



1
00:00:01,834 --> 00:00:07,340
[OCEAN WAVES AND WIND]

2
00:00:07,340 --> 00:00:09,441
(Max Coleman) It isn't
immediately apparent how

3
00:00:09,441 --> 00:00:12,344
looking at the bottom of
the ocean on Earth

4
00:00:12,344 --> 00:00:15,848
can help us look for
life on Europa.

5
00:00:15,848 --> 00:00:17,650
But it does.

6
00:00:17,650 --> 00:00:17,649
■ [MUSIC "Line By Line"]

7
00:00:17,650 --> 00:00:21,020
Despite the fact that Europa is
very much smaller than Earth,

8
00:00:21,020 --> 00:00:23,556
it has a very deep ocean.

9
00:00:23,556 --> 00:00:24,924
We don't know if
there's life in it.

10
00:00:24,924 --> 00:00:30,696
But it could have great
similarities to oceans on Earth.

11
00:00:30,696 --> 00:00:34,567
Here we are, deep in the ocean,
in the middle of the Caribbean

12

00:00:34,567 --> 00:00:37,436
'bout 50 miles south
of Grand Cayman.

13

00:00:37,436 --> 00:00:40,106
We go down into part of the
ocean which is completely dark

14

00:00:40,106 --> 00:00:42,675
if it weren't for the
lights on this ROV...

15

00:00:42,675 --> 00:00:46,012
"Remotely Operated Vehicle"

16

00:00:46,012 --> 00:00:49,782
These hydrothermal vents,
volcanic hot springs

17

00:00:49,782 --> 00:00:52,451
occur only at very,
very, few places.

18

00:00:52,451 --> 00:00:55,788
The water can be at a
temperature of 450 Fahrenheit

19

00:00:55,788 --> 00:01:00,292
or in some other nearby areas,
up to 770 degrees Fahrenheit.

20

00:01:00,292 --> 00:01:03,529
And yet an inch away from
these spouts of hot water

21

00:01:03,529 --> 00:01:07,033
we get lots and lots
and lots of shrimp.

22

00:01:07,033 --> 00:01:10,036

These shrimp are blind. Because there's no light down there.

23

00:01:10,036 --> 00:01:11,838

They have no need for eyes.

24

00:01:11,838 --> 00:01:16,075

So how does life exist on Earth at these great depths?

25

00:01:16,075 --> 00:01:19,011

The answer is, that in the absence of sunlight,

26

00:01:19,011 --> 00:01:21,947

which normally provides the energy for making food,

27

00:01:21,947 --> 00:01:24,717

we have energy from chemicals

28

00:01:24,717 --> 00:01:28,888

coming out from volcanic hot springs on the ocean floor.

29

00:01:28,888 --> 00:01:31,457

They provide the energy to bacteria,

30

00:01:31,457 --> 00:01:34,827

which provide energy for shrimp and other organisms

31

00:01:34,827 --> 00:01:36,495

that live off them.

32

00:01:36,495 --> 00:01:40,266

By looking at these systems

in detail, we can calculate

33

00:01:40,266 --> 00:01:44,304

the amount of living matter,
biomass, being supported

34

00:01:44,304 --> 00:01:47,640

by the chemical energy coming
out from the hydrothermal vents;

35

00:01:47,640 --> 00:01:50,442

the submarine hot springs.

36

00:01:50,442 --> 00:01:54,213

Our investigations at the bottom
of the ocean on Earth

37

00:01:54,213 --> 00:01:56,516

not only have found out things
which we didn't know

38

00:01:56,516 --> 00:01:57,916

about Earth's biology,

39

00:01:57,916 --> 00:01:59,886

but give us a great connection

40

00:01:59,886 --> 00:02:02,321

with what might be
happening on Europa,