

Dwarf Planet Ceres

On Friday morning (March 6), NASA's Dawn spacecraft will arrive at Ceres, becoming the first probe ever to orbit a dwarf planet. Ceres is the largest object in the asteroid belt between Mars and Jupiter, and the closest dwarf planet to Earth. Dawn is expected to provide a wealth of information about Ceres' evolution and composition.

While Dawn's work will be the first in-depth examination of Ceres, astronomers have learned a bit about the dwarf planet already using NASA's Hubble Space Telescope. Here are seven weird facts about Ceres.

1. It was the first asteroid to be discovered

Ceres was first spotted on Jan. 1, 1801 by Sicilian astronomer Giuseppe Piazzi. The asteroid was found after Piazzi followed up on mathematical predictions (later determined to be false) that there should be a planet between Mars and Jupiter.

At first Ceres was called a planet, but as more asteroid belt members were discovered, Ceres was demoted to asteroid. Its status changed again in 2006 when it was promoted to dwarf planet — a classification it shares with Pluto, which was demoted from full-fledged planet that same year in a move that remains controversial today.

2. It was named after the Roman goddess of agriculture

Piazzi called his discovery Ceres after the Roman goddess of harvests and corn. She also was considered the patron goddess of Sicily, according to the Encyclopedia Britannica. In 1803, the element cerium was named after the dwarf planet. Cerium is the most abundant of rare-Earth metals, the encyclopedia says, and (among other occurrences) it is found as a fission product of plutonium, thorium and uranium.

3. It has mysterious bright spots

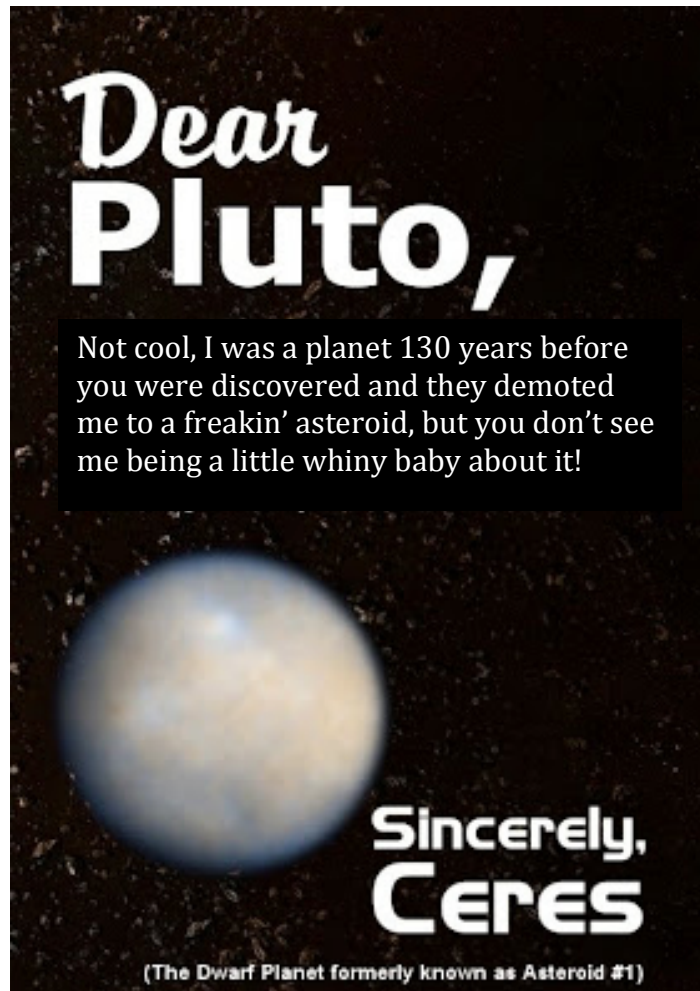
As Dawn sped towards the dwarf planet in late 2014 and early 2015, astronomers found two surprise bright spots at about 19 degrees north latitude on Ceres, inside a crater. There don't seem to be any mounds or features close to these spots, which suggests that they are not volcanic in origin.

The bright spots indicate a highly reflective material, likely water ice or salts, researchers say. Dawn team members hope the spacecraft will solve the mystery.

4. Ceres may have a water-vapor plume

The Herschel Space Observatory recently spotted water vapor emanating from Ceres. The plumes appeared to be generated from two locations (including close to where the white spots were found) and could be a product of icy volcanoes, scientists have said.

The vapor may also have sublimated, changing a substance from a solid to gas, off after a meteorite strike exposed subsurface ice to space. The plume's nature is another mystery for Dawn



to investigate.

5. Ceres may harbor a subsurface ocean

Water-vapor geysers would hint at the presence of a subsurface ocean on Ceres, which might be capable of supporting life as we know it, some scientists say.

Icy moons of the outer solar system such as the Jovian satellite Europa and Saturn's moon Enceladus are thought to have underground oceans, which are apparently kept liquid by tidal forces generated by the gravity of neighboring moons and their huge host planets. Ceres would not experience such tidal forces but could possibly retain some radioactive heat from elements in its interior. No tidal forces would occur on Ceres because no object around it would have a strong enough gravitational pull on the dwarf planet.



6. It's round

Unlike other members of the asteroid belt, Ceres is round, because it's large enough for gravity to mold its shape into a sphere. (Ceres is about 590 miles, or 950 kilometers, wide.) Scientists also believe that round bodies tend to have differentiated interiors, meaning that there are different zones inside of them. Ceres probably has a rocky core, an icy mantle, perhaps some subsurface liquid water and a dusty top layer.

7. It may have an atmosphere

Ceres is relatively far from the sun, but scientists believe its surface temperatures could rise as high as minus 37 degrees Fahrenheit (minus 38 degrees Celsius). If there is any water ice at the surface, it would quickly sublime — change directly to a gas — which could generate an atmosphere around the dwarf planet. That said, there have only been a few observations of possible sublimation to date. Dawn will be on the lookout for more.



The case against Pluto

If Ceres isn't a planet then Pluto should not be a planet either. The scientist who discovered Eris, Caltech astronomer Mike Brown, thinks Pluto's demotion was the right move. Pluto, Eris and the many other Kuiper Belt objects are far too different to be lumped in with the eight official planets, he said.

For one thing, they're much smaller. Pluto is about 1,455 miles (2,342 km) wide. The smallest official planet, Mercury, is more than twice as big at 3,032 miles (4,880 km) across. The dwarfs' orbits tend to be very different, too — much more elliptical and more inclined, relative to the plane of the solar system. And they're made of different stuff, with ices comprising more of their mass.

"It just makes no sense from a classification standpoint to take these objects that clearly belong together and pick one — or two, or a dozen — and say, 'Oh, these belong with the very different, large, planet-like things,'" Brown said.

The only reason Pluto was ever deemed a planet, Brown added, is because it was first detected so long ago, before people realized that it was just one of the many objects beyond Neptune's orbit.

The Kuiper Belt — which is now known to host more than 1,000 icy bodies, with many more likely to be discovered — wasn't even discovered until 1992.

"It's just a funny historical accident that we found Pluto so early, and that it was the only thing known out there for so long," Brown told SPACE.com. "No one in their right mind would not have called it a planet back then, because we didn't know any better."

Astronomers have a much better sense of what Pluto is now, according to Brown.

"We have progressed so much further in our understanding of what the solar system is that it's pretty obvious," he said. "We can go back and reassess the mistakes of our ancestors."

So Pluto should take its rightful place alongside other Kuiper Belt objects rather than consort with the "real" planets, some astronomers say.

"I group Pluto with the other icy bodies in the Kuiper Belt," said Neil deGrasse Tyson, director of New York City's Hayden Planetarium. "I think it's happier there, actually. Pluto has family in the outer solar system."

Tyson was one of the first to push for Pluto's demotion. A decade ago, when he and the Hayden staff redesigned the planetarium's exhibits, they lumped Pluto with the Kuiper Belt objects rather than with the eight official planets.