



1  
00:00:04,289 --> 00:00:02,790  
an international research team led out

2  
00:00:06,630 --> 00:00:04,299  
of nasa's goddard space flight center

3  
00:00:08,749 --> 00:00:06,640  
have obtained the first direct detection

4  
00:00:11,129 --> 00:00:08,759  
of water vapor on Jupiter's moon Europa

5  
00:00:13,230 --> 00:00:11,139  
this came in the form of an infrared

6  
00:00:16,590 --> 00:00:13,240  
signal captured by an instrument on the

7  
00:00:18,480 --> 00:00:16,600  
Keck telescope in Hawaii past NASA

8  
00:00:20,279 --> 00:00:18,490  
missions and earthbound telescopes have

9  
00:00:21,750 --> 00:00:20,289  
found strong evidence suggesting there

10  
00:00:24,269 --> 00:00:21,760  
is an ocean of water beneath Europa's

11  
00:00:27,480 --> 00:00:24,279  
icy surface and plumes seemingly

12  
00:00:29,910 --> 00:00:27,490  
bursting through cracks into space in

13  
00:00:31,829 --> 00:00:29,920

this recent study the scientists

14

00:00:35,639 --> 00:00:31,839

observed the entire surface of Europa

15

00:00:38,310 --> 00:00:35,649

over 17 days in 2016 and 2017

16

00:00:40,680 --> 00:00:38,320

in one instance there was a short-lived

17

00:00:42,119 --> 00:00:40,690

spike in infrared light a spectral

18

00:00:46,290 --> 00:00:42,129

fingerprint that could only be due to

19

00:00:48,420 --> 00:00:46,300

water vapor when water escapes from

20

00:00:50,220 --> 00:00:48,430

Europa's subsurface reservoirs the

21

00:00:53,069 --> 00:00:50,230

resulting vapor is exposed to radiation

22

00:00:56,160 --> 00:00:53,079

from the Sun and the h<sub>2</sub>o molecules give

23

00:00:58,709 --> 00:00:56,170

off a distinctive infrared glow this

24

00:01:00,540 --> 00:00:58,719

glowing signal detected by Keck allowed

25

00:01:03,180 --> 00:01:00,550

scientists the first direct measurement

26  
00:01:05,610 --> 00:01:03,190  
of water vapor on Europa and here

27  
00:01:07,920 --> 00:01:05,620  
scientists measured over 2,000 tons of

28  
00:01:10,140 --> 00:01:07,930  
water in the plume nearly the volume of

29  
00:01:11,610 --> 00:01:10,150  
an Olympic swimming pool while

30  
00:01:14,070 --> 00:01:11,620  
scientists currently have limited

31  
00:01:16,230 --> 00:01:14,080  
ability to detect liquid water on Europa

32  
00:01:18,360 --> 00:01:16,240  
this new detection of water and vapor

33  
00:01:19,650 --> 00:01:18,370  
form is the next best thing in the

34  
00:01:22,290 --> 00:01:19,660  
search for one of the most essential

35  
00:01:24,030 --> 00:01:22,300  
ingredients for life this discovery

36  
00:01:26,550 --> 00:01:24,040  
will inform future observations of

37  
00:01:28,320 --> 00:01:26,560  
Europa including NASA's upcoming Europa

38  
00:01:29,970 --> 00:01:28,330

clipper mission which will study the

39

00:01:31,950 --> 00:01:29,980

Jovian moon and close range

40

00:01:34,170 --> 00:01:31,960

these efforts should further unlock the

41

00:01:35,330 --> 00:01:34,180

secrets of Europa and its potential for