Hubble snaps Majestic Photos of Giant’s Thrashing Storms and the Volcanic Moon Io

Description

Hubble 2024 Jupiter
Image from Hubble Jupiter unknown

Captured from the Hubble Space Telescope, these extraordinary images of the planet Jupiter provide us with an exclusive view of the dynamic weather patterns and notable storms, featuring the Great Red Spot and the Red Jr. The images, obtained on the 5th and 6th of January, 2024, are an integral part of the ongoing Outer Planet Atmospheres Legacy program's annual assessment that makes salient the volcanic activities and surface featur Io. Credit: NASA, ESA, STScI, Amy Simon (NASA-GSFC)

Tempestuous Cyclones and Violent Storms: Turbulent Atmosphere of Jupiter Unleashed

As the giant amongst its outer planet counterparts, Jupiter, with its iridescent clouds, offers a continually transforming spectacle of shapes and colors. The planet embodies an eternal storm, marked by a succession of cyclones, anticyclones, wind shear, and the colossal storm of the solar system, the Great Red Spot.

Unlike terrestrial planets, Jupiter lacks a solid surface. The planet is uniformly adorned with predominantly ammonia ice-crystal clouds. These relatively thin atmospheric layers, stretching some 30 miles, are the master artists behind Jupiter's signature striped appearance.

These conspicuous zebra-like bands result from the dual-directional flow of air at varied latitudes, with some wind speeds even reaching a staggering 350 miles per hour. The planet’s chromatic canvas is segmented into alternating light-hued zones, where the atmosphere ascends and dark-hued belts, illustrating regions where the air descends. The collision of these competing flows results in tumultuous storms and turbulence.

The Hubble Space Telescope provides year-round surveillance of these atmospheric metamorphoses with a clarity unparalleled to any other. Capturing colossal storms and fleeting white clouds, the latest images bear evidence of the escalating activity within Jupiter's atmosphere.

Hubble 2024 Jupiter Compass Image
Image from Hubble Jupiter unknown

Lining Jupiter are stripes in varying hues of light grey, soft yellow, and brownish-orange, interrupted by large st and specks of white clouds. The notorious Great Red Spot, the most prominent feature of the planet, situates in lower third of the image. Not far from the grand tempest, Red Spot Jr., a relatively diminutive but equally intrigu anticyclone, makes an appearance. Another smaller anticyclone dots the upper middle of the planetary view. O top right, two juxtapositioned storms, a cyclone and an anticyclone, can be noticed. Far on the left edge of the image, lies Jupiter’s minuscule moon Io, displaying a variegated orange surface, indicative of volcanic deposits. Credit: NASA, ESA, Amy Simon (NASA-GSFC)

Closely Trailing Jupiter's Stormy Weather: An Overview from

the Hubble Space Telescope

The magnificent planet Jupiter, clothed in its signature stripes, greets NASA’s Hubble Space Telescope once more in the latest images taken on the 5th and 6th of January, 2024. The images encapsulate both hemispheric views of the celestial body. As part of the Outer Planet Atmospheres Legacy program (OPAL), the Hubble Space Telescope annually monitors Jupiter along with other planets in the outer solar system. Draped in a mix of clouds and hazes whipped up by violent winds, these expansive worlds yield a captivating array of atmospheric transformations.

Launching straight into the planet’s southern hemisphere, one can observe an anticyclone, dubbed the Red Spot Jr., positioned to the lower right of the colossal Great Red Spot. This climatic phenomenon culminated from the fusion of several storms in 1998 and 2000, appearing red for the first time in 2006 before reverting to a less conspicuous beige in subsequent years. The striking red hue's origin remains a conundrum, postulated to involve a multitude of cyclic chemical compounds, including sulfur, phosphorus, or even organic matter. Following the planet’s latitudinal currents but moving in opposing directions, the Great Red Spot and Red Spot Jr. Astoundingly graze past each other every two years. A smaller red anticyclone can be spotted in the far north of the planet.

Emerging into the opposing hemisphere, we encounter a pair of tempestuous siblings – a deep red cyclone and a reddish anticyclone, huddled near the right of the centre. Radiating such a vivid red, one might easily mistake Jupiter for bearing an celestial abrasion. Reflecting high and low-pressure system patterns, these storms illustrate opposing rotations, with the cyclone exhibiting an upwelling along the edges and descending clouds interiorly causing a clearing of atmospheric haze.

Credit: NASA’s Goddard Space Flight Center, Lead Producer: Paul Morris

Amy Simon, the OPAL project lead stationed at NASA’s Goddard Space Flight Center in Greenbelt, Maryland, anticipates the storms to evade collision due to the repelling effect of their opposing rotations. She emphasises, “The many large storms and small white clouds are indicative of Jupiter's currently bustling atmospheric activity.".

Edge closer to the leftmost part of the image to locate the smallest of Galilean moons, Io. Despite its size, Io is the solar system’s most dynamic volcanic body. Hubble manages to decode volcanic deposits scattered across its surface. Probing into blue and violet wavelengths, Hubble unveils surface features that go beyond the standard visual spectrum. This demonstrates the telescope's continued advancement in space exploration, following up on Voyager 1's discovery of Io’s distinctive volcanic activity and 'pizza-like' appearance in 1979.

The Hubble Space Telescope’s over three-decade-long deployment has paved the path for groundbreaking discoveries and insights into our universe's complexities. Hubble, the fruit of a joint venture between NASA and the European Space Agency (ESA), is managed by NASA’s Goddard Space Flight Center in Greenbelt, Maryland.

Goddard collaborates with Lockheed Martin Space situated in Denver, Colorado, to handle mission operations. In Baltimore, Maryland, the Space Telescope Science Institute (STScI) conducts scientific operations for both Hubble and Webb on behalf of NASA. The institute is operated by the Association of Universities for Research in Astronomy, headquartered in Washington, D.C.

Jupiter OPAL 2024

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This 12-panel Hubble image sequence portrays a complete rotation of the colossal Jupiter. The Great Red Spot provides a reliable indicator of the planet's true rotational time of nearly 10 hours. In several frames, the innern Galilean moon, Io, is observable along with its shadow dancing over the tops of Jupiter's cloud cover. Hubble, ur the auspices of the Outer Planet Atmospheres Legacy program (OPAL), keeps a dutiful watch over Jupiter and th outer planets of the solar system year after year. Credit: Amy Simon (NASA-GSFC)

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Vocabulary List:

1. **Iridescent** // (adjective): Displaying a play of lustrousrainbow-like colors.
2. **Atmosphere** // (noun): The envelope of gases surrounding a planet or other celestial body.
3. **Anticyclone** // (noun): A circulation of winds around a central region of high atmospheric pressure.
4. **Colossal** // (adjective): Extremely large or great.
5. **Astounding** // (adjective): Surprisingly impressive.
6. **Conspicuous** // (adjective): Easily seen or noticed obvious.

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. Which term means prominent or distinguished?

Option: Eminent
Option: Serendipitous
Option: Exigencies
Option: Contingency

2. What is the term for adjusting or calibrating something again?

Option: Eminent
Option: Recalibrated
Option: Impulse
Option: Transparent

3. Which term refers to a possible event or circumstance?

Option: Intriguing
Option: Contingency
Option: Denouement
Option: Astute

4. What field involves the use of technology to study the brain?

Option: Neurotechnology
Option: Graphene
Option: Paradigm
Option: Innovative

5. Which term means easily understood or seen through?

Option: Eminent
Option: Prognosticate
Option: Transparent
Option: Caveat

6. What is a material that can conduct electricity under certain conditions?

Option: Therapeutic
Option: Semiconductor
Option: Perpetuates
Option: Formidable

7. Which term means showing luminous colors that seem to change when seen from different angles?

Option: Caveat
Option: Intriguing
Option: Astute
Option: Iridescent

8. Which term means continues indefinitely?

Option: Perpetuates
Option: Formidable
Option: Astounding
Option: Innovative

9. Which term means extremely large or huge?

Option: Atmosphere
Option: Anticyclone
Option: Colossal
Option: Astounding

10. Which term refers to urgent needs or demands?

Option: Exigencies

Option: Therapeutic
Option: Innovative
Option: Paradigm

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The _____ of the play revealed the true intentions of the characters.

12. The new research presents a _____ shift in how we view the subject.

13. The team faced a _____ opponent in the championship match.

14. The company prides itself on its _____ approach to product development.

15. His red hat made him easily _____ in the crowd.

16. The magician's tricks were truly _____ leaving the audience in awe.

17. She bought the dress on a whim following a sudden _____.

18. The spa offers various _____ treatments to help guests relax.

19. The contract had a _____ regarding late payment fees.

20. Her _____ observations about the market helped her make successful investments.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. Finding money in an old jacket was a discovery that made her day.
22. Corporate is important for building trust with stakeholders.
23. After much they reached a decision on which course of action to take.
24. The scientist proposed a new about the behavior of black holes.
25. is a promising material for future electronic devices due to its unique properties.
26. His dedication to charity work is truly and deserving of praise.
27. The warm of the café made it a popular spot for locals.
28. An is a weather phenomenon characterized by high pressure and dry conditions.
29. As an scientist she was invited to speak at the prestigious conference.

30. His business decisions were always leading to consistent growth.

Answer

Multiple Choice: 1. Eminent 2. Recalibrated 3. Contingency 4. Neurotechnology 5. Transparent 6. Semiconductor 7. Iridescent 8. Perpetuates 9. Colossal 10. Exigencies
Gap-Fill: 11. denouement 12. paradigm 13. formidable 14. innovative 15. conspicuous 16. astounding 17. impulse 18. therapeutic 19. caveat 20. astute
Matching sentence: 1. serendipitous 2. transparency 3. deliberation 4. postulate 5. graphene 6. commendable 7. atmosphere 8. anticyclone 9. eminent 10. astute

CATEGORY

1. Sci/Tech - LEVEL6

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