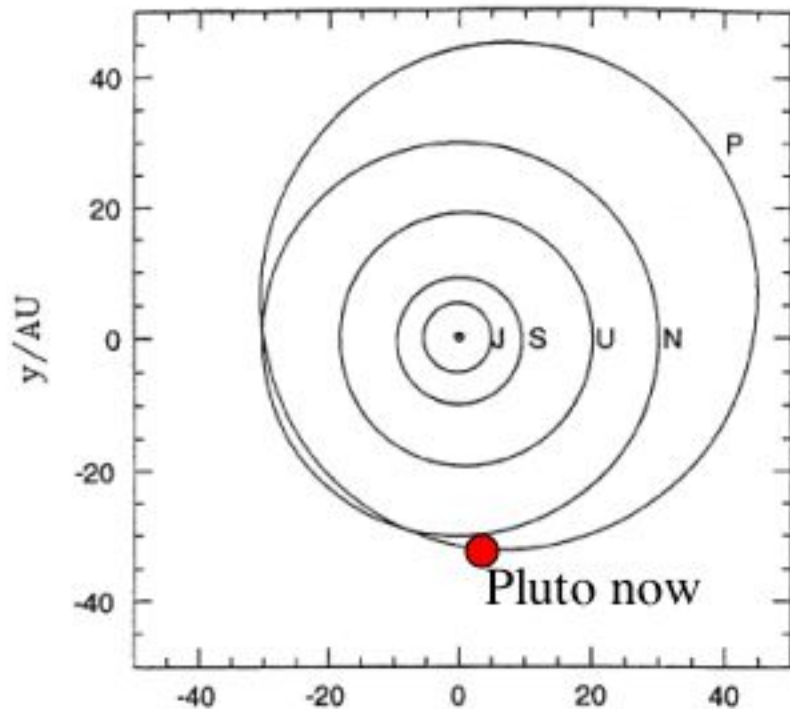


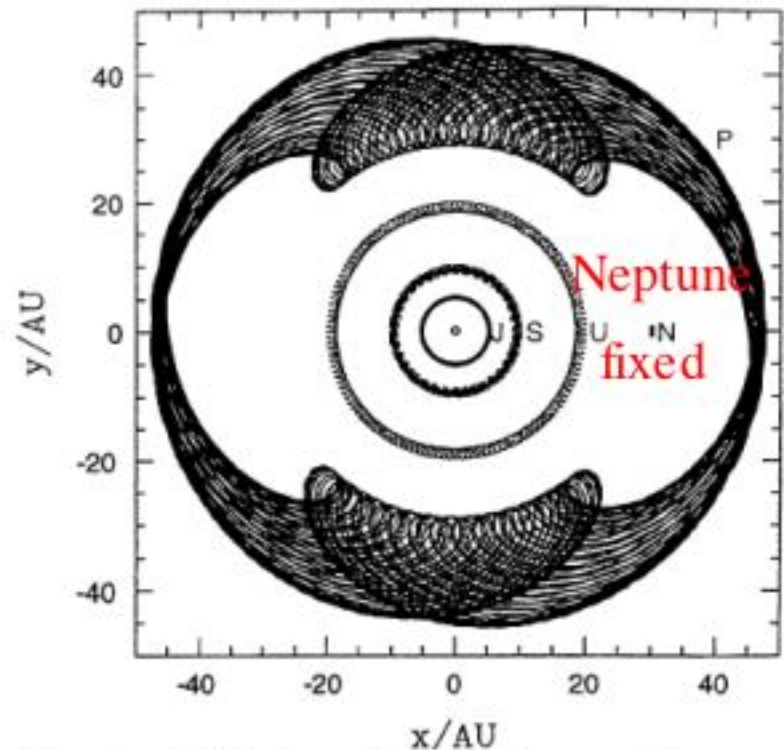
- Pluto: Discovered by Clyde Tombaugh 1930
- Pluto orbits the Sun on an elliptical path, tilted 17 degrees from the ecliptic plane, between 30 and 50 AU
- Pluto's orbital period = 248 years. Perihelion was Sept. 1989

Looking down on the solar system - the orbits of the outer planets



Because Pluto is sometimes closer to the Sun than Neptune, some people thought it might be an escaped moon of Neptune.

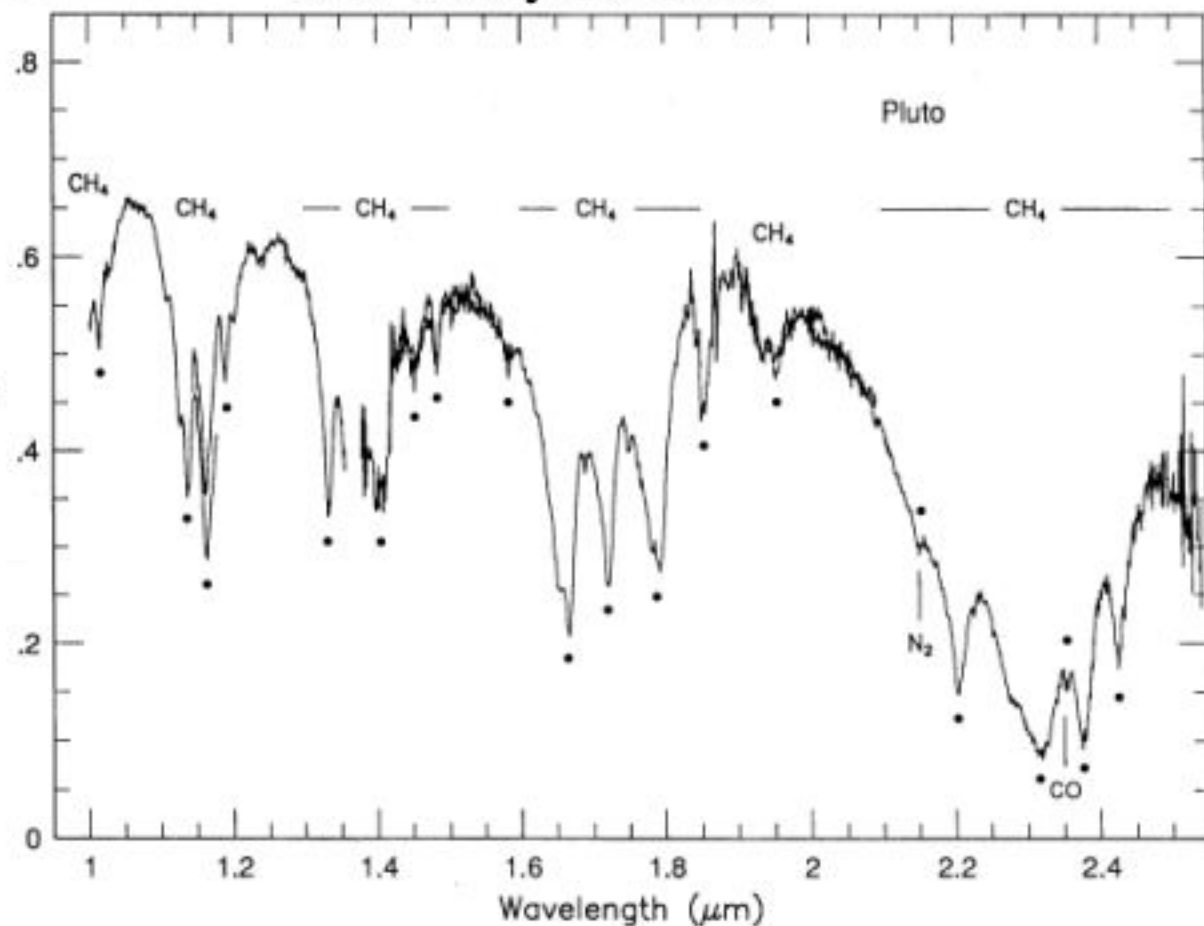
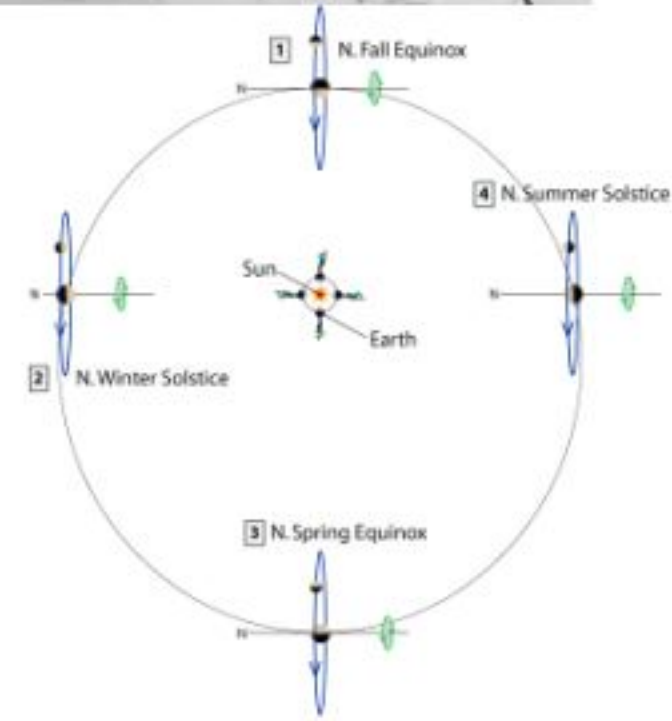
Keeping Neptune fixed and watching the paths of the other planets for millions of years

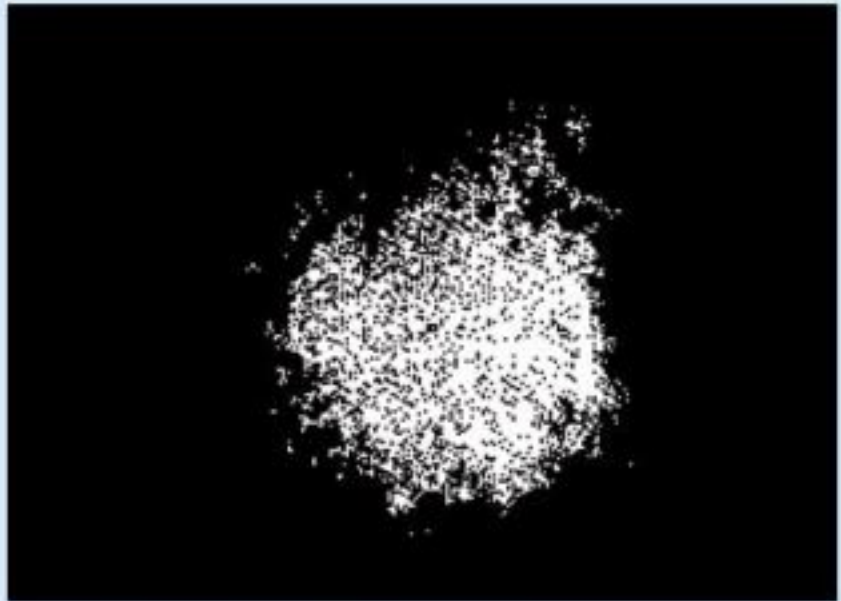
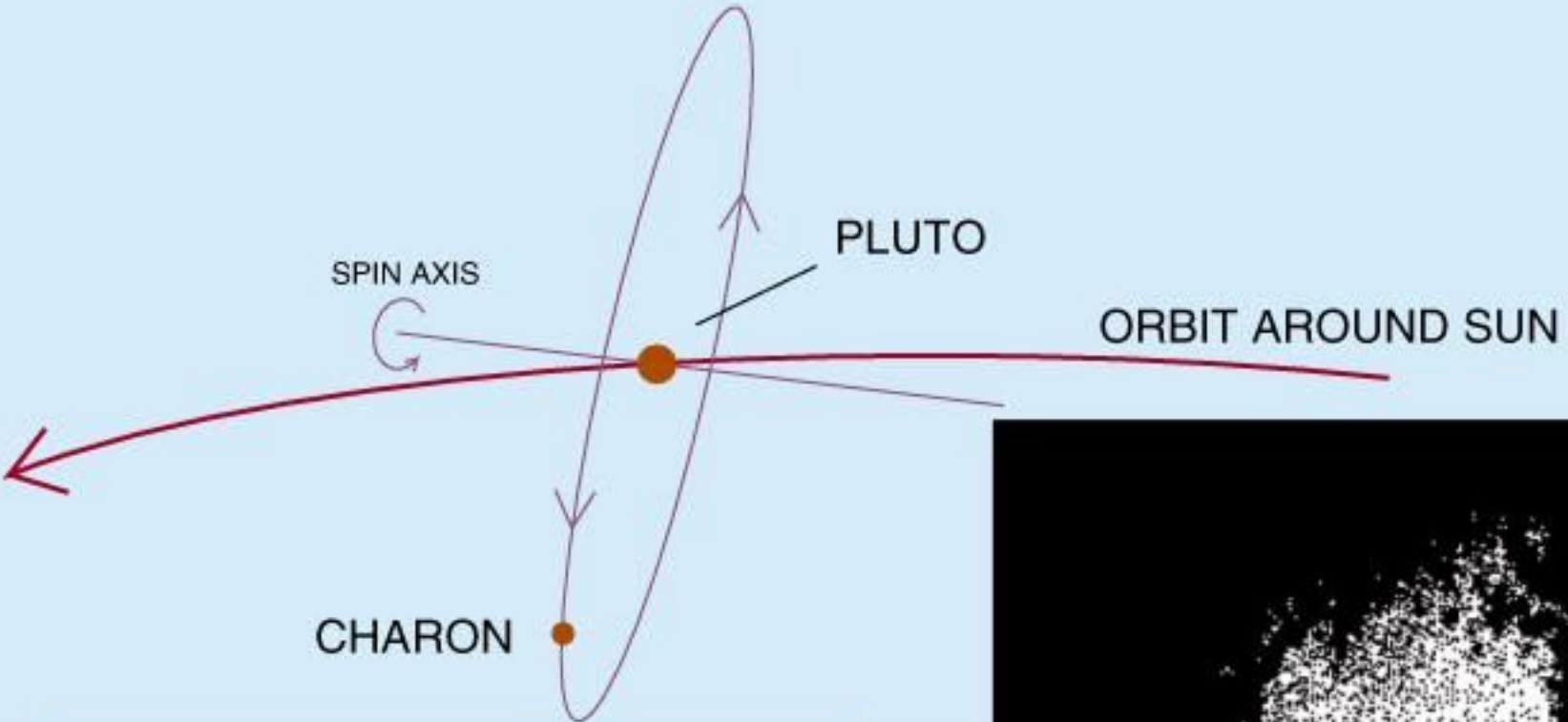


But orbital calculations show that Pluto and Neptune's orbits are in a 3:2 resonance - they dance together - but never get close.



- 1975 Detection of surface ices: CH_4 , N_2 , CO
- Implied possible sublimation atmosphere
- With strong seasonal changes over 248 year orbit





Pluto's Satellite Charon

Mutual Eclipses of Charon and Pluto

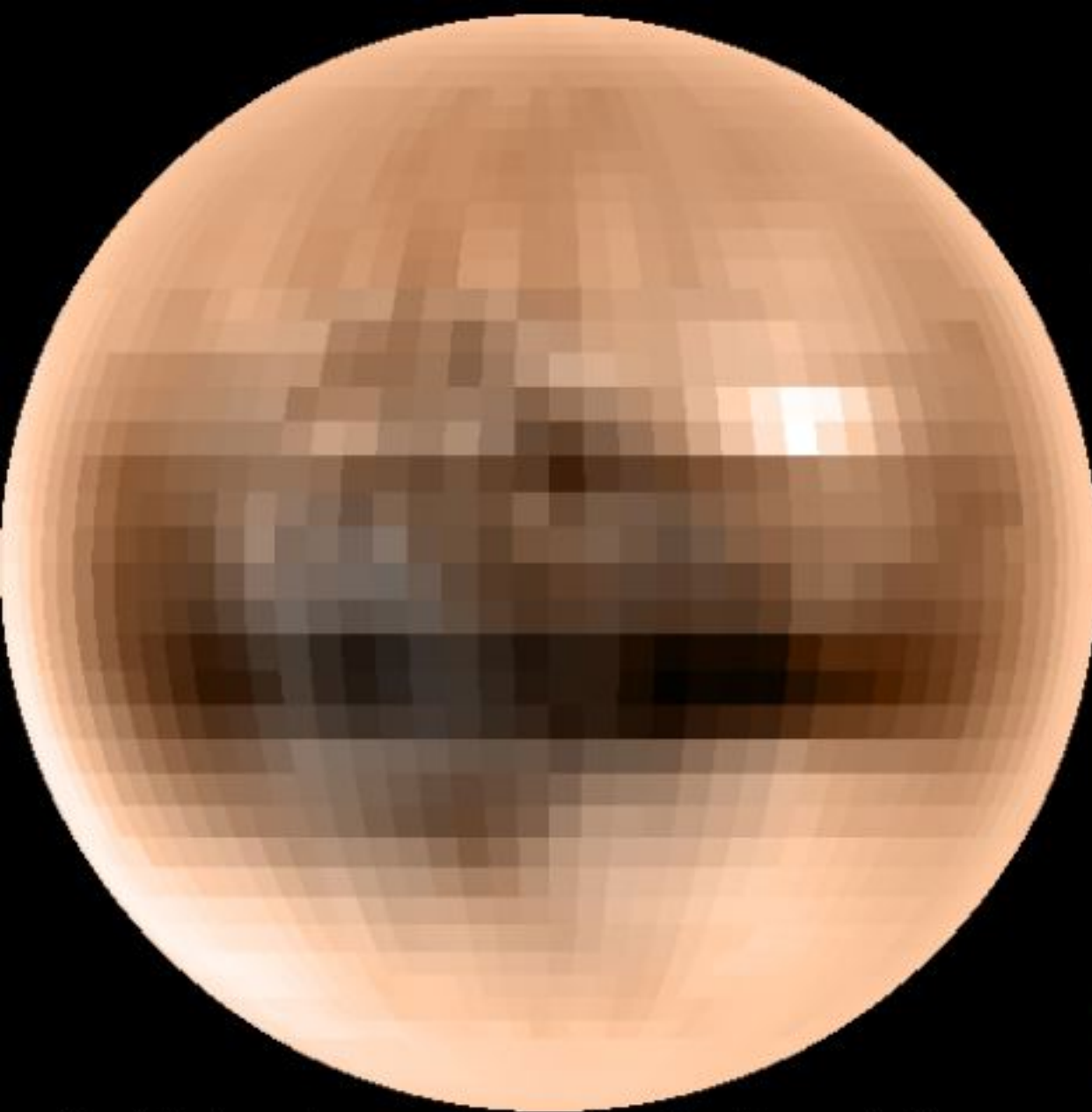
created by

Alan Sill
Texas Tech University

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Orbital Parameters:

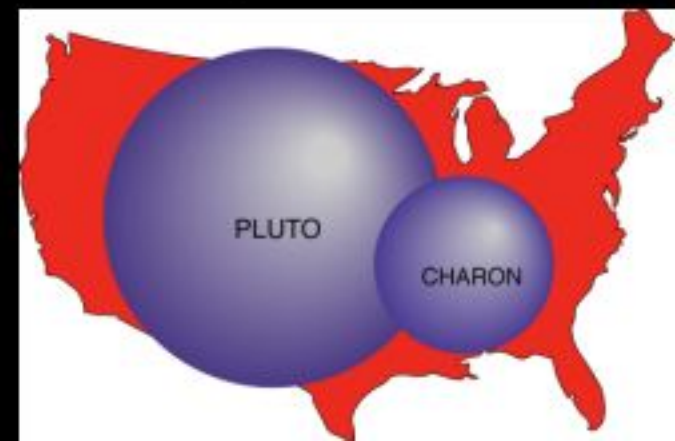
- Distance from Pluto = 17,600 km
- Orbit Period = 6.3867 days
- Circular orbit



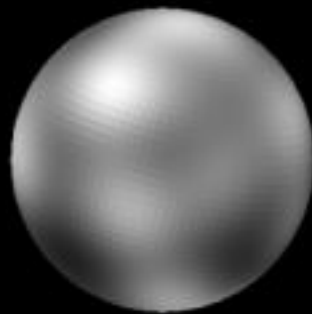
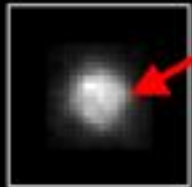
Reddish color and strong albedo variations



Temperature:
40 Kelvin
= -233 C = -340 F

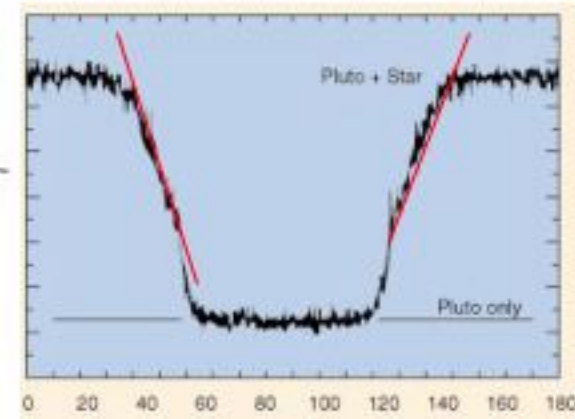
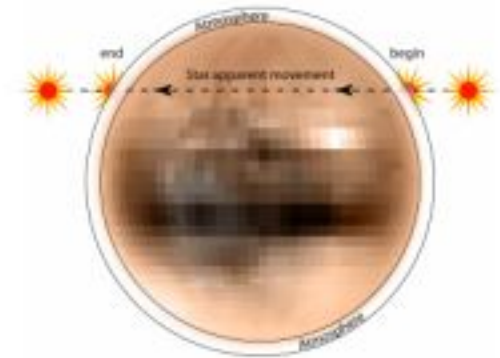
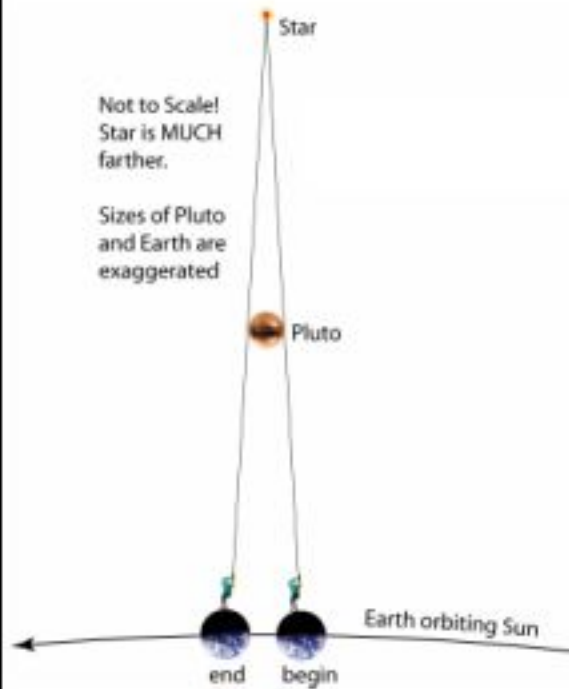


Hubble's Best Picture



Pluto

Smoothed and modeled image



- 1988 Stellar occultation by Pluto
- Gradual decrease in starlight -> atmosphere
- $P_0 \sim 3$ nanobar, $T \sim 50K$