



1  
00:00:00,000 --> 00:00:00,767  
[Music]

2  
00:00:00,767 --> 00:00:04,972  
From late 2013 to early 2014,  
a NASA mission called LADEE

3  
00:00:04,972 --> 00:00:07,808  
explored the Moon's  
tenuous atmosphere and its dust

4  
00:00:07,808 --> 00:00:09,042  
environment.

5  
00:00:09,042 --> 00:00:12,713  
Now, LADEE's observations  
have led to a new discovery: the

6  
00:00:12,713 --> 00:00:16,149  
lunar surface is  
periodically releasing water.

7  
00:00:16,149 --> 00:00:20,287  
What we discovered is that the  
surface releases its water when

8  
00:00:20,287 --> 00:00:23,023  
the Moon is bombarded  
by micrometeoroids.

9  
00:00:23,023 --> 00:00:26,627  
This is especially noticeable  
during meteor showers.

10  
00:00:26,627 --> 00:00:30,264  
What we also found is that the  
surface that's releasing the

11  
00:00:30,264 --> 00:00:34,301

water is being protected by a layer, a few centimeters of dry

12

00:00:34,301 --> 00:00:39,106

soil that can only be breached by large micrometeoroids.

13

00:00:39,106 --> 00:00:42,876

When micrometeoroids impact the surface of the Moon, most of the

14

00:00:42,876 --> 00:00:45,245

material in the crater is vaporized.

15

00:00:45,245 --> 00:00:48,849

There is also a shock wave that propagates outward.

16

00:00:48,849 --> 00:00:52,986

That shock wave carries enough energy to release the water

17

00:00:52,986 --> 00:00:55,222

that's coating the grains of the soil.

18

00:00:55,222 --> 00:00:59,459

Most of that water will get released into space, and that's

19

00:00:59,459 --> 00:01:01,495

the signature that LADEE detects with its instrument from its

20

00:01:01,495 --> 00:01:03,931

orbit.

21

00:01:03,931 --> 00:01:06,700

By analyzing the data

returned by the neutral mass

22

00:01:06,700 --> 00:01:10,037  
spectrometer, we found that the  
intensity and the frequencies of

23

00:01:10,037 --> 00:01:13,407  
the fluctuations of signals  
from the water to be perfectly

24

00:01:13,407 --> 00:01:15,175  
correlated with  
known meteor streams.

25

00:01:15,175 --> 00:01:18,545  
For example, we were able to  
detect a big spike of water

26

00:01:18,545 --> 00:01:22,082  
during the Geminid meteor shower  
that occurred in December of

27

00:01:22,082 --> 00:01:23,617  
2013.

28

00:01:23,617 --> 00:01:27,454  
Thanks to LADEE, we now know  
that trace amounts of water are

29

00:01:27,454 --> 00:01:29,923  
widely distributed  
across the lunar surface.

30

00:01:29,923 --> 00:01:33,126  
This discovery provides a  
potential resource for future

31

00:01:33,126 --> 00:01:36,330  
exploration, and it improves  
our understanding the Moon's

