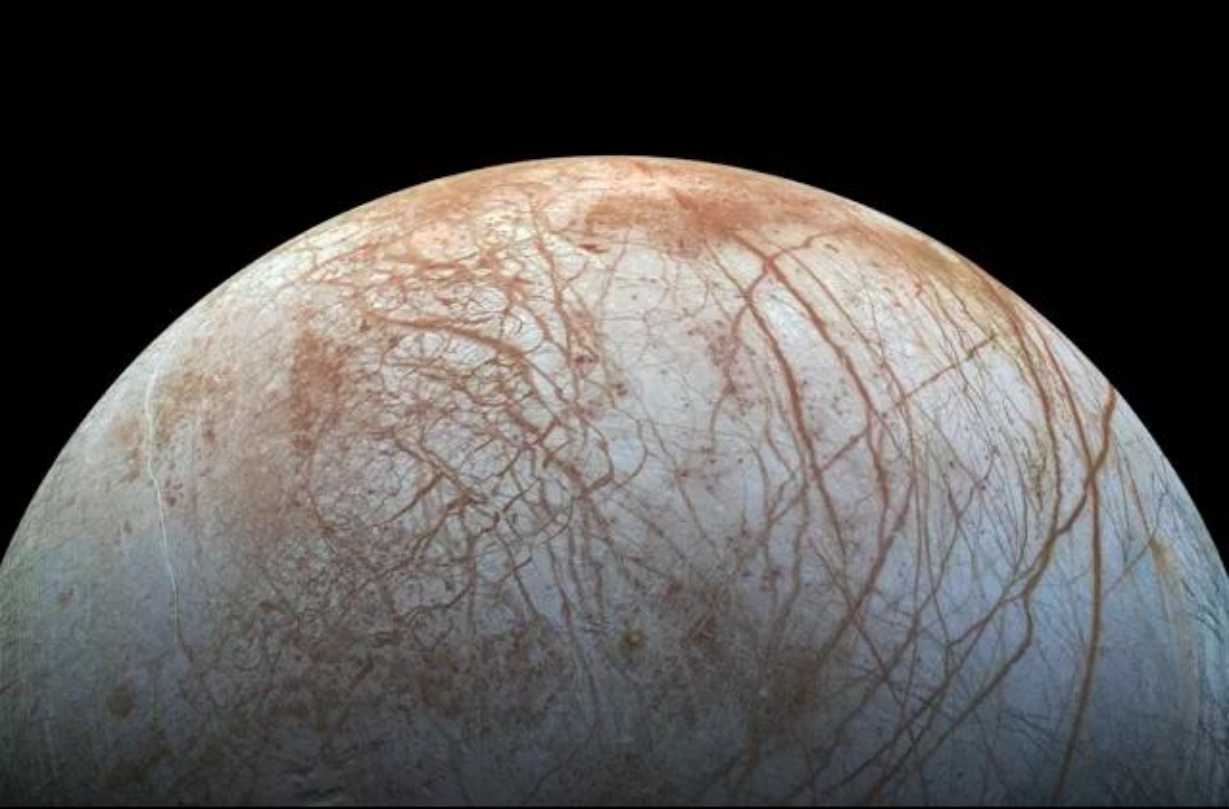

1
00:00:00,834 --> 00:00:04,371
Hubble has found even more
evidence of water vapor plumes

2
00:00:04,371 --> 00:00:09,610
on the ocean world Europa. Last
September we announced that the

3
00:00:09,610 --> 00:00:12,913
Hubble Space Telescope had taken
multiple images of what could be

4
00:00:12,913 --> 00:00:16,817
water vapor plumes on Jupiter's
moon, Europa - an icy world

5
00:00:16,817 --> 00:00:19,486
that's thought to have a
subsurface global ocean of

6
00:00:19,486 --> 00:00:23,123
water. That same team of
astronomers has now taken

7
00:00:23,123 --> 00:00:26,593
additional ultraviolet images of
probable plumes on this icy

8
00:00:26,593 --> 00:00:30,097
moon. While these plumes seem
intermittent, they appear to

9
00:00:30,097 --> 00:00:33,667
have repeated in the same
location. Pieces of the puzzle

10
00:00:33,667 --> 00:00:37,137
of what's going on with Europa
are continuing to come together.

11
00:00:37,137 --> 00:00:41,008
When the Galileo spacecraft was
orbiting Jupiter in the late 90s

12
00:00:41,008 --> 00:00:44,678
and early 2000s, it gathered
data to build a thermal map of

13
00:00:44,678 --> 00:00:48,282
Europa, and it appears the water
vapor plumes Hubble is observing

14
00:00:48,282 --> 00:00:51,752
correspond with a relatively
warm region on Europa's southern

15
00:00:51,752 --> 00:00:56,256
surface about 200 miles across.
This thermal anomaly the Galileo

16
00:00:56,256 --> 00:00:59,760
spacecraft observed suggested
geologic activity was happening

17
00:00:59,760 --> 00:01:02,829
in this location, a conclusion
now further supported by

18
00:01:02,829 --> 00:01:06,500
Hubble's recent observations of
water vapor plumes. This

19
00:01:06,500 --> 00:01:09,236
phenomenon may be similar to
what the Cassini spacecraft has

20
00:01:09,236 --> 00:01:12,773
seen at Saturn's moon Enceladus,
where there are also water vapor

21
00:01:12,773 --> 00:01:16,209
plumes associated with warm
regions on the moon’s surface.

22
00:01:16,209 --> 00:01:20,547
The warm spot on Europa has a
couple possible explanations.

23
00:01:20,547 --> 00:01:24,217
Perhaps this location is warmed
by liquid water a mile under the

24
00:01:24,217 --> 00:01:27,921
surface pushing up through
cracks in the ice. Or perhaps

25
00:01:27,921 --> 00:01:30,624
the fine mist that’s falling
from the water vapor plume

26
00:01:30,624 --> 00:01:33,627
changes the structure of the
surface ice grains, allowing

27
00:01:33,627 --> 00:01:37,698
them to retain heat longer than
the surrounding landscape. Now

28
00:01:37,698 --> 00:01:40,801
that Hubble has shown Europa
probably has water vapor plumes

29
00:01:40,801 --> 00:01:44,237
associated with warm spots on
its surface, this information

30
00:01:44,237 --> 00:01:47,975
will be used for planning NASA's
upcoming Europa Clipper mission.

31
00:01:47,975 --> 00:01:51,244
Europa Clipper will be able to
take up-close observations of

32
00:01:51,244 --> 00:01:54,514
these probable plumes Hubble
identified, and will be equipped

33
00:01:54,514 --> 00:01:57,584
with instruments that can detect
any additional warm spots and

34
00:01:57,584 --> 00:02:01,121
water vapor plumes. This will
provide insight into Europa’s

35
00:02:01,121 --> 00:02:04,091
chemistry, geology, and
potential conditions for

36
00:02:04,091 --> 00:02:05,459
harboring alien life.