
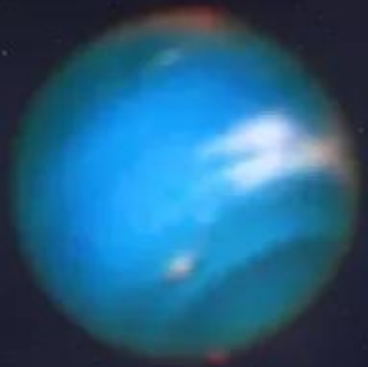


1
00:00:00,300 --> 00:00:03,704
NASA’s Hubble Space Telescope
has been watching a large, dark

2
00:00:03,704 --> 00:00:07,474
storm on the planet Neptune
disappear before our very eyes –

3
00:00:07,474 --> 00:00:11,812
or, telescope mirror. The first
and only spacecraft to visit

4
00:00:11,812 --> 00:00:17,518
Neptune was NASA’s Voyager 2 in
1989. It discovered two immense,

5
00:00:17,518 --> 00:00:20,187
dark storms churning through
Neptune’s thick, blue

6
00:00:20,187 --> 00:00:24,124
atmosphere. Voyager 2 then
headed out of the solar system,

7
00:00:24,124 --> 00:00:27,995
and since then our primary means
of watching Neptune’s storms has

8
00:00:27,995 --> 00:00:32,466
been the Hubble Space Telescope.
Our atmosphere on Earth makes it

9
00:00:32,466 --> 00:00:35,836
hard to look at blue light in
high resolution, so Hubble is

10
00:00:35,836 --> 00:00:38,739
currently the only telescope
that is able to see these

11
00:00:38,739 --> 00:00:43,076
storms. The larger of the two
storms Voyager 2 discovered on

12
00:00:43,076 --> 00:00:46,113
Neptune was called the Great
Dark Spot, because it looked

13
00:00:46,113 --> 00:00:49,049
very similar to the Great Red
Spot on Jupiter. Jupiter’s Great

14
00:00:49,049 --> 00:00:52,619
Red Spot has existed for
hundreds of years, but when

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00:00:52,619 --> 00:00:56,857
Hubble looked at Neptune in
1994, the Great Dark Spot was

16
00:00:56,857 --> 00:01:00,027
already gone. Instead there was
a new storm on the northern

17
00:01:00,027 --> 00:01:04,097
hemisphere, which was named the
Northern Great Dark Spot. Since

18
00:01:04,097 --> 00:01:07,100
then, that spot has also
disappeared, and now in total

19
00:01:07,100 --> 00:01:10,837
we’ve observed five different
dark spots on Neptune. We can

20
00:01:10,837 --> 00:01:14,007
see that large storms on Neptune
form and dissipate much more

21
00:01:14,007 --> 00:01:17,477
rapidly than storms on Jupiter,
and there’s a lot of diversity

22
00:01:17,477 --> 00:01:20,247
in what Neptune’s storms look
like and how they move. These

23
00:01:20,247 --> 00:01:23,951
dark vortices on Neptune present
atmospheric scientists with an

24
00:01:23,951 --> 00:01:27,220
amazing opportunity to learn
about how storms work on a

25
00:01:27,220 --> 00:01:30,324
different world. But because
there is so much in the universe

26
00:01:30,324 --> 00:01:32,659
that Hubble looks at, the
telescope had only been

27
00:01:32,659 --> 00:01:36,296
observing Neptune once every few
years, which wasn’t frequent

28
00:01:36,296 --> 00:01:40,067
enough to watch the formation or
demise of any one particular

29
00:01:40,067 --> 00:01:43,503
storm. Since 2014 however,
Hubble has begun a project

30
00:01:43,503 --> 00:01:46,807
called the Outer Planet
Atmospheres Legacy program, or

31
00:01:46,807 --> 00:01:50,744
OPAL, to gather global maps of
our gas giant planets every year

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00:01:50,744 --> 00:01:54,548
for the remainder of Hubble's
operation. Now for the first

33
00:01:54,548 --> 00:01:58,618
time, using data from OPAL and
additional Hubble observations,

34
00:01:58,618 --> 00:02:02,255
Hubble has captured time-lapse
images showing the gradual death

35
00:02:02,255 --> 00:02:06,093
of a storm on Neptune. The
vortex pictured here is dredging

36
00:02:06,093 --> 00:02:09,329
up material from deep inside
Neptune's atmosphere, possibly

37
00:02:09,329 --> 00:02:13,166
such as hydrogen sulfide, which
would make for a pretty smelly

38
00:02:13,166 --> 00:02:18,438
storm. In the first image from
2015, the storm is over 3000

39
00:02:18,438 --> 00:02:22,142
miles across – big enough to
stretch across the entire

40
00:02:22,142 --> 00:02:25,612
Atlantic Ocean from Boston to
Portugal. The storm is dark in

41
00:02:25,612 --> 00:02:28,382
blue wavelengths, but
overshadowed at green and red

42
00:02:28,382 --> 00:02:32,285
wavelengths by nearby companion
clouds. The contrast of the dark

43
00:02:32,285 --> 00:02:35,989
vortex faded quite a bit by late
2017, though the feature was

44
00:02:35,989 --> 00:02:40,360
still over 2000 miles wide.
Seeing this storm unfold gives

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00:02:40,360 --> 00:02:43,697
scientists a chance to test
their models of how they

46
00:02:43,697 --> 00:02:47,067
predicted an anticyclone may
interact with the wind jets on

47
00:02:47,067 --> 00:02:50,137
Neptune. This particular vortex
is not behaving how some

48
00:02:50,137 --> 00:02:53,540
dynamical simulations predicted,
which is great because that

49
00:02:53,540 --> 00:02:57,344
means there’s a lot left to
learn on Neptune. The Hubble

50
00:02:57,344 --> 00:03:00,647
Space Telescope is up to that
task of advancing scientists’

51
00:03:00,647 --> 00:03:03,884
understanding of planetary
atmospheres.