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Astronomy

The youthful face of Jupiter?

An Earth-sized storm on Jupiter known as the Great Red Spot may be a recent addition

Leah Crane

JUPITER'S Great Red Spot could be younger than many astronomers thought. It is commonly accepted that the enormous storm was first observed by Giovanni Cassini in 1665, but it turns out that the spot he saw was probably different to the vortex visible now.

The spot, a storm larger than Earth, has been continuously observable since 1831. But an enormous storm was also visible at the same location on Jupiter from 1665 to 1713, and astronomers have been debating whether the two tempests are in fact one and the same for decades.

Agustín Sánchez-Lavega at the University of the Basque Country in Spain and his colleagues performed a systematic review and analysis of all the available observations of the earlier storm – which was known as the Permanent Spot – preserved in astronomers' drawings.

They then compared them to early photographs and newer images of the Great Red Spot we see today. They found that, if the drawings are accurate, the Permanent Spot was far smaller

than the Great Red Spot – its diameter would have had to grow at a rate of about 160 kilometres per year from 1713 to 1879 for the two to be consistent.

But none of Jupiter's vortices have been shown to grow in such a rapid and sustained manner. Moreover, recent observations show that the Great Red Spot appears to be shrinking, not

Jupiter's red spot as captured by NASA's Juno spacecraft

growing. This and other factors, along with the 118-year gap in observations, led the researchers to conclude that the two spots aren't the same (*Geophysical Research Letters*, doi.org/m446).

However, Scott Bolton at the Southwest Research Institute in Texas says it is difficult to make secure conclusions based on hand-drawn pictures of a distant world.

"What I think we may be seeing is not so much that the storm went away and then a new one came in almost the same place – it would

be a very big coincidence to have it occur at the same exact latitude, or even a similar latitude," he says. "It could be that what we're really watching is the evolution of the storm." That still wouldn't account for the recent shrinking, though.

Even if the Great Red Spot is younger than we thought, it is still far longer-lasting than any other storm we have ever seen. But if it isn't, it could be mind-bogglingly old. "If this was actually the same storm that Cassini saw, even in a different form, it could be much older than the 1600s," says Bolton.

On the other hand, if the two spots seen on Jupiter are wholly different storms, "an implication... is that the modern Great Red Spot must have formed or appeared during the late 18th century or just after," says Peter Read at the University of Oxford. "Its formation may therefore have been amenable to observation, at least in principle."

If that is the case, we could search for hints of the birth of the Great Red Spot in the historical record, closing the case of the two spots once and for all. ■



NASA/JPL-CALTECH/SWRI/MISSISSIPPI/GERALD EICHSTADT/SEAN DORAN/CC BY SA

Archaeology

World's oldest wine found in 2000-year-old Roman tomb

A REDDISH liquid found in an ancient Roman mausoleum in Spain is the oldest known liquid wine in existence, a chemical analysis has revealed.

"It seemed impossible that a liquid could have remained in this state for 2000 years," says José Rafael Ruiz Arrebola at the University of Cordoba in Spain.

Until now, a sealed vessel found near Speyer, Germany, and believed

to be about 1700 years old, was thought to contain the oldest known wine, but it has never been opened.

The Spanish tomb, discovered in 2019 in Carmona, near Seville, dates from the 1st century AD and belonged to a wealthy family. Burial niches carved in its walls held six urns made from limestone, sandstone or glass. Half contained the cremated remains of women and the other half those of men. Two urns bore the names of the deceased: Hispanae and Senicio.

One of the glass urns, encased in a lead shell, contained bone remnants of a 45-year-old man,

a gold ring bearing the image of the two-faced Roman god Janus and approximately 5 litres of liquid.

Ruiz Arrebola and his team studied the composition of the reddish liquid by methods including liquid chromatography-mass spectrometry.

Its mineral profile was similar to that of modern sherry and fino wines from Spain. It also contained seven polyphenols, natural antioxidant

"It seemed impossible that a liquid could have remained in this state for 2000 years"

compounds, exclusively found in wine. The absence of syringic acid, a compound produced when the main pigment in red wines decomposes, confirmed the fluid was white wine. It had a pH of 7.5 – more alkaline than normal for wine, indicating strong decay. The wine was probably meant for the deceased to drink on the voyage into the afterlife (*Journal of Archaeological Science: Reports*, doi.org/m45g).

The find provides unique insights into Roman burial practices, says Davide Tanasi at the University of South Florida. ■ Soumya Sagar