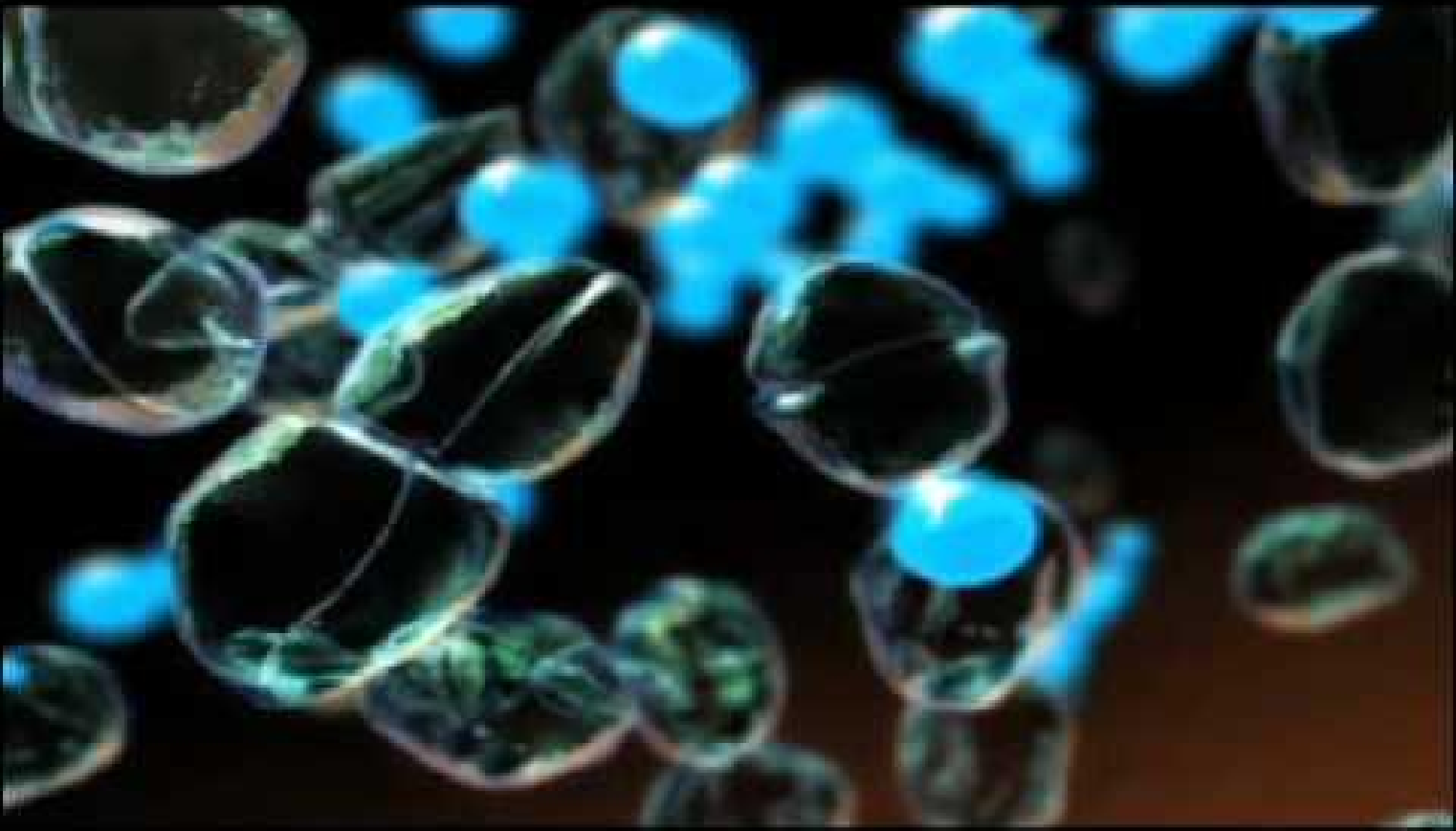

1
00:00:11,509 --> 00:00:09,589
my name is michael mumma i work at

2
00:00:12,789 --> 00:00:11,519
goddard space flight center for the

3
00:00:15,829 --> 00:00:12,799
national aeronautics and space

4
00:00:19,029 --> 00:00:15,839
administration in greenbelt maryland

5
00:00:21,029 --> 00:00:19,039
our team has discovered methane on mars

6
00:00:22,950 --> 00:00:21,039
the surprising thing about methane on

7
00:00:24,870 --> 00:00:22,960
mars is that

8
00:00:27,429 --> 00:00:24,880
first that we detect it meaning it's

9
00:00:29,029 --> 00:00:27,439
recently generated but in addition we

10
00:00:30,950 --> 00:00:29,039
find that it's being released from

11
00:00:34,069 --> 00:00:30,960
several discrete vents

12
00:00:35,430 --> 00:00:34,079
or sites on the planet's surface in

13
00:00:37,190 --> 00:00:35,440

either mid-summer in the northern

14
00:00:39,350 --> 00:00:37,200
hemisphere or early spring in the

15
00:00:42,310 --> 00:00:39,360
southern hemisphere on mars

16
00:00:45,510 --> 00:00:42,320
and yet at a later season

17
00:00:47,830 --> 00:00:45,520
we see essentially no methane

18
00:00:49,670 --> 00:00:47,840
the big question is uh what is the

19
00:00:51,110 --> 00:00:49,680
origin of this methane

20
00:00:54,150 --> 00:00:51,120
now being released

21
00:00:56,069 --> 00:00:54,160
the two principal areas are first

22
00:00:58,150 --> 00:00:56,079
by analogy with the earth it could be

23
00:01:00,470 --> 00:00:58,160
released and produced initially

24
00:01:02,310 --> 00:01:00,480
primarily by biology this would be

25
00:01:04,549 --> 00:01:02,320
microbial activity

26
00:01:05,509 --> 00:01:04,559
acting on certain chemicals below the

27
00:01:07,030 --> 00:01:05,519
surface

28
00:01:08,870 --> 00:01:07,040
and then producing methane as a

29
00:01:10,469 --> 00:01:08,880
byproduct

30
00:01:13,109 --> 00:01:10,479
but of course we can't state with

31
00:01:14,789 --> 00:01:13,119
certitude that it is

32
00:01:17,670 --> 00:01:14,799
biologically produced

33
00:01:18,870 --> 00:01:17,680
and so we also consider geochemical

34
00:01:19,830 --> 00:01:18,880
mechanisms

35
00:01:22,310 --> 00:01:19,840
in which

36
00:01:23,670 --> 00:01:22,320
carbon dioxide is actually combining

37
00:01:25,350 --> 00:01:23,680
with water

38
00:01:27,030 --> 00:01:25,360

and producing methane under very high

39
00:01:28,789 --> 00:01:27,040
temperatures and pressures

40
00:01:31,510 --> 00:01:28,799
and that methane can then be released in

41
00:01:33,749 --> 00:01:31,520
the atmosphere separately

42
00:01:36,069 --> 00:01:33,759
one of the most important

43
00:01:37,270 --> 00:01:36,079
consequences of our discoveries

44
00:01:40,230 --> 00:01:37,280
is that

45
00:01:42,469 --> 00:01:40,240
we've identified certain signposts on

46
00:01:45,429 --> 00:01:42,479
mars that basically are like little

47
00:01:47,749 --> 00:01:45,439
flags that say come here here i am

48
00:01:48,870 --> 00:01:47,759
nasa has several missions along these

49
00:01:50,389 --> 00:01:48,880
lines

50
00:01:53,590 --> 00:01:50,399
one is called the mars science

51
00:01:56,389 --> 00:01:53,600
laboratory one of the key objectives is

52
00:01:57,830 --> 00:01:56,399
to understand whether life ever arose on

53
00:02:00,310 --> 00:01:57,840
mars by

54
00:02:02,230 --> 00:02:00,320
sampling the material on the surface and

55
00:02:04,469 --> 00:02:02,240
then evaluating that in terms of its

56
00:02:06,469 --> 00:02:04,479
origins you could then can appreciate

57
00:02:08,309 --> 00:02:06,479
that if you go to this right location

58
00:02:10,150 --> 00:02:08,319
you may in fact be able to identify