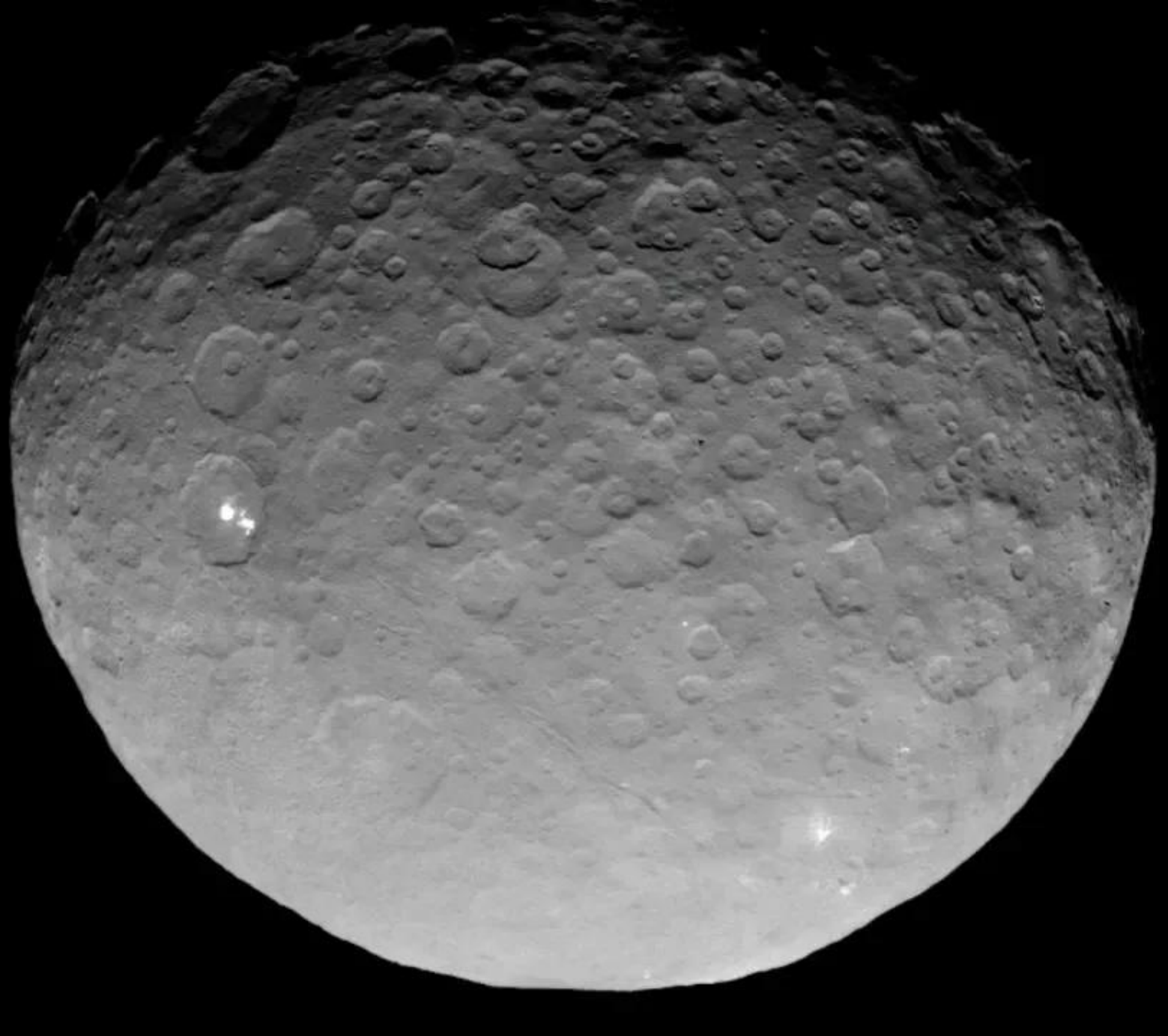

1
00:00:00,000 --> 00:00:02,960
The Bright Stuff:New Dawn Findings at Ceres

2
00:00:02,960 --> 00:00:05,920
[Nathan Stein, Doctoral Researcher, Caltech]

3
00:00:06,260 --> 00:00:07,860
When folks think about asteroids

4
00:00:07,880 --> 00:00:09,940
they might think about dead chunks of rock

5
00:00:10,020 --> 00:00:11,200
that are floating around space.

6
00:00:11,320 --> 00:00:12,960
And what we see with Ceres is that

7
00:00:13,180 --> 00:00:15,380
the processes are modifying the surface

8
00:00:15,380 --> 00:00:16,980
even in the present day.

9
00:00:17,000 --> 00:00:17,500
[Jennifer Scully, JPL Research Scientist]

10
00:00:17,580 --> 00:00:18,340
Approaching Ceres,

11
00:00:18,480 --> 00:00:20,620
we saw this very bright region on the surface.

12
00:00:21,060 --> 00:00:22,620
And then as we got closer and closer,

13
00:00:22,880 --> 00:00:24,400

you saw that there were multiple bright regions

14
00:00:24,800 --> 00:00:26,060
in this one crater.

15
00:00:26,620 --> 00:00:28,520
There's the one in the center,

16
00:00:28,520 --> 00:00:30,340
which is called Cerealia Facula,

17
00:00:30,420 --> 00:00:32,880
and then there's the ones off to the side in the crater floor,

18
00:00:32,880 --> 00:00:34,400
which are called Vinalia Faculae.

19
00:00:34,960 --> 00:00:38,380
Cerealia is located in a pit within the center of the crater.

20
00:00:38,780 --> 00:00:41,140
That pit is about 10 kilometers wide.

21
00:00:41,880 --> 00:00:43,680
And so it's about 1/9 the diameter of

22
00:00:43,680 --> 00:00:44,820
Occator Crater itself.

23
00:00:44,820 --> 00:00:47,340
And within that pit there is a little central dome.

24
00:00:48,160 --> 00:00:49,900
[Stein] What we're seeing is an indication that

25
00:00:49,940 --> 00:00:51,340
there are liquid brines

26
00:00:51,360 --> 00:00:53,660
potentially in the subsurface, even in the present day

27
00:00:53,660 --> 00:00:56,420
rising to the surface and becoming these bright spots.

28
00:00:56,420 --> 00:00:59,020
And that tells us that there has to be a process

29
00:00:59,020 --> 00:01:02,740
providing energy to drive these fluids to the surface.

30
00:01:02,840 --> 00:01:06,760
We call them bright spots, but actually it's a relative term.

31
00:01:06,880 --> 00:01:09,800
The brightest bright spot on Ceres, Cerealia Facula,

32
00:01:09,860 --> 00:01:12,680
has an albedo of around .5

33
00:01:12,680 --> 00:01:15,480
which is about the same brightness as dirty snow.

34
00:01:15,500 --> 00:01:18,460
Bright spots on Ceres aren't limited to a single place.

35
00:01:18,460 --> 00:01:21,240
We've found that there are over 300 bright spots,

36
00:01:21,320 --> 00:01:22,740
all over the surface of Ceres.

37
00:01:22,740 --> 00:01:25,920
And that indicates that this is a relatively widespread process.

38
00:01:25,920 --> 00:01:29,040

[Scully] The salts that we see in Occator Crater

39
00:01:29,120 --> 00:01:31,560
are of similar composition to salts that we find

40
00:01:31,560 --> 00:01:33,780
In Mono Lake in California.

41
00:01:33,860 --> 00:01:36,300
It's interesting that you can have these similar materials

42
00:01:36,300 --> 00:01:38,180
found in different places.

43
00:01:38,180 --> 00:01:39,880
that were formed by different processes.

44
00:01:40,660 --> 00:01:42,560
[Stein] Ceres represents something of a bridge

45
00:01:42,560 --> 00:01:44,720
between the bodies of the inner solar system

46
00:01:44,720 --> 00:01:46,280
and the outer solar system

47
00:01:46,280 --> 00:01:48,560
In the inner solar system, we see rocky bodies.

48
00:01:48,560 --> 00:01:51,420
In the outer solar system, we, more broadly, see icy bodies.

49
00:01:51,520 --> 00:01:53,840
And Ceres is sitting somewhere in-between.

50
00:01:53,840 --> 00:01:57,320
But we know now from the bright spots that it is changing.

51
00:01:57,320 --> 00:01:59,840
The bright spots that are already on the surface

52
00:01:59,840 --> 00:02:01,900
are darkening over time scales of

53
00:02:01,900 --> 00:02:04,060
hundreds of millions of years or even less.

54
00:02:04,080 --> 00:02:07,000
And we also see that the bright spots maybe are still forming.

55
00:02:07,000 --> 00:02:09,280
So Ceres is still an active body.

56
00:02:09,300 --> 00:02:11,500
And we still have a lot of questions about

57
00:02:11,500 --> 00:02:13,740
what are the processes that are modifying

58
00:02:13,740 --> 00:02:15,400
Ceres' surface over time

59
00:02:15,420 --> 00:02:18,720
and what that tells us about the internal nature of Ceres

60
00:02:18,720 --> 00:02:21,000
and how it actually formed.