



THE ATMOSPHERIC RESERVOIR

Examining the Atmosphere and Atmospheric Resource Management

Pluto: Our Distant Dwarf Planet

By Mark D. Schneider

Besides being the former ninth planet of our solar system, Pluto's reclassification as a dwarf planet in 2006 is just one item of more recent interest to us. Fascinating discoveries are currently being made about Pluto that may have implications for our understanding of Earth. Last year, NASA's space probe New Horizons began sending information about Pluto back to Earth and it will likely take until the end of 2016 to download the data in its entirety.

Unlike Earth, Pluto's atmosphere is thought to be a periodic one, consisting of nitrogen, methane, and carbon dioxide gases which are present when the planet's orbit brings it closer to the sun and it heats up. As Pluto moves away from the sun, the gases in its atmosphere freeze and solidify and it's thought that the atmosphere disappears.



Credit: NASA/APL/SwRI.

According to Space.com, in 2006, 424 scientists (making up less than five percent of the world's astronomers) with the International Astronomical Union decided the criteria defining a dwarf planet with a vote. These criteria state that a dwarf planet: orbits the sun, has enough mass to assume a nearly round shape, is not a moon, and has not cleared the neighborhood around its orbit. To explain the last criterion, Pluto is part of what's known as the Kuiper Belt, or region beyond Neptune where thus far only dwarf planets, moons, asteroids, and comets are known to exist. The theory is that when our solar system was formed, the conditions outside of Neptune weren't favorable enough for a "regular" planet with greater mass to develop, so instead this area was left with smaller, less dense "bodies" that have less gravitational influence on each other. Under this definition, both Pluto and its moon Charon are considered dwarf planets because they both orbit a point in space that lies between them, instead of one orbiting the other. Pluto and Charon are actually given the name double dwarf planet, double planet, or binary system. Also, neither Pluto nor Charon have enough mass to "clear" the remaining objects in the Kuiper Belt with their gravitational influence, so the region is scattered with what's thought to be hundreds of thousands of "icy bodies," which are objects with diameters greater than 62 miles or 100 kilometers.

Because Pluto has an exaggerated elliptical orbit, its perihelion, or closest orbit to the sun actually passes inside of Neptune's. This means that before 2006 when Pluto was considered the ninth planet, there were times when its orbit officially made it the eighth!

The importance of New Horizons initial discoveries including a frozen lake that scientists believe contained liquid nitrogen, channels on Pluto's surface where fluids may have flowed and evidence of 11,000 foot mountains that appear to be formed on a bedrock of water ice indicating a warmer period in Pluto's history could help us better understand our solar system's formation and quite possibly Earth's past, present and future.

Atmospheric Resource Board | North Dakota State Water Commission | 900 East Boulevard, Bismarck, ND 58505
(701) 328-2788 | <http://swc.nd.gov>

ND Weather Modification Association | PO Box 2599 | Bismarck, ND 58502 | (701) 223-4232