

# WHY DOES JUPITER HAVE TWO SOUTH POLES?

Jupiter is the fifth planet in our Solar System and the largest. This gas giant has an atmosphere mostly made up of hydrogen gas and helium gas, just like the sun. Its core temperature is around the surface temperature of the sun (5505°C) but the exterior clouds are about -145 degrees Celsius. Jupiter also has also over 70 moons in its orbit.

## What does Jupiter's field look like?

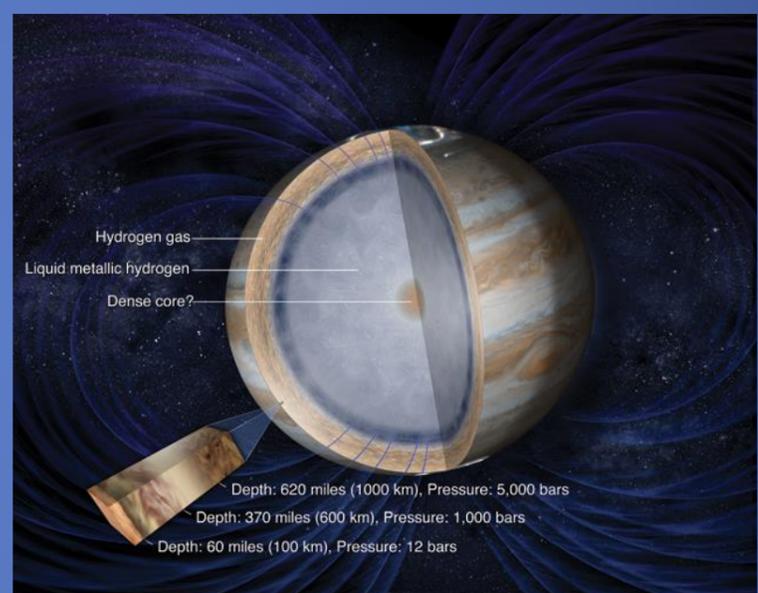
Juno, a NASA satellite in Jupiter's orbit since 2011, has been using magnetometers to measure the magnetic field of Jupiter, allowing scientists to develop models. It had been discovered that, along with a large north pole, Jupiter has two south poles, one directly in the south and another in an isolated patch near equator. This makes an unexpected north-south asymmetry pattern, as seen in the image below.

## What causes this magnetic field to be so different to ours?

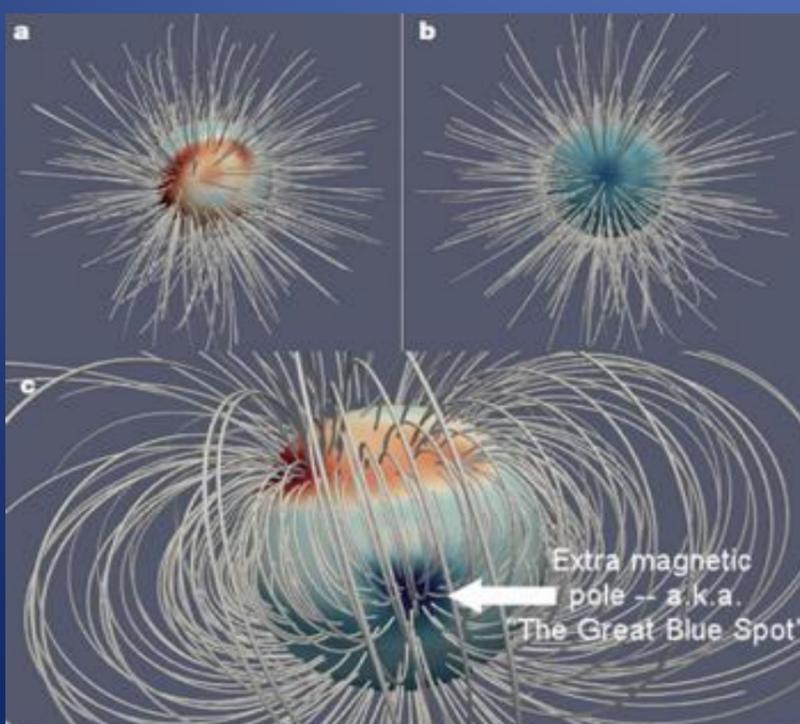
The Earth's core is made of liquid iron that moves around and causes a magnetic field. In comparison, the inside of Jupiter is made up of metallic liquid hydrogen, formed by the intense heat and pressure down below.

The electrons from the hydrogens move within the fluid, creating a current and a very strong magnetic field.

However this does not explain the existence of another south pole. Scientists believe that the liquid metallic hydrogen exists in layers in the core. Rock and ice found in Jupiter could possibly dissolve with the hydrogen, increasing the density in that area. If not uniform, this produces areas with different densities changing the convection consequently destabilizing the field pattern of Jupiter. This is the main theory on the explanation of Jupiter's second south pole, where this could be a regular occurrence.



This scientific idea has not been proven yet and is still relatively new but more research will follow on Jupiter's magnetic field. We are all looking forward to receiving new data from the continual research.



## References:

- <https://www.skyandtelescope.com/astronomy-news/jupiters-magnetic-field-has-weird-structure/>
- <https://www.earthmagazine.org/article/juno-unveils-jupiters-secrets>
- <https://www.jpl.nasa.gov/news/news.php?feature=7406>
- <https://www.space.com/41751-jupiter-weird-magnetic-field-even-weirder.html>