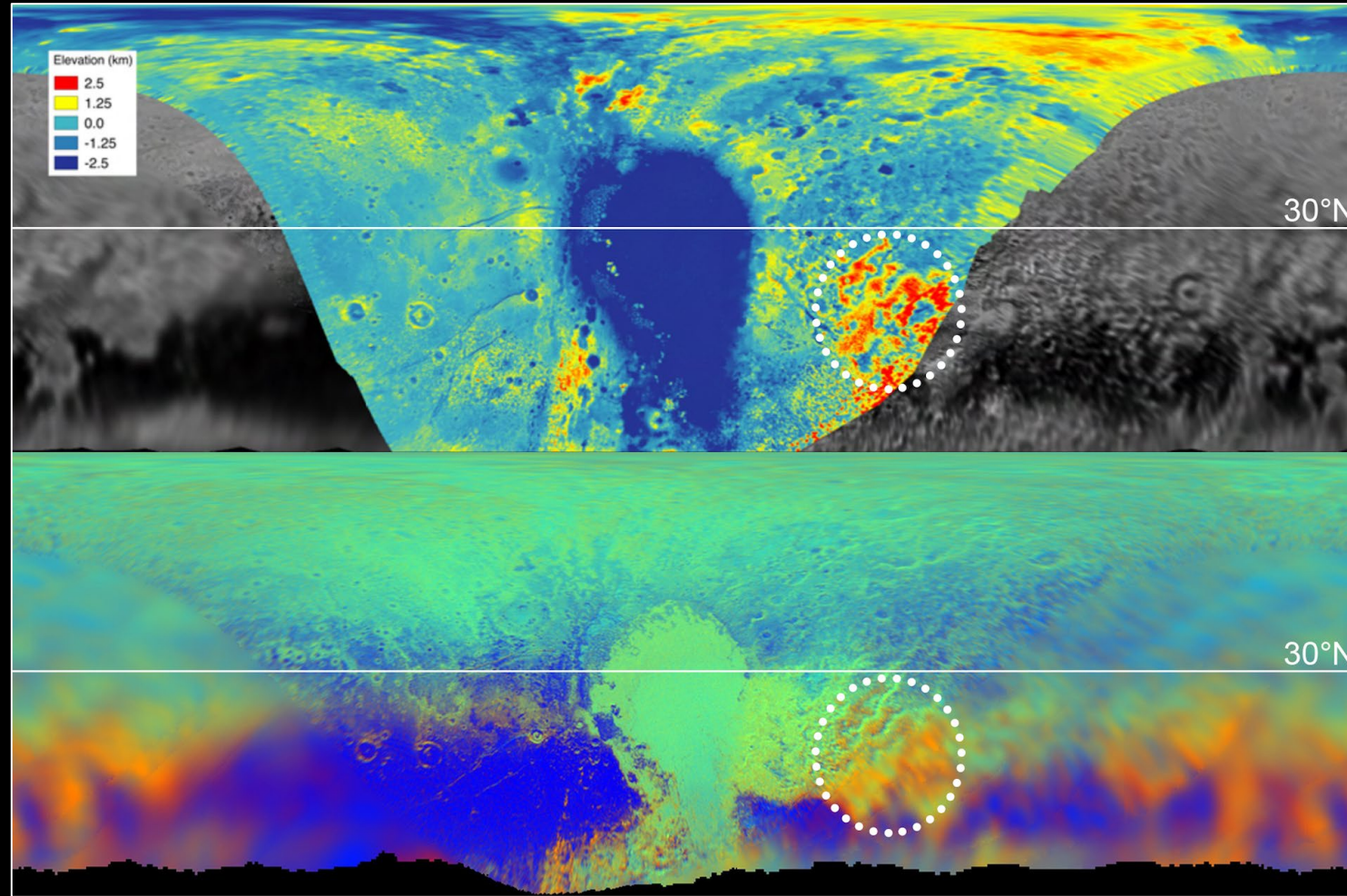
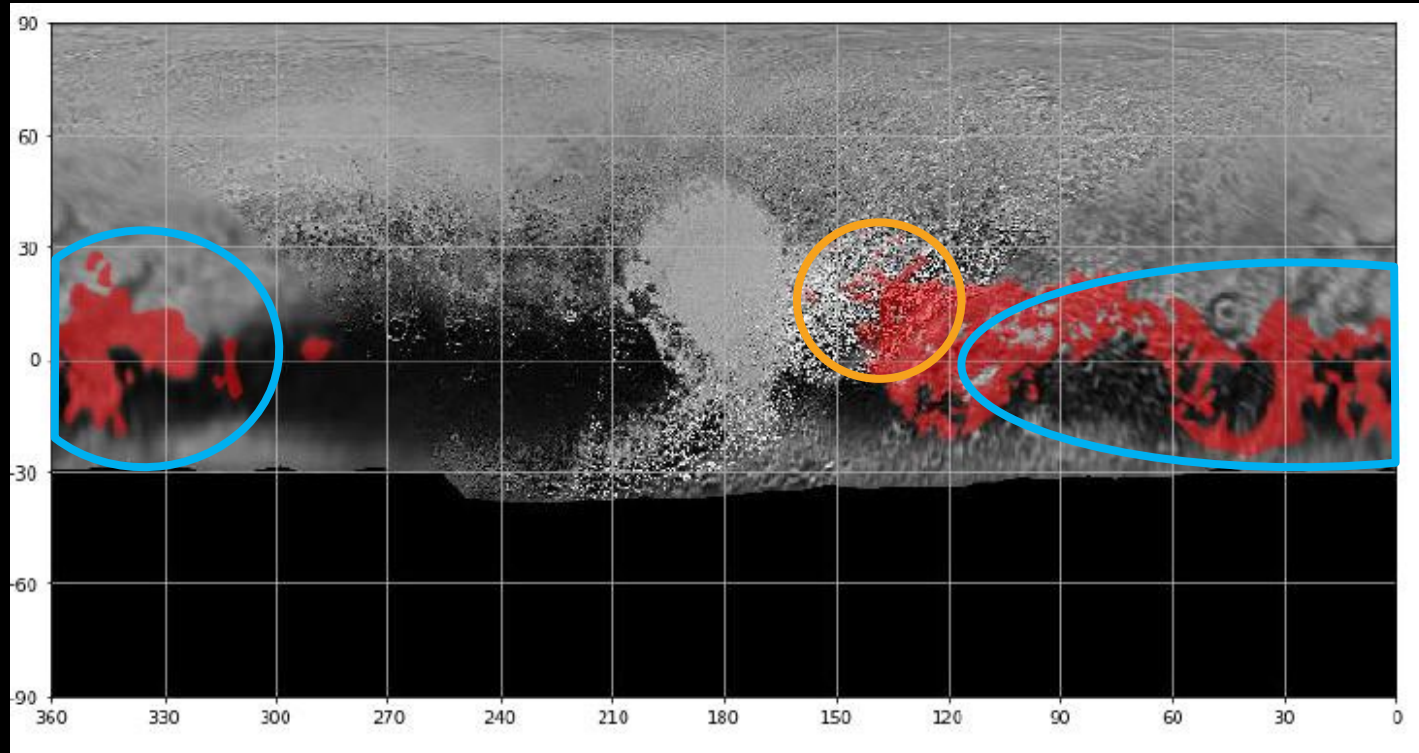




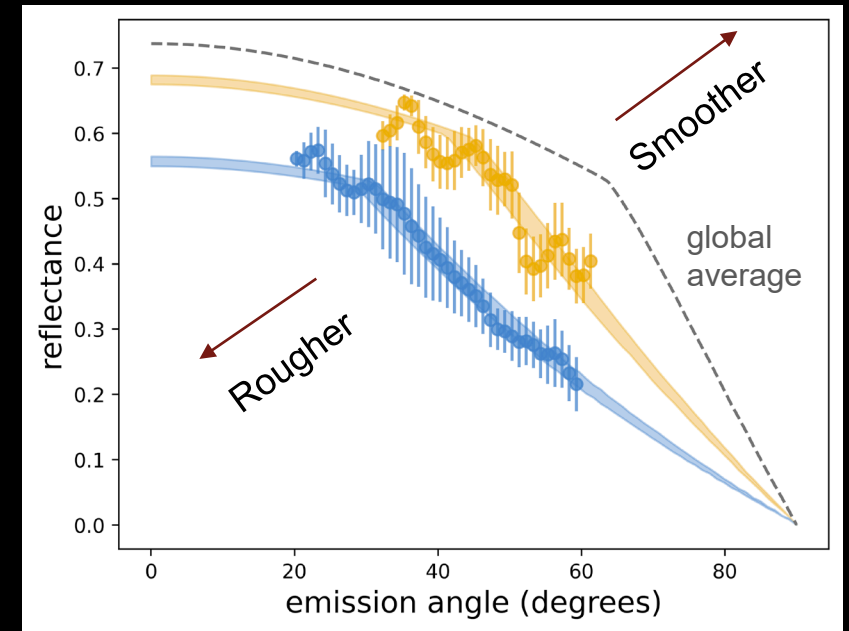
Figure from Moore et al. (2018)

Bladed Terrain Across Pluto: New Evidence



LEGEND

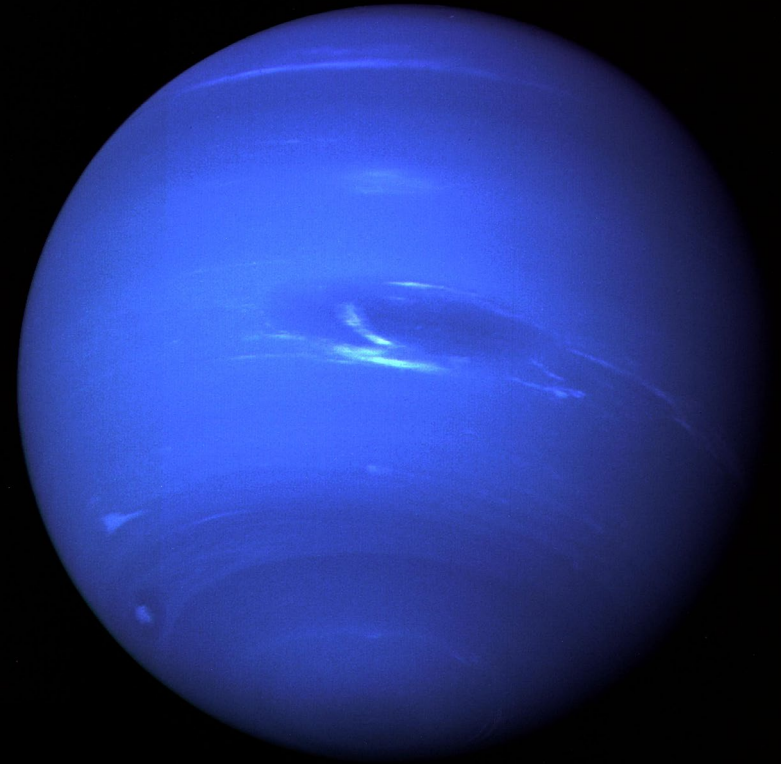
-  Non-encounter side “presumed” bladed terrain
-  Encounter side “real” bladed terrain



Observing Ice Giants Uranus and Neptune

Will Grundy

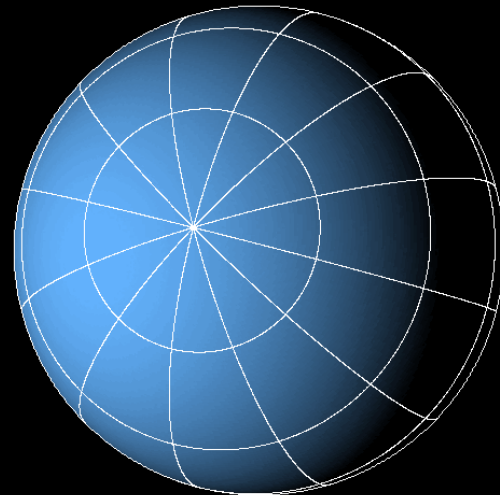
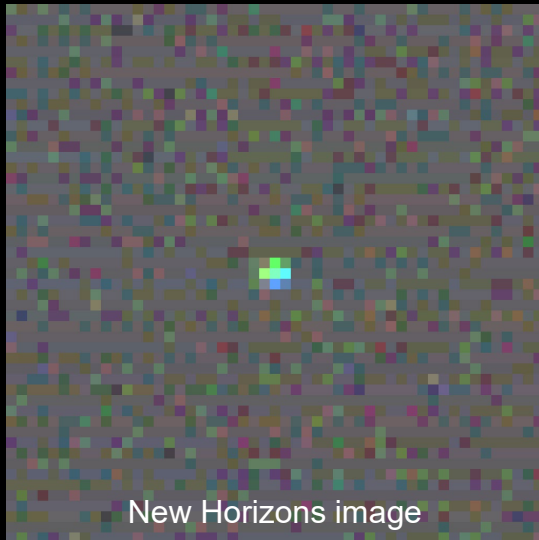
New Horizons Co-Investigator, Lowell Observatory



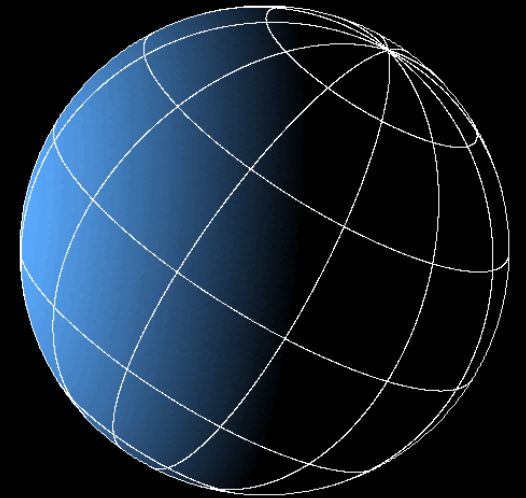
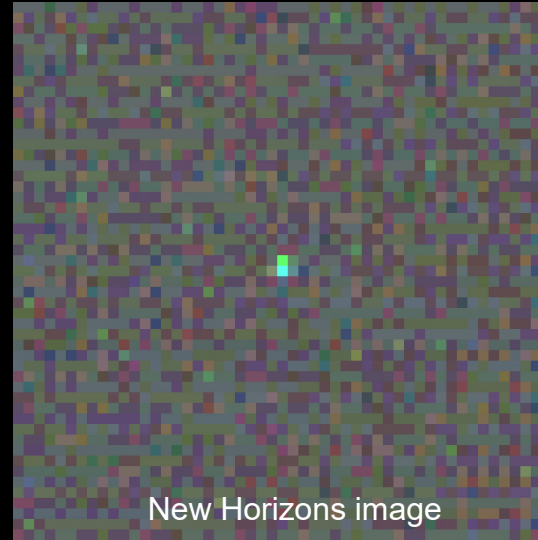
Ice Giant Observations from New Horizons

- Capitalize on New Horizons' unique vantage from the edge of solar system.
- Extend to longer wavelengths than Voyager could observe, and to new seasons.
- Study variability as the planets rotate.
- Analogous to future observations of ice giant class exoplanets.

Uranus



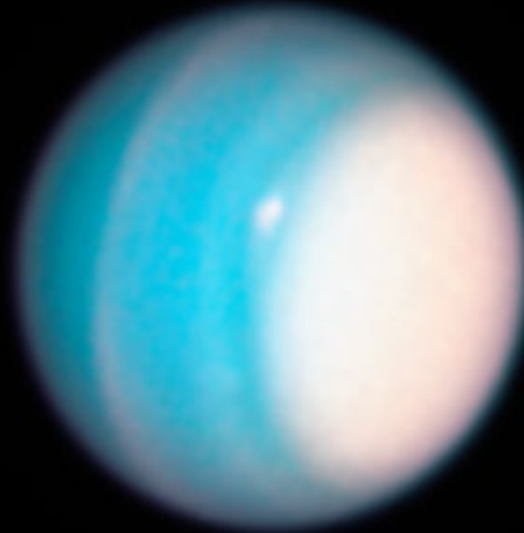
Neptune



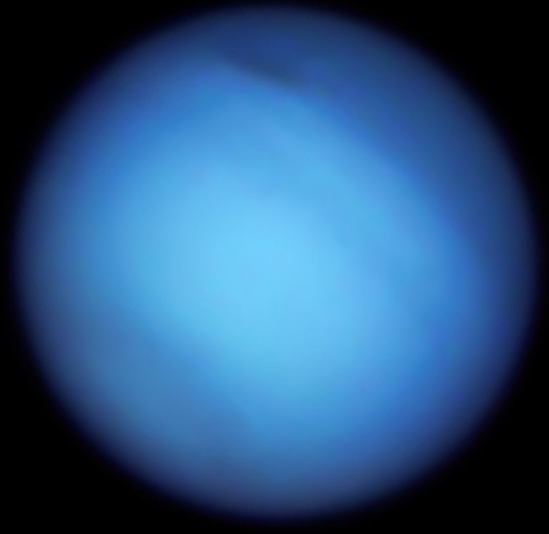
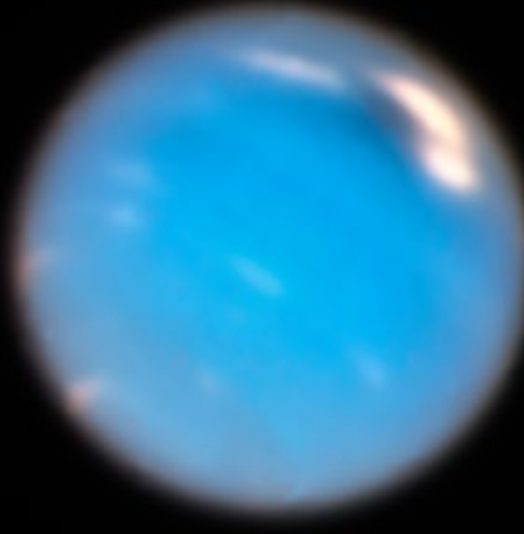
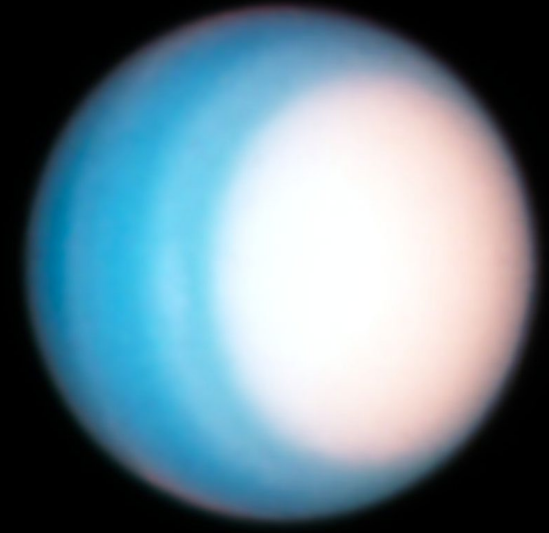
Context Observations from Hubble

- Key to studies of atmospheres and heat balance.
- Better science than either spacecraft can do on its own.
- Can be continued into the future.

2018



2021





Follow New Horizons

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