1
00:00:00,050 --> 00:00:04,030
[music] Tom Watters: Two years ago, we reported

2
00:00:04,050 --> 00:00:08,040
evidence that the moon is shrinking. Now, we've found

3
00:00:08,060 --> 00:00:12,050
evidence that the moon is actually being pulled apart--forming

4
00:00:12,070 --> 00:00:16,070
features called graben. So, the "shrinking moon"

5
00:00:16,090 --> 00:00:20,120
--it turns out, is not shrinking everywhere.

6
00:00:20,140 --> 00:00:24,140
Some places, the moon is actually expanding by

7
00:00:24,160 --> 00:00:28,170
a little bit. So, finding these young graben was a real surprise

8
00:00:28,190 --> 00:00:32,200
because we thought, well, all these lobate scarps are telling us

9
00:00:32,220 --> 00:00:36,220
the moon is shrinking, so what are these little, small

10
00:00:36,240 --> 00:00:40,270
graben that are telling us the moon is pulling apart--doing

11
00:00:40,290 --> 00:00:44,330
in this picture? How does this all fit together? All that's related

12
00:00:44,350 --> 00:00:48,370
to how the moon has evolved--how the moon has lost heat.

13
00:00:48,390 --> 00:00:52,400

over its four-and-a-half billion year history. Most of the

14
00:00:52,420 --> 00:00:56,450
terrestrial planets, when they formed, were very hot, and they got so hot

15
00:00:56,470 --> 00:01:00,460
that they actually completely melted. When that happens,

16
00:01:00,480 --> 00:01:04,660
they will be in a general state of contraction because they're still hot

17
00:01:04,680 --> 00:01:08,690
on the inside and cooling down, and as they cool, they want to shrink.

18
00:01:08,710 --> 00:01:12,710
Only the outer part of the moon melted, forming what is called a magma ocean,

19
00:01:12,730 --> 00:01:16,740
and in that model, the balance of stresses or forces

20
00:01:16,760 --> 00:01:20,780
that are acting on the moon would allow us to form both

21
00:01:20,800 --> 00:01:24,820
these small lobate scarps that show contraction, as well as

22
00:01:24,840 --> 00:01:28,870
these small graben that show the moon being pulled apart.

23
00:01:28,890 --> 00:01:32,920
One of the really, really exciting returns

24
00:01:32,940 --> 00:01:37,020
of the Lunar Reconnaissance Orbiter mission is that we've seen this

25
00:01:37,040 --> 00:01:41,040
now growing evidence of very young geoloic activity on the

26
00:01:41,060 --> 00:01:45,070
moon. Many, many people have felt that the moon

27
00:01:45,090 --> 00:01:49,110
is pretty much geologically dead, and what we're finding is that that's totally wrong,

28
00:01:49,130 --> 00:01:53,160
that the moon appears to be geologically active now.

29
00:01:53,180 --> 00:01:57,210
[music]

30
00:01:57,230 --> 00:02:01,280
[music, beeping]

31
00:02:01,300 --> 00:02:05,360
[beeping]