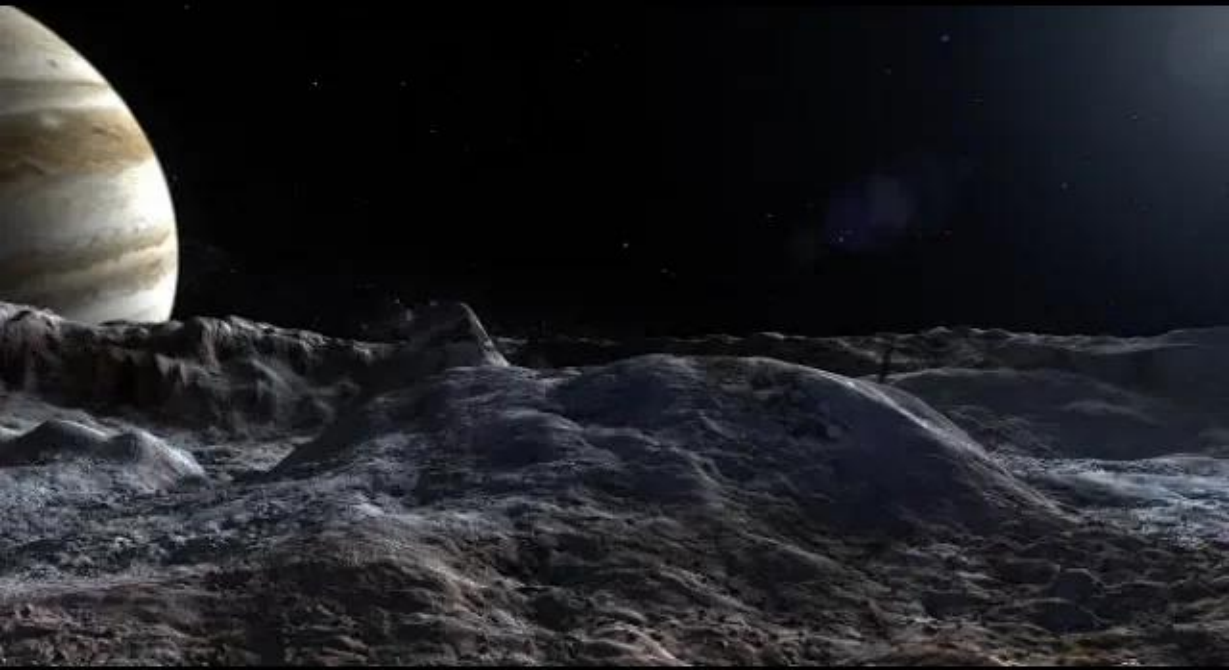

1
00:00:00,834 --> 00:00:01,468
[Music] [Title:
RE-ANALYZING OLD DATA

2
00:00:01,501 --> 00:00:02,535
REVEALS EVIDENCE AT EUROPA]

3
00:00:02,569 --> 00:00:03,870
[Robert Poppalardo] We
didn't know 'til today

4
00:00:03,903 --> 00:00:06,305
that there's evidence
from years ago

5
00:00:06,338 --> 00:00:09,242
that there's
something there.

6
00:00:09,275 --> 00:00:10,810
Europa is one of the
most fascinating

7
00:00:10,843 --> 00:00:12,645
bodies in the
solar system.

8
00:00:12,678 --> 00:00:16,716
We think beneath its icy
surface is a global ocean

9
00:00:16,749 --> 00:00:21,187
twice the volume of all of
Earth's oceans combined.

10
00:00:21,220 --> 00:00:24,223
In the late 1990s, the
Galileo spacecraft

11

00:00:24,256 --> 00:00:26,459
explored the Jupiter system.

12
00:00:26,492 --> 00:00:29,896
It made about a dozen
flybys of Europa.

13
00:00:29,929 --> 00:00:32,398
It took observations
from its cameras

14
00:00:32,431 --> 00:00:34,667
and from its magnetometer.

15
00:00:34,700 --> 00:00:37,036
[Margaret Kivelson] By
discovering that there was

16
00:00:37,069 --> 00:00:40,540
an induced magnetic
field at Europa,

17
00:00:40,573 --> 00:00:44,610
we were led to the
conclusion that there must be

18
00:00:44,643 --> 00:00:48,848
an ocean just beneath the icy
surface of the moon.

19
00:00:49,548 --> 00:00:53,953
But there were some strange
signatures in the magnetic field

20
00:00:53,986 --> 00:00:58,024
that we had never really
been able to account for.

21
00:00:58,057 --> 00:01:00,593
[Poppalardo] Images of

Europa from the

22
00:01:00,626 --> 00:01:04,497
Hubble space telescope have
hinted at gases that

23
00:01:04,530 --> 00:01:08,635
might have come from plumes
erupting at Europa.

24
00:01:09,068 --> 00:01:12,605
[Kivelson] The Hubble images
had given an estimate

25
00:01:12,638 --> 00:01:15,875
of the height and width
and I knew how fast

26
00:01:15,908 --> 00:01:19,412
Galileo was moving
relative to Europa.

27
00:01:19,445 --> 00:01:21,447
There are better
tools now...

28
00:01:21,480 --> 00:01:23,749
better computational
techniques...

29
00:01:23,782 --> 00:01:26,419
better computing...
that we can go back

30
00:01:26,452 --> 00:01:28,788
and look at that
old dataset anew.

31
00:01:28,821 --> 00:01:34,193
So, my colleague Xianzhe Jia

set up a calculation to see

32
00:01:34,226 --> 00:01:37,597
what would happen in the
environment of Europa

33
00:01:37,630 --> 00:01:40,199
if there were
such a plume.

34
00:01:40,232 --> 00:01:44,337
And when he ran this
simulation, it agreed

35
00:01:44,370 --> 00:01:48,107
just beautifully with the data
that we had collected.

36
00:01:48,140 --> 00:01:53,946
Reanalysis of the Galileo
magnetometer data suggests

37
00:01:53,979 --> 00:01:58,784
that the Galileo spacecraft,
on its closest flyby of Europa,

38
00:01:58,817 --> 00:02:01,020
flew through a plume.

39
00:02:02,688 --> 00:02:06,325
The Europa Clipper mission is
going to explore Europa

40
00:02:06,358 --> 00:02:08,294
to investigate
its habitability.

41
00:02:08,327 --> 00:02:12,798
If we find active plumes, then
we can sail on through them

42
00:02:12,831 --> 00:02:16,536
and sniff and taste that stuff
that's in the plume.

43
00:02:16,569 --> 00:02:20,339
We can analyze the particles
and the gases to get at the