



Jupiter

Europa

1
00:00:08,660 --> 00:00:06,320
can there be life elsewhere where are

2
00:00:11,240 --> 00:00:08,670
the habitable environments in our solar

3
00:00:13,879 --> 00:00:11,250
system Mars is an obvious place to think

4
00:00:16,310 --> 00:00:13,889
about but so are the icy worlds of the

5
00:00:18,769 --> 00:00:16,320
outer solar system where beneath their

6
00:00:22,670 --> 00:00:18,779
surfaces there may be liquid water

7
00:00:26,000 --> 00:00:22,680
oceans the Europa Jupiter system mission

8
00:00:29,390 --> 00:00:26,010
is a partnership between ESA and NASA to

9
00:00:33,350 --> 00:00:29,400
send two spacecraft to the Jupiter

10
00:00:36,560 --> 00:00:33,360
system one to orbit Europa the other two

11
00:00:39,470 --> 00:00:36,570
orbit Ganymede to understand what we're

12
00:00:54,560 --> 00:00:39,480
phrasing as the emergence of habitable

13
00:00:56,959 --> 00:00:54,570

worlds around gas giants the subsurface

14

00:01:01,040 --> 00:00:56,969

oceans are certainly the key driver for

15

00:01:03,080 --> 00:01:01,050

exploration of these worlds Europa is a

16

00:01:06,200 --> 00:01:03,090

fascinating place with an ocean that

17

00:01:09,410 --> 00:01:06,210

might be only tens of kilometres below

18

00:01:10,969 --> 00:01:09,420

the surface and may communicate actively

19

00:01:14,539 --> 00:01:10,979

with the surface they're erupting

20

00:01:16,700 --> 00:01:14,549

through icy convection blobs of warm ice

21

00:01:19,240 --> 00:01:16,710

moving up to the surface through

22

00:01:22,580 --> 00:01:19,250

cracking and breaking of the ice so

23

00:01:25,940 --> 00:01:22,590

there could be signs on the surface of

24

00:01:27,920 --> 00:01:25,950

what's going on deep down below the

25

00:01:30,170 --> 00:01:27,930

surface so what we can do with a

26
00:01:33,679 --> 00:01:30,180
spacecraft in orbit around Europa is

27
00:01:37,969 --> 00:01:33,689
measure how you OPA flexes as its

28
00:01:40,670 --> 00:01:37,979
stretched by Jupiter's gravity that

29
00:01:46,100 --> 00:01:40,680
tells us something very specific about

30
00:01:49,010 --> 00:01:46,110
how stiff that ice shell is and by how

31
00:01:53,260 --> 00:01:49,020
stiff it is we can get a measure of its

32
00:01:56,660 --> 00:01:53,270
thickness you rope as may be rarer

33
00:01:58,740 --> 00:01:56,670
example of an ocean in contact with a

34
00:02:01,090 --> 00:01:58,750
rocky mantle

35
00:02:03,670 --> 00:02:01,100
ganymede actually might be a more common

36
00:02:08,580 --> 00:02:03,680
example of a notion where it's it's a

37
00:02:12,670 --> 00:02:09,850
Callisto

38
00:02:15,460 --> 00:02:12,680

the relatively dead world has not the

39

00:02:18,970 --> 00:02:15,470

level of activity that Europa and

40

00:02:22,480 --> 00:02:18,980

Ganymede have yet we think that Callisto

41

00:02:24,790 --> 00:02:22,490

has an ocean beneath its surface it's

42

00:02:26,500 --> 00:02:24,800

not out of the question that if there

43

00:02:28,540 --> 00:02:26,510

are liquid water oceans down there and

44

00:02:32,350 --> 00:02:28,550

there's heat and there's energy that

45

00:02:36,070 --> 00:02:32,360

there could possibly be life

46

00:02:38,800 --> 00:02:36,080

the Europa spacecraft will make three or

47

00:02:41,860 --> 00:02:38,810

four close flybys of Io the most

48

00:02:43,930 --> 00:02:41,870

volcanic Io active world in our solar

49

00:02:46,630 --> 00:02:43,940

system in fact we might even be able to

50

00:02:49,390 --> 00:02:46,640

fly through one of these volcanic plumes

51
00:02:51,550 --> 00:02:49,400
and sample the material that's spewing

52
00:02:52,420 --> 00:02:51,560
out and we're not going to forget the

53
00:02:54,460 --> 00:02:52,430
big guy either

54
00:02:57,880 --> 00:02:54,470
Jupiter we're gonna be able to make

55
00:03:02,440 --> 00:02:57,890
observations of Jupiter and its rings as

56
00:03:05,140 --> 00:03:02,450
we orbit for about two years what's

57
00:03:07,690 --> 00:03:05,150
really compelling about these worlds is

58
00:03:10,570 --> 00:03:07,700
our search for whether there is life

59
00:03:13,060 --> 00:03:10,580
elsewhere not just in the solar system

60
00:03:15,610 --> 00:03:13,070
but in the universe can these be

61
00:03:18,370 --> 00:03:15,620
habitable environments that's really