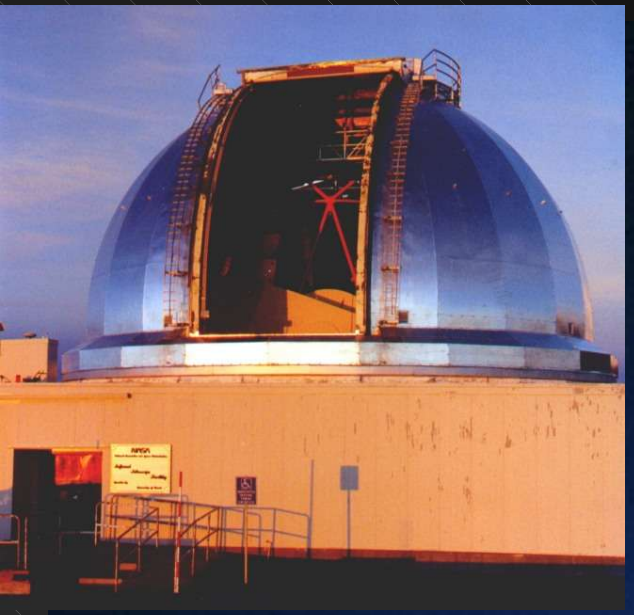
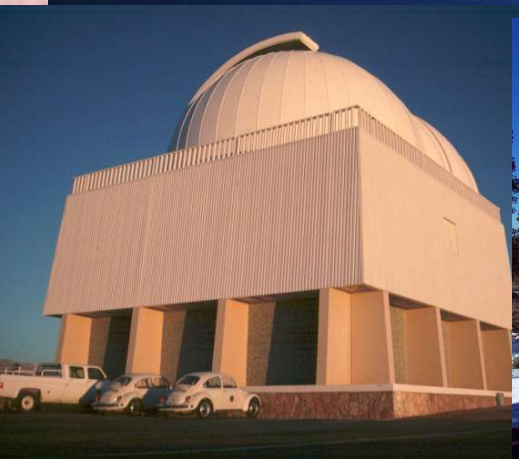
Pluto and Its Neighbors

Marc W. Buie
Lowell Observatory

Current Tools

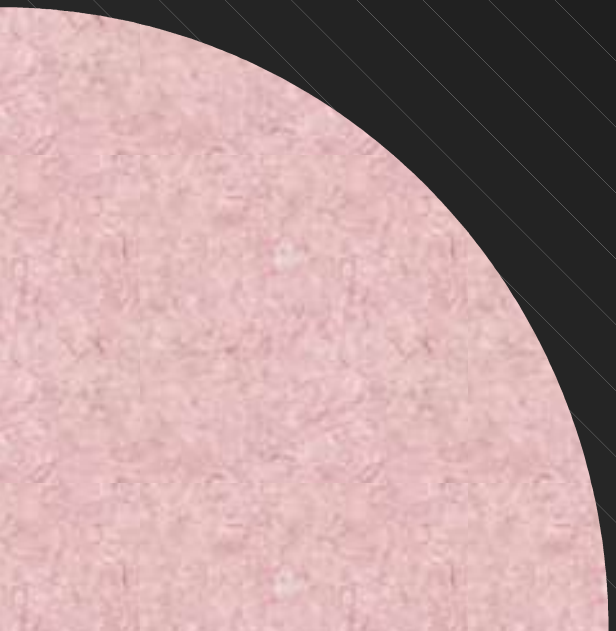




Current Tools

The Science (or Art) of Astronomy

- Unraveling the mysteries of distant objects
- What would it be like to be on Pluto?
- What else is out there?

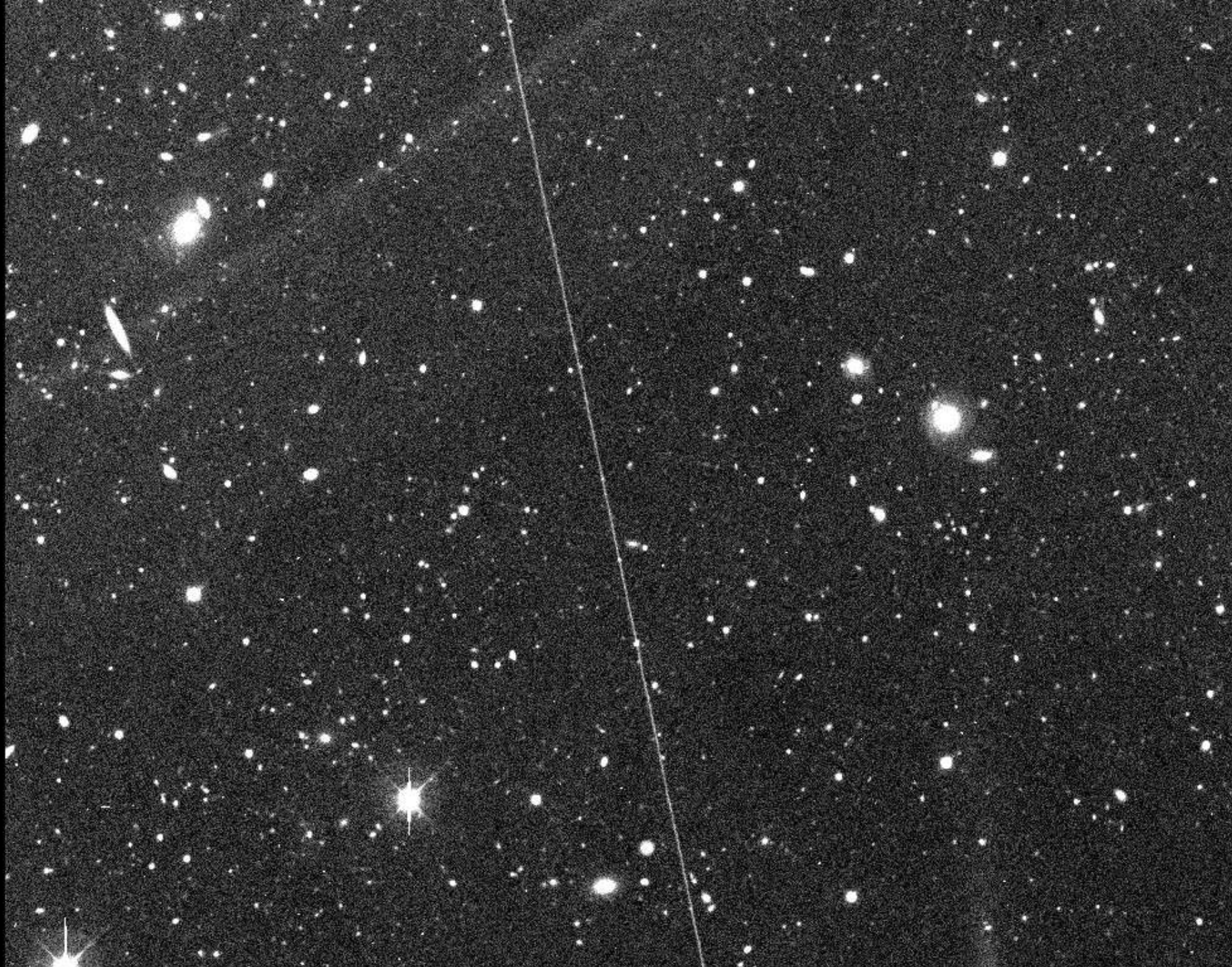


Discovery Techniques

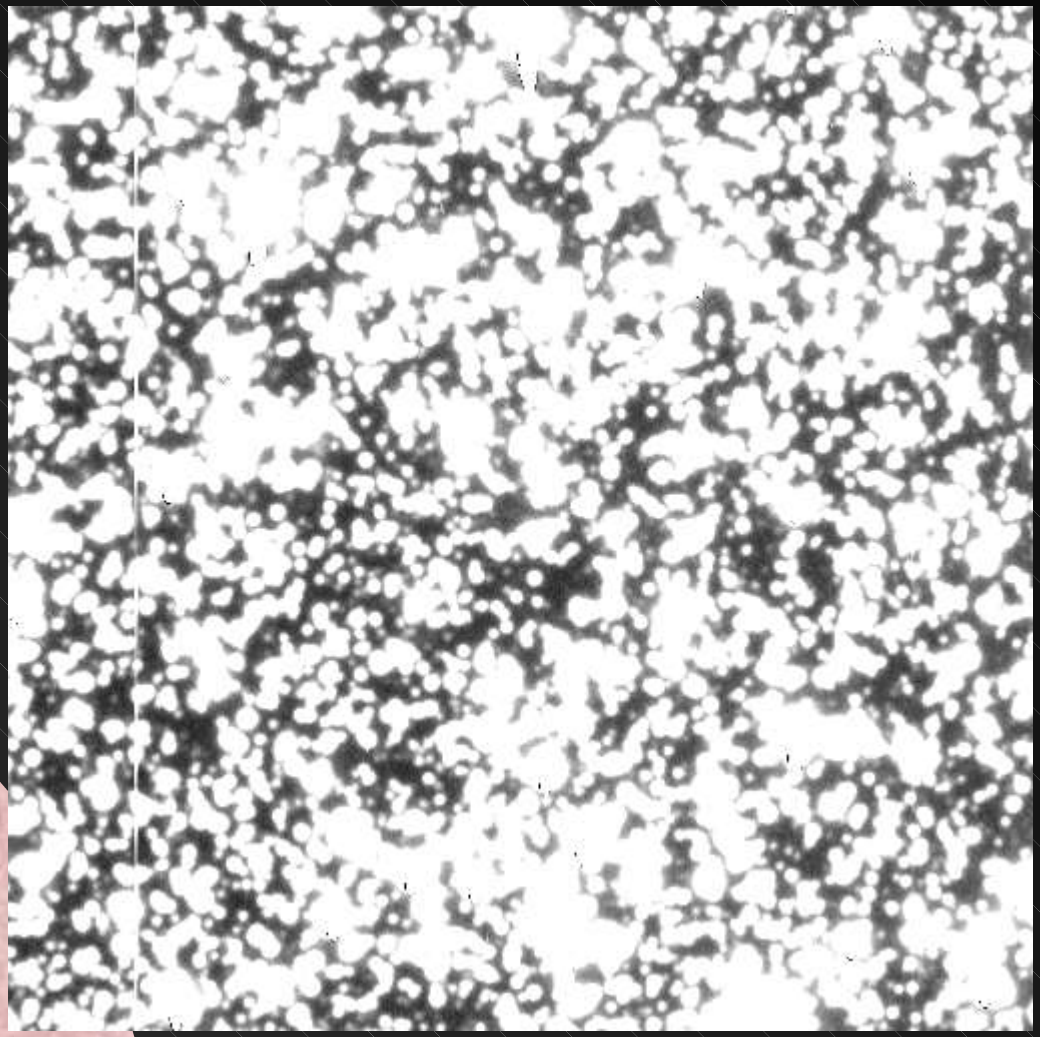
- The human eye
- Photography
- Electronic detectors
- Computers

Jan 23, 1930

Jan 29, 1930



Searching for NH target



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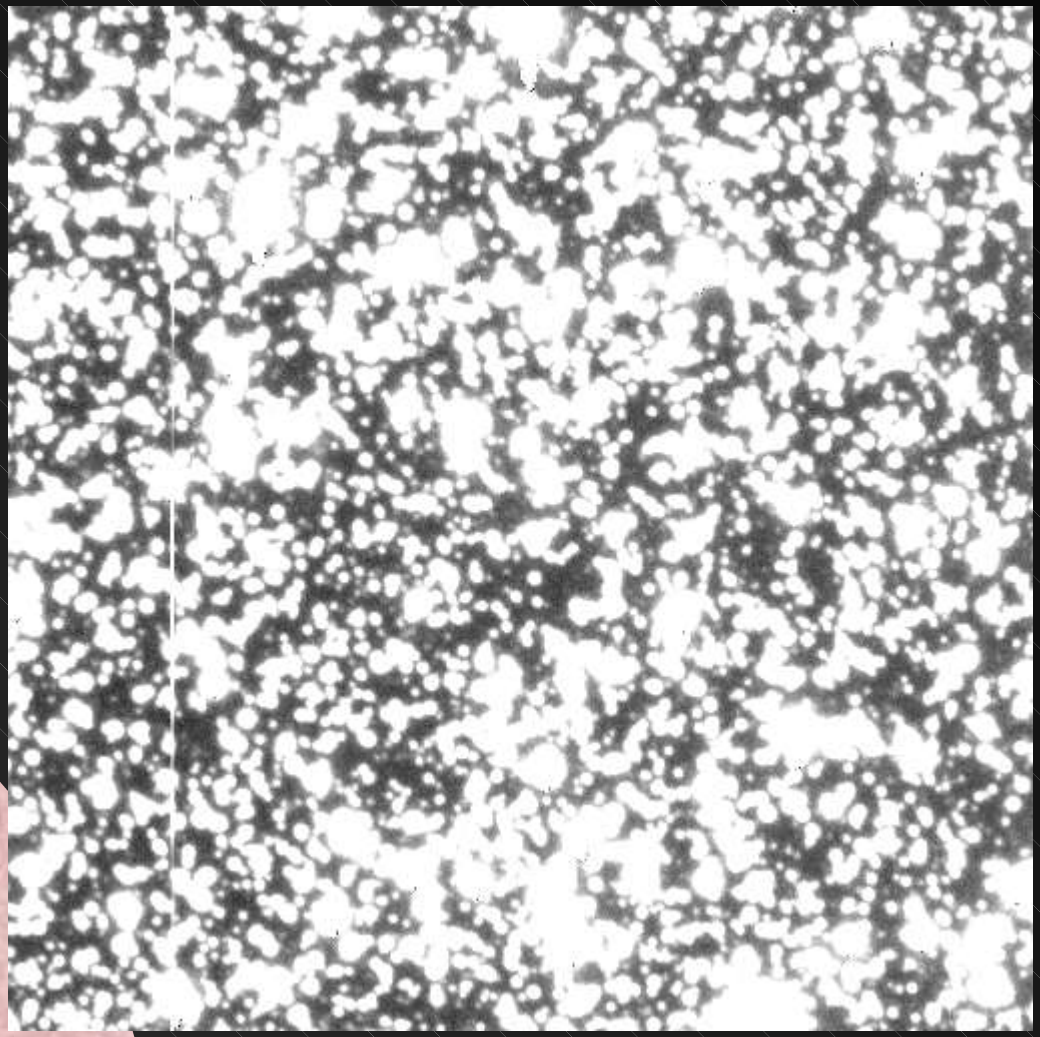

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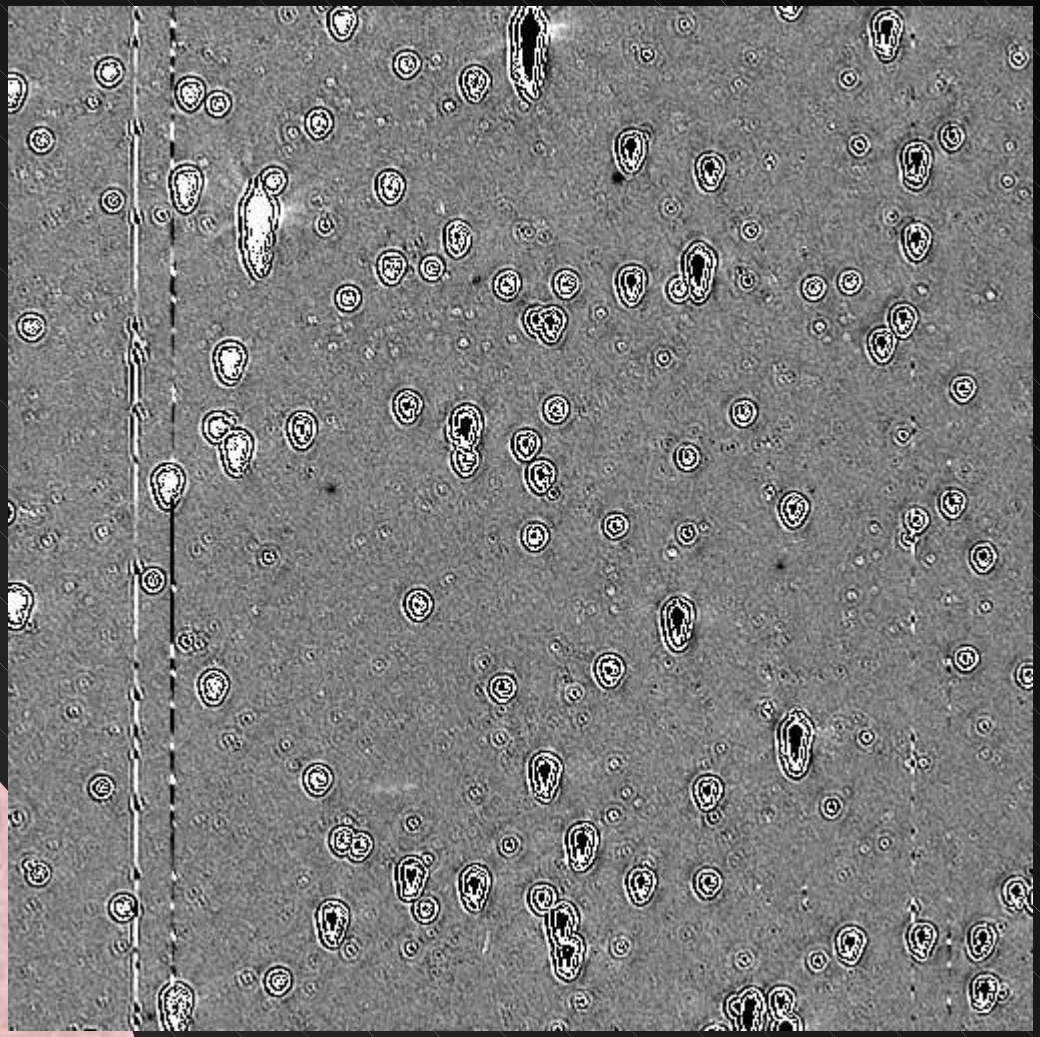
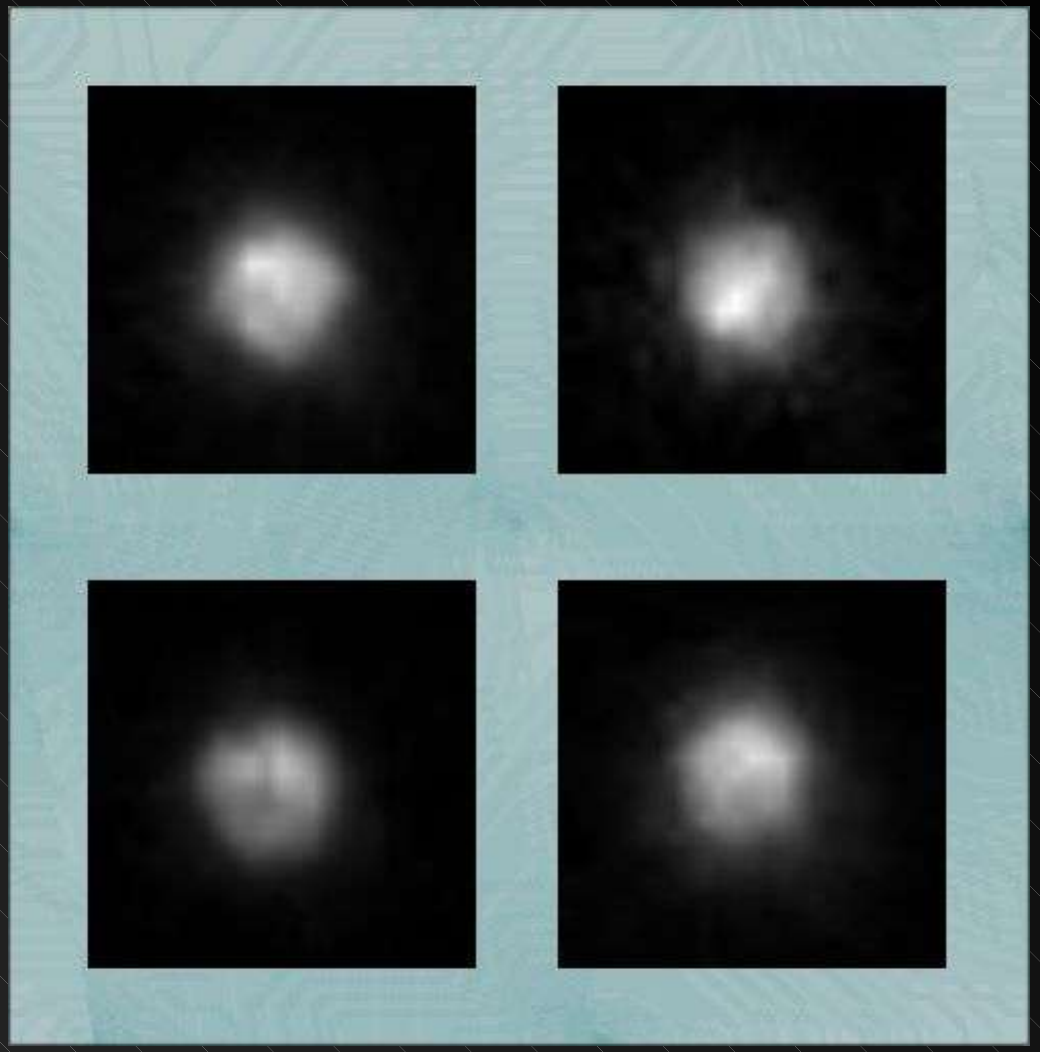
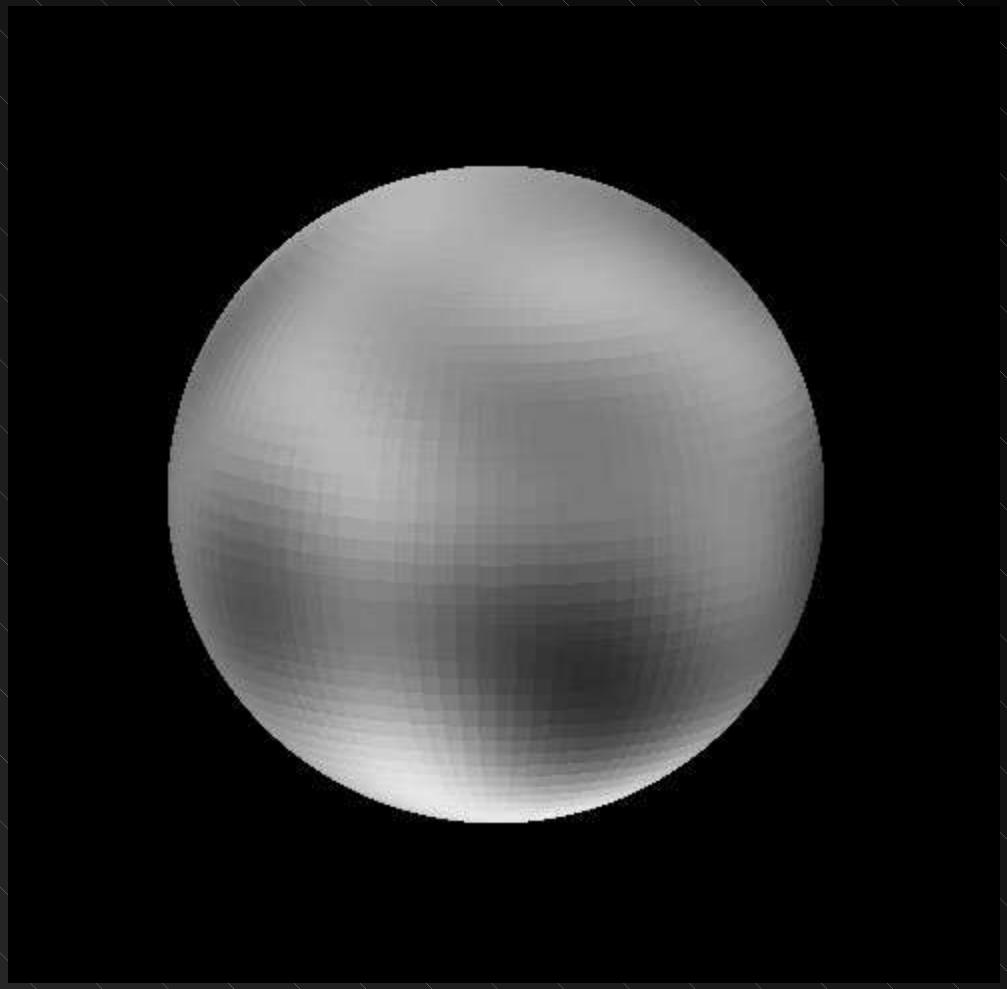


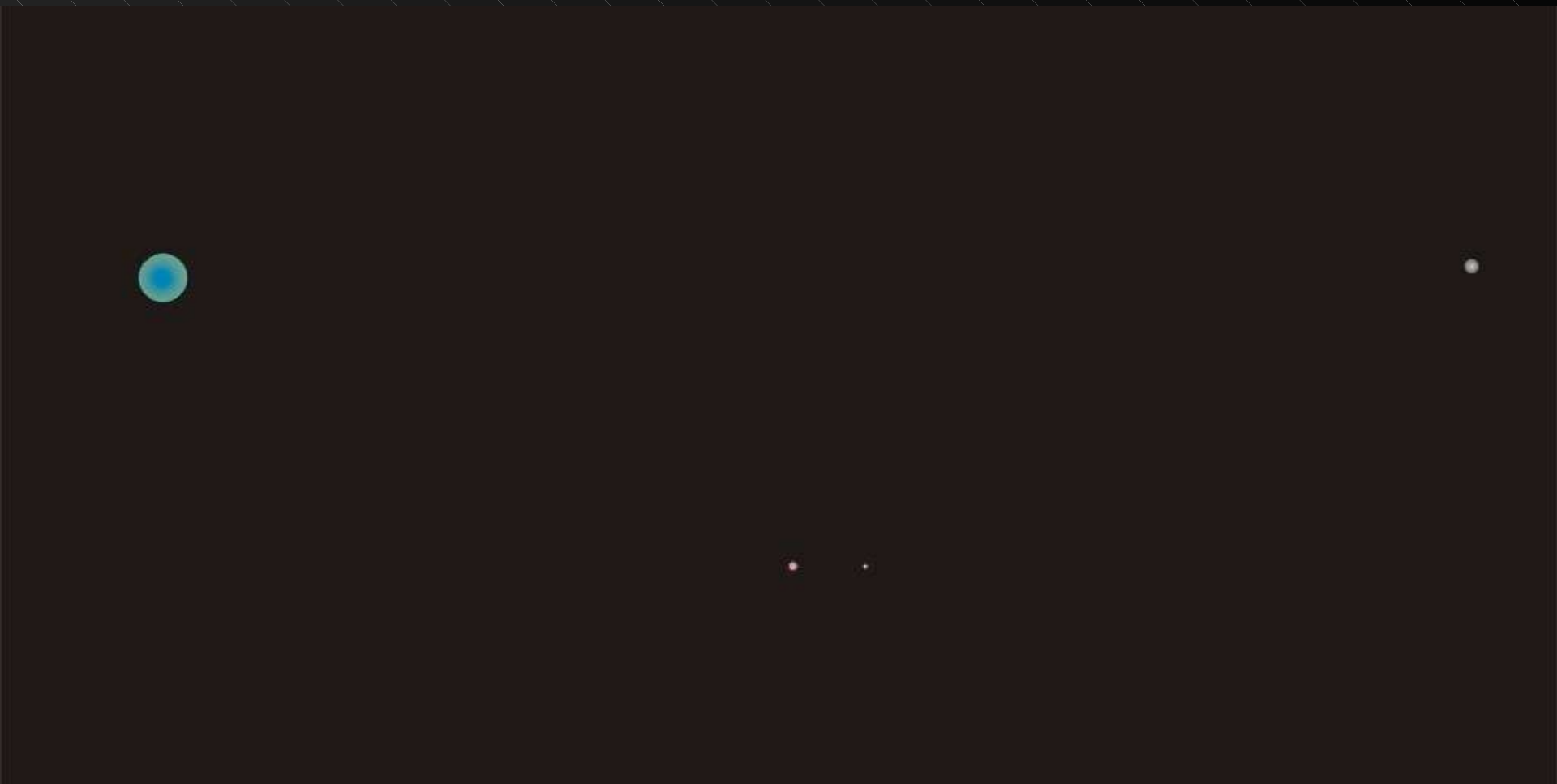
Best Images of Pluto

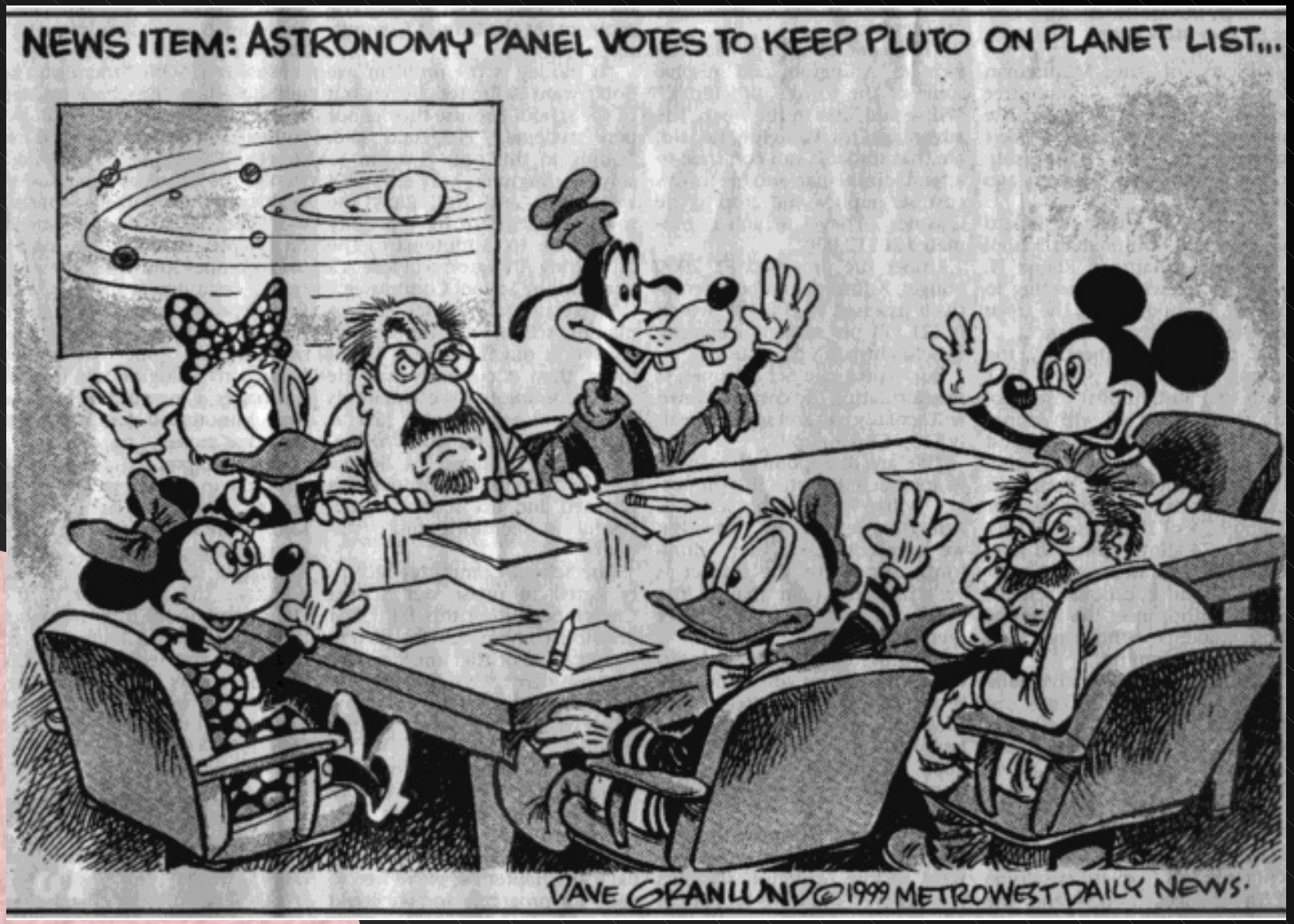


Current Best Map



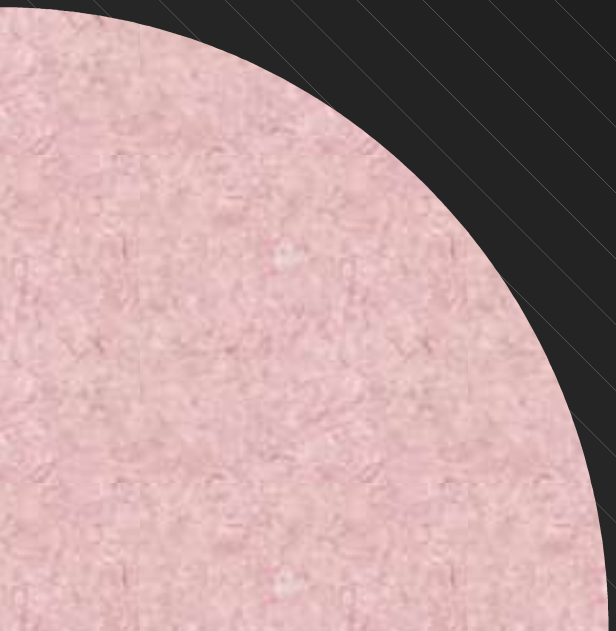
Earth-Moon
Pluto-Charon




NEWS ITEM: ASTRONOMY PANEL VOTES TO KEEP PLUTO ON PLANET LIST...
DAVE GRANLUND©1999 METROWEST DAILY NEWS.

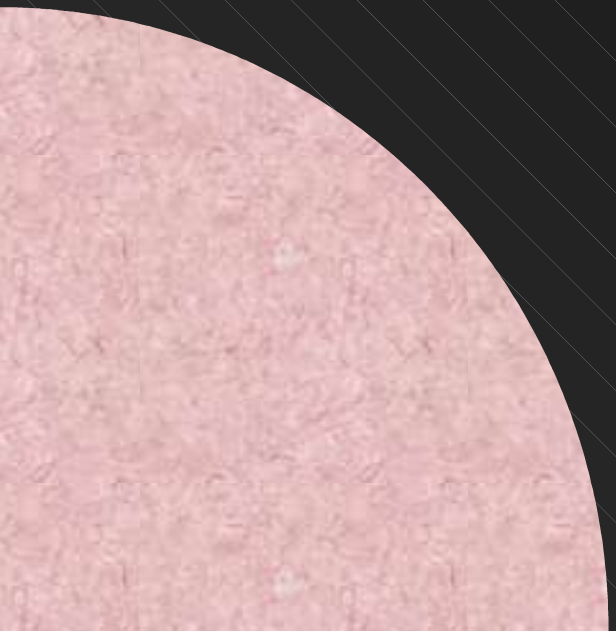
What *Is* A Planet?

- Too small to burn like a star
- Enough gravity to make it spherical



What Is A Double Planet?

- Two planets in orbit around each other.
- Center-of-gravity located outside the surface of both bodies.



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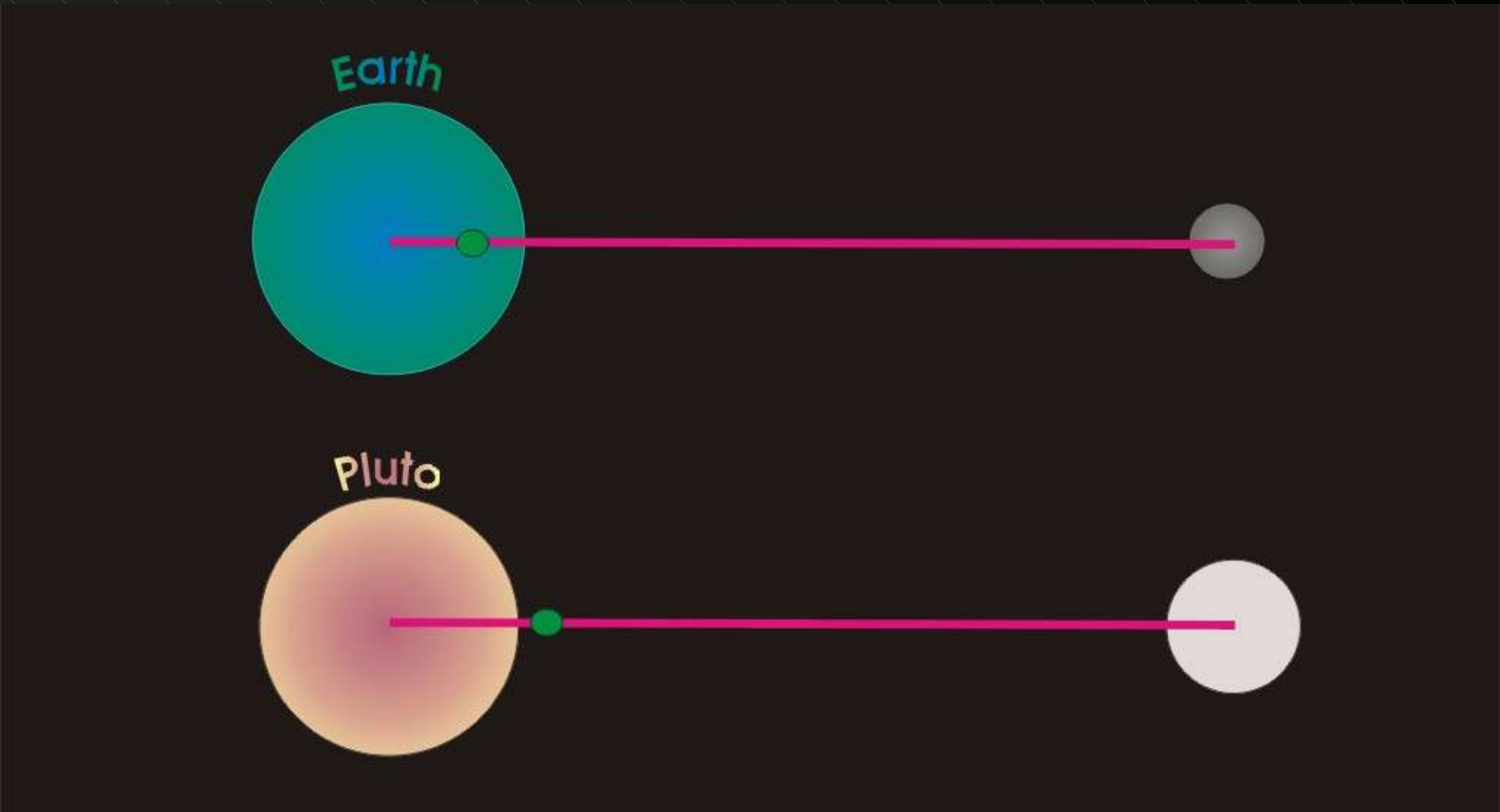
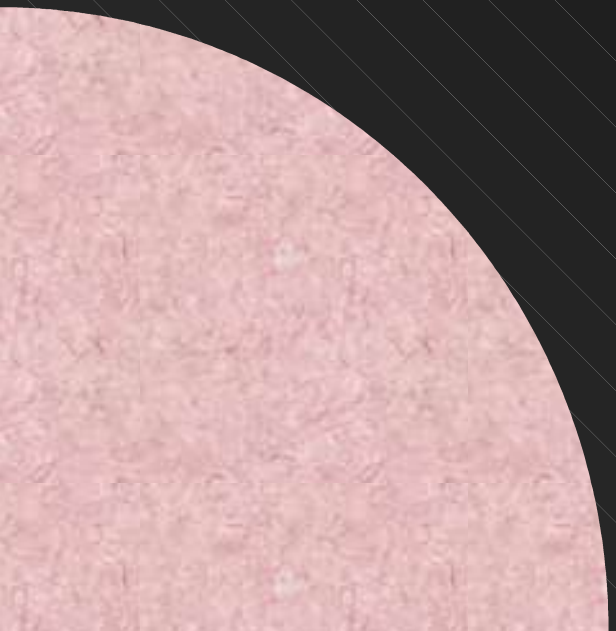


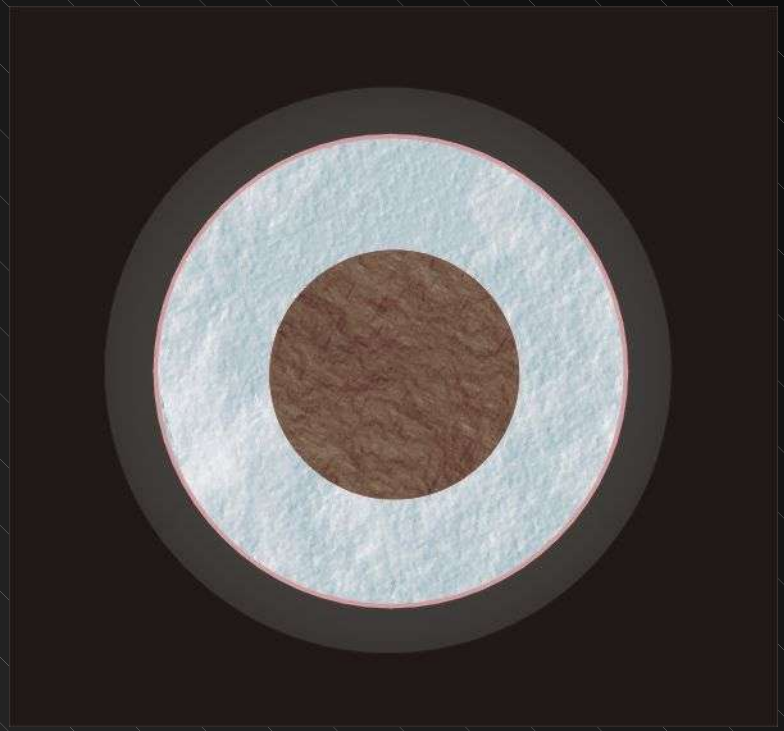
The Interior of Pluto

Rock

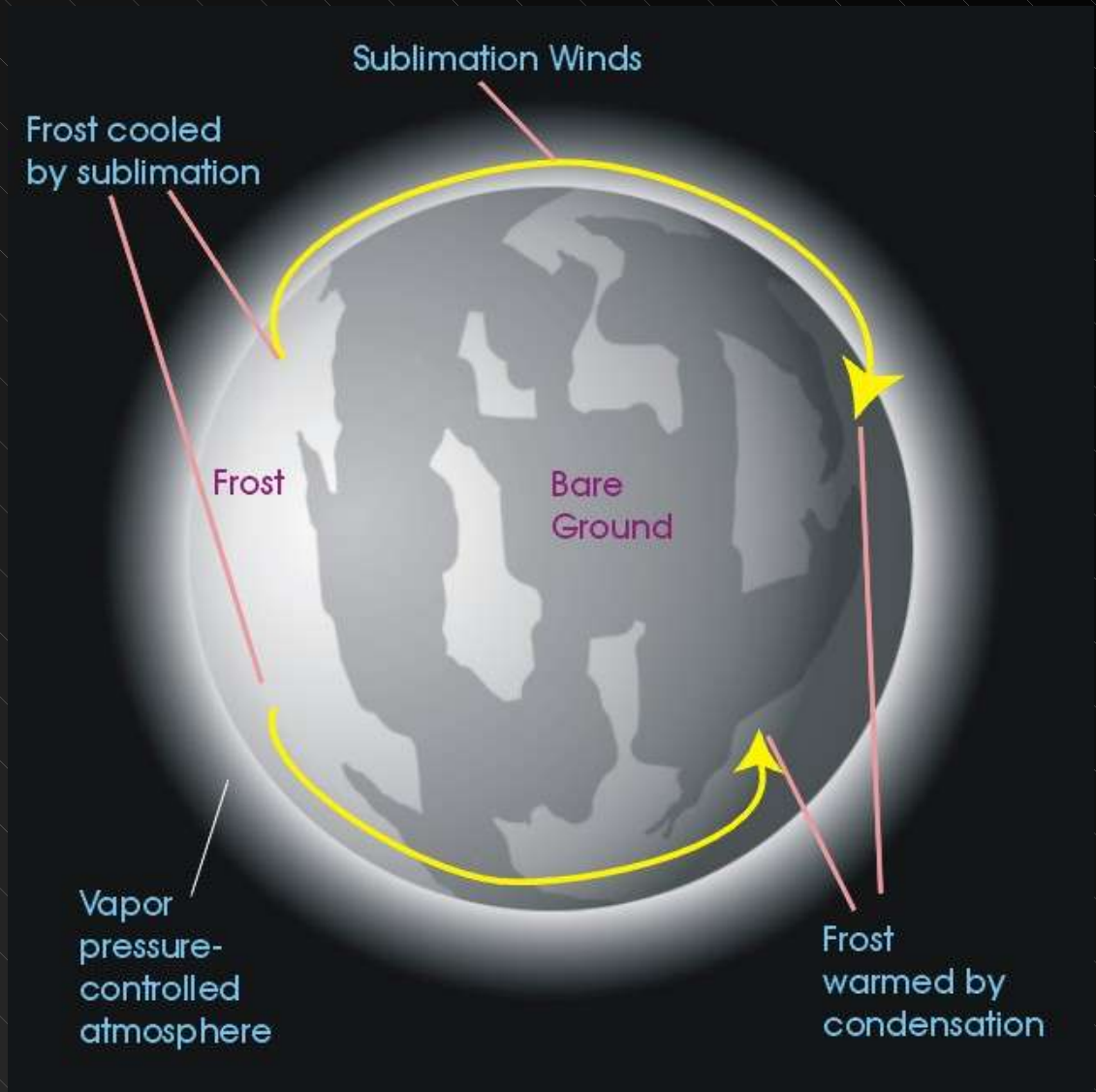
Ice (mostly H_2O)

Skin of N_2, CH_4, dirt and tar





Surface of Pluto



Surface of Pluto

- Bright
- Mostly N_2 (nitrogen frost)
- Methane (CH_4) frost
- Carbon monoxide (CO) frost
- Frozen water (H_2O)
- Dark red stuff (frozen-smog)

Atmosphere of Pluto

- Very thin (million times less than Earth)
- Extended because of Pluto's low gravity
- Mostly N_2 (nitrogen, just like Earth)
- Some methane (CH_4)
- Possible thin haze

Atmosphere comparison

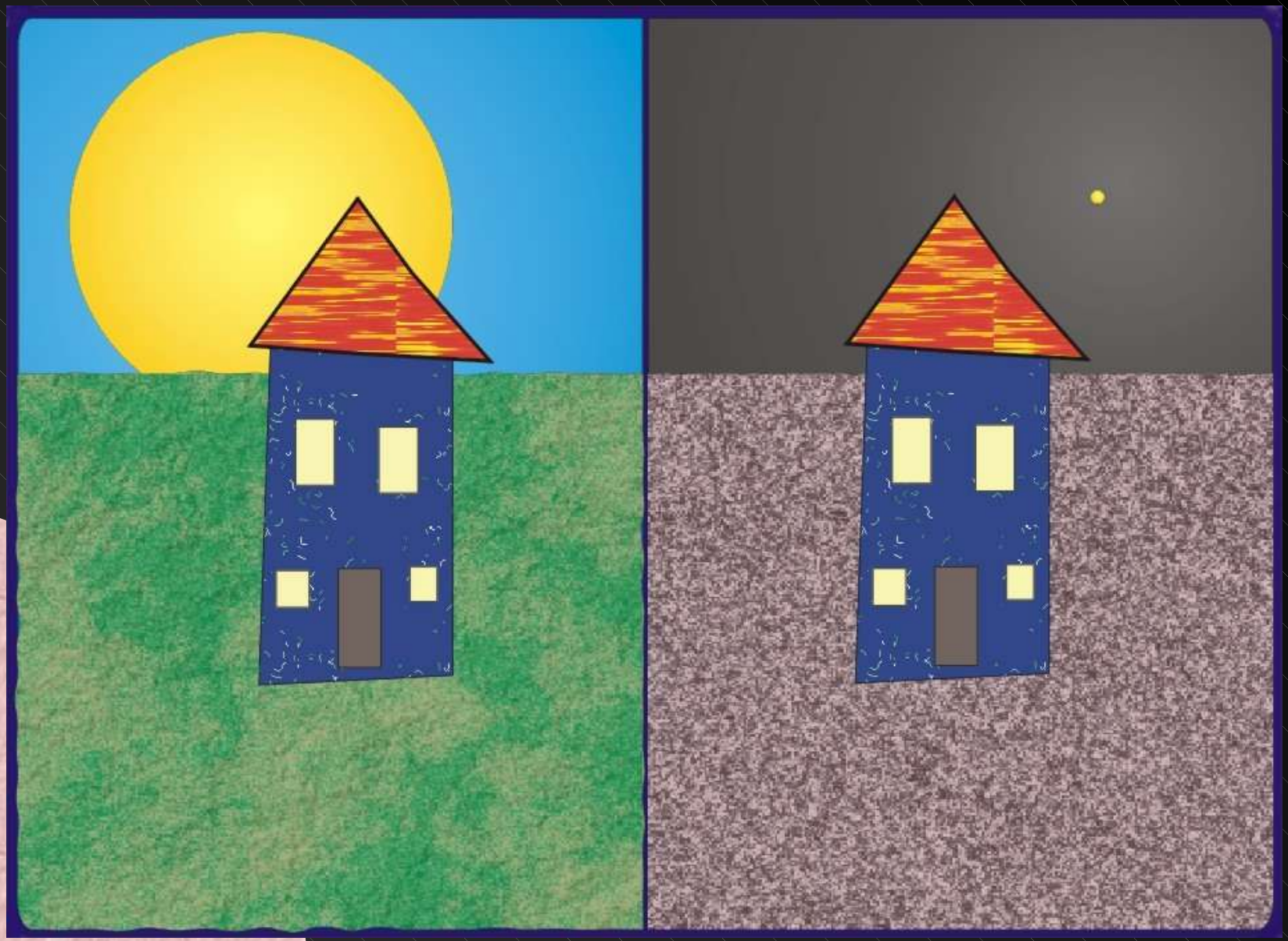
Earth

- 1 bar
- N_2, O_2, CO_2, H_2O
- 300K
- Locally Dynamic
- Stable

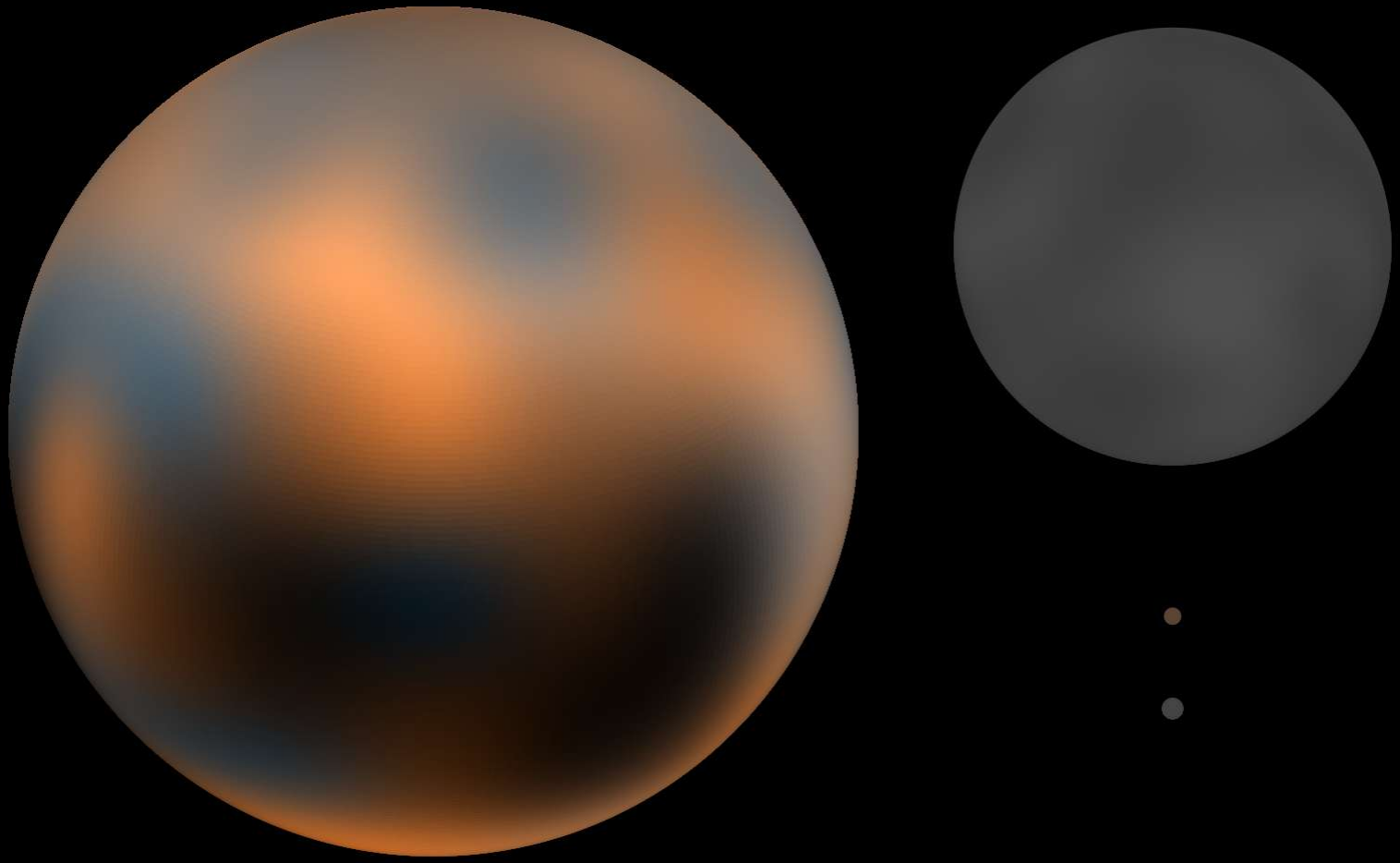
Pluto

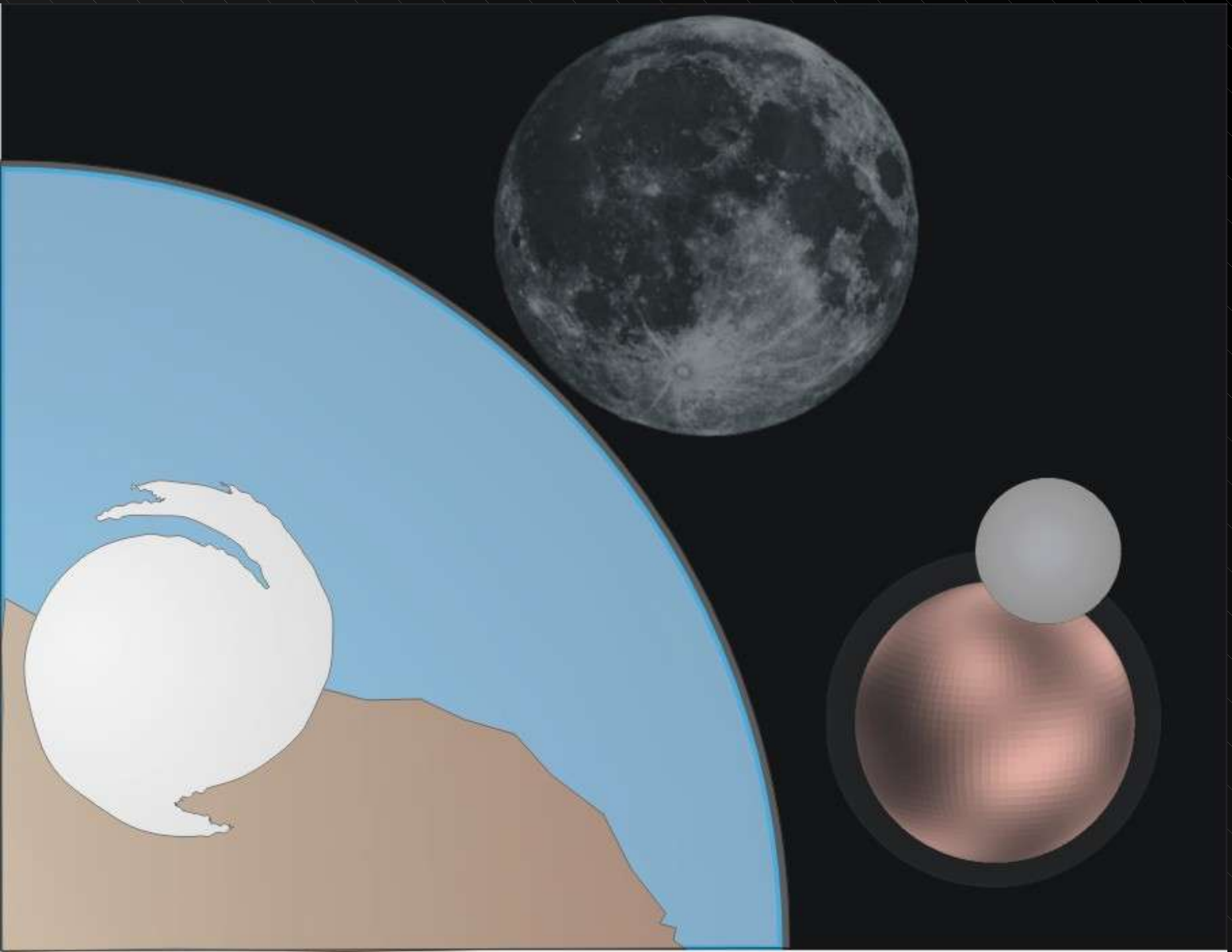
- 0.000001 bar
- N_2, CH_4, CO
- 40K
- Globally Dynamic
- Unstable

Sun from Earth and Pluto



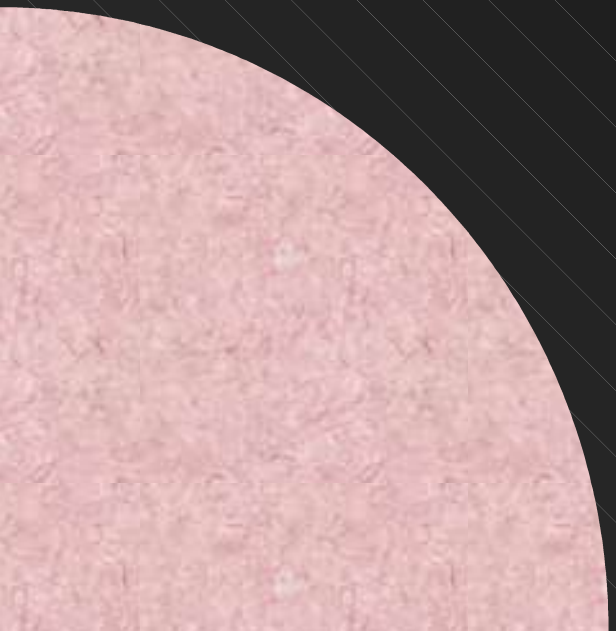
Family portrait (revised)



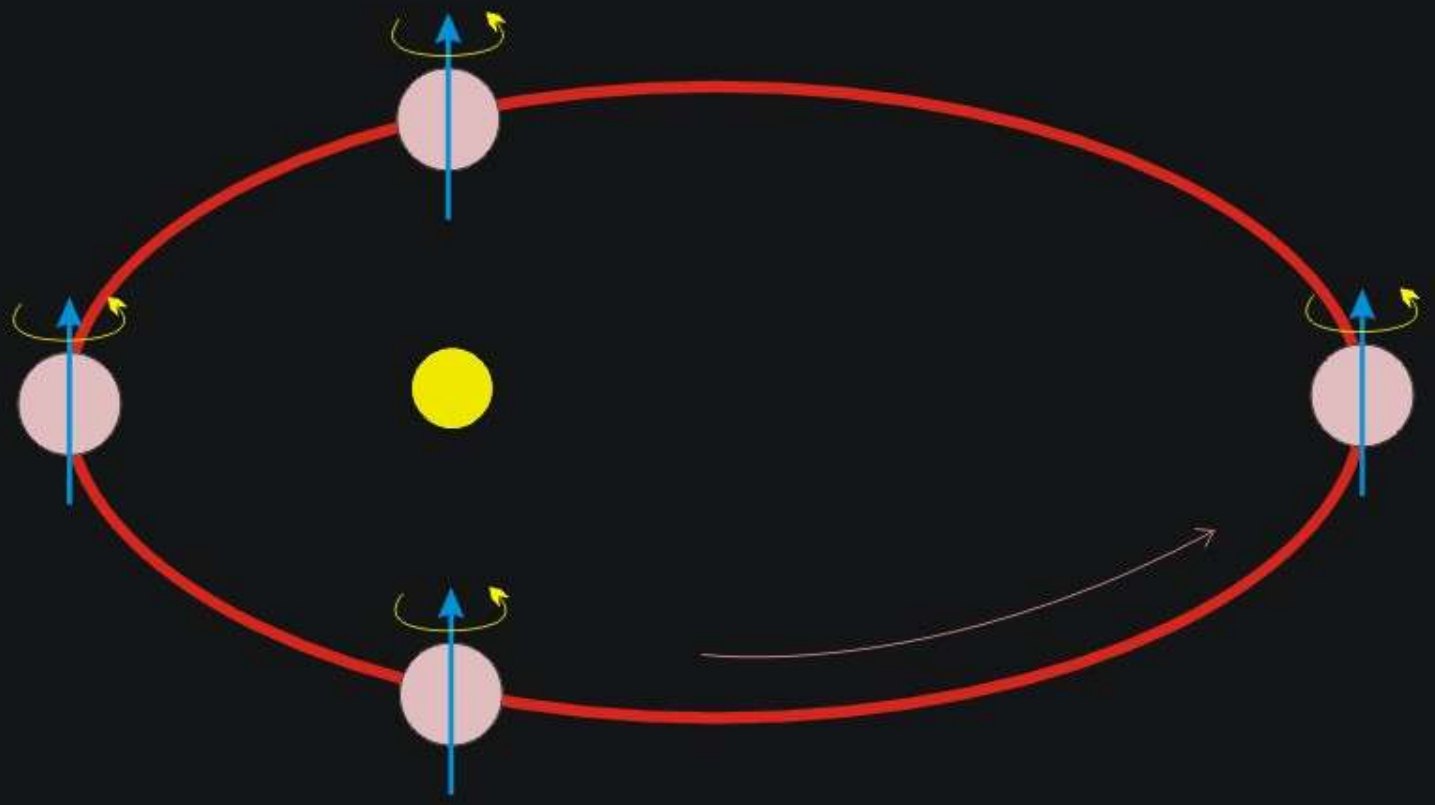


Seasons on Pluto

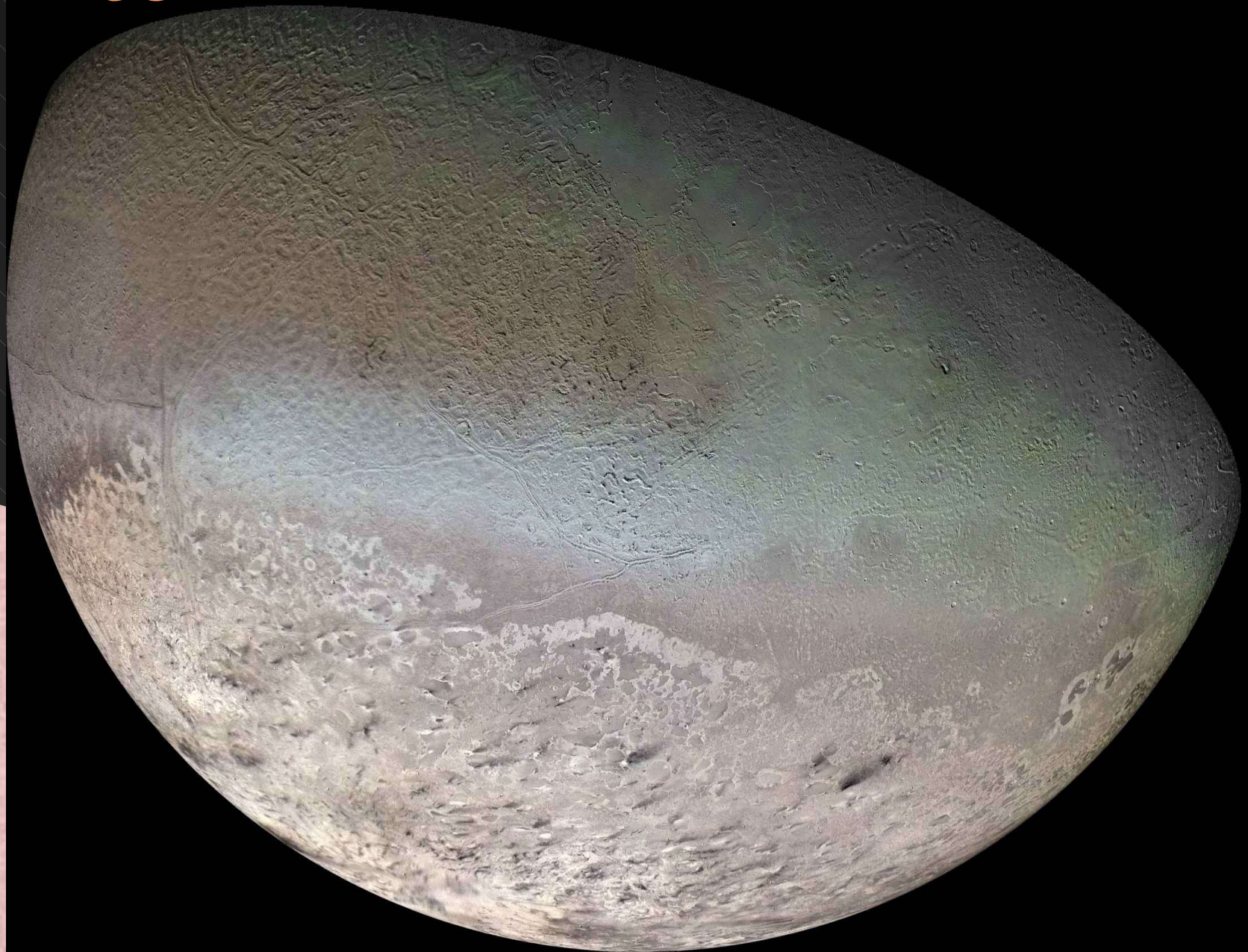
- 240 year orbit around the Sun
- Distance to Sun changes dramatically
- Rotational axis tipped over
- Atmosphere may collapse in winter



Seasons on Pluto



Triton



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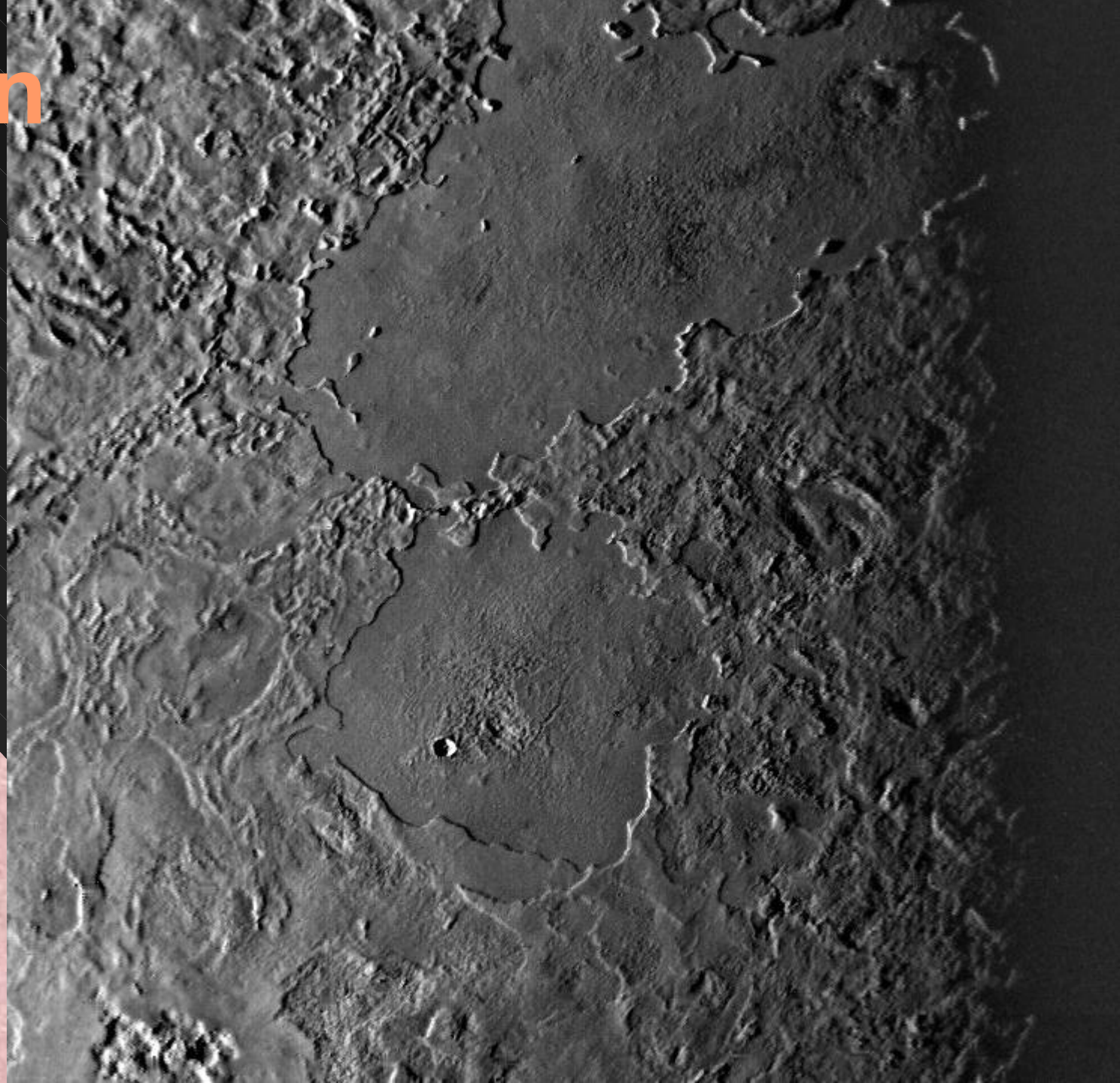

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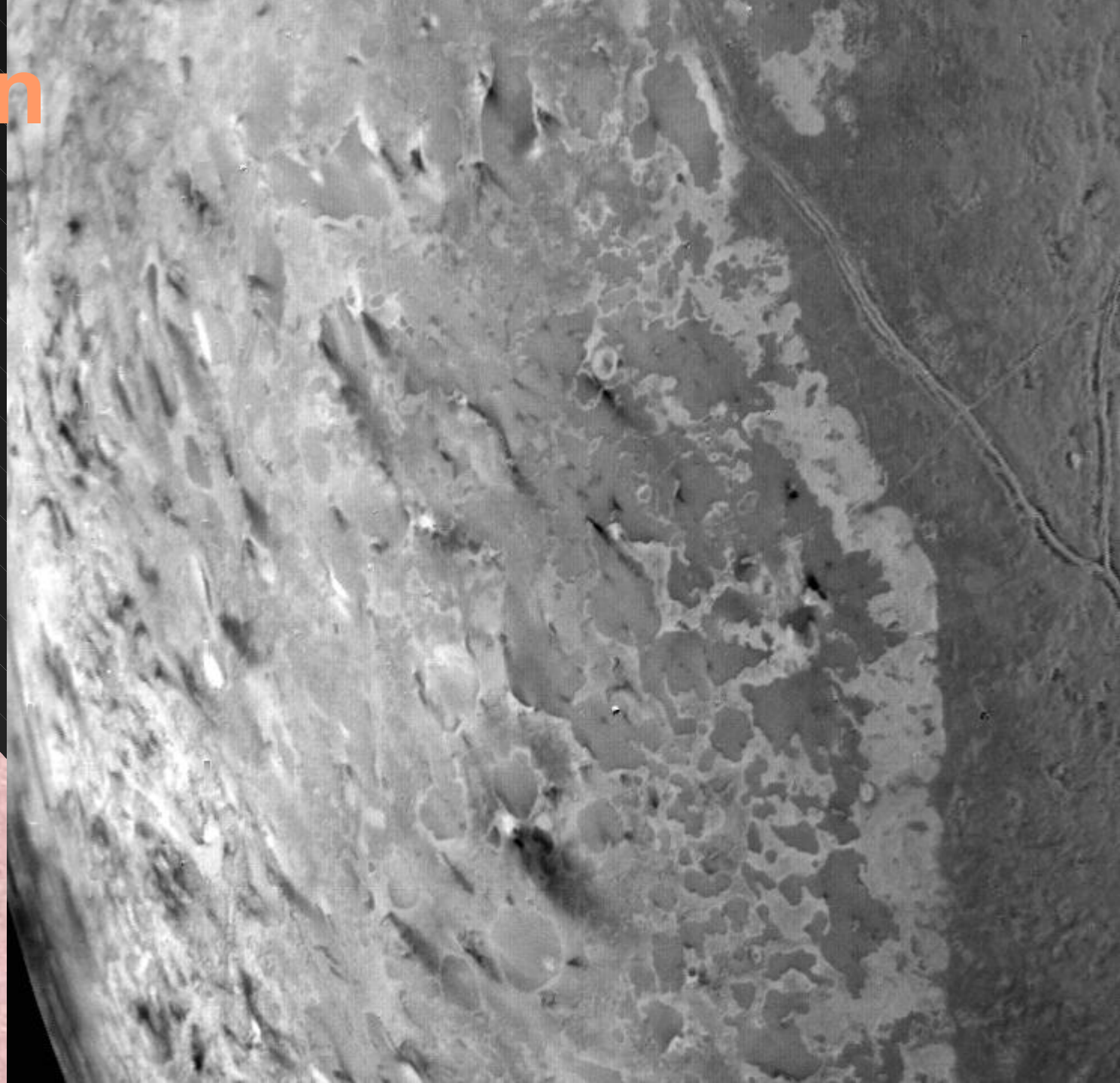
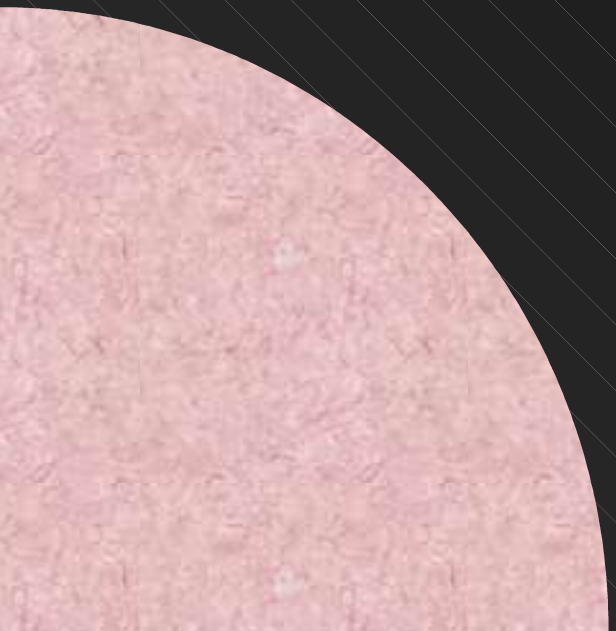


New Horizons

- First visit to the Pluto system
- Visit beyond to a more distant Kuiper Belt object

- Launch 2006
- Arrival at Pluto in 2015




LOCKHEED MARTIN
USAF

Primary Mission Goals

- Characterize the global geology and morphology of Pluto and Charon
- Map surface composition of Pluto and Charon
- Characterize the neutral atmosphere of Pluto and its escape rate