1
00:00:00,000 --> 00:00:03,000
(music)

2
00:00:03,000 --> 00:00:08,000
We tend to think of Mars as a dead planet where all the exciting geologic activity

3
00:00:08,000 --> 00:00:13,000
happened billions of years ago. But information from NASA's Mars Reconnaissance Orbiter

4
00:00:13,000 --> 00:00:17,000
shows us that Mars is still a very dynamic place.

5
00:00:17,000 --> 00:00:21,000
Mars has a permanent ice cap made up of water ice at its north pole.

6
00:00:21,000 --> 00:00:26,000
This pole is ringed by sand dunes, which we're looking straight down on.

7
00:00:26,000 --> 00:00:30,000
These dunes are made of small bits of basalt, dark volcanic rock similar

8
00:00:30,000 --> 00:00:33,000
to the rocks found around the Hawaiian volcanoes.

9
00:00:33,000 --> 00:00:39,000
In the fall and winter, the temperatures are so cold that 30 percent of the Martian carbon

10
00:00:39,000 --> 00:00:44,000
dioxide atmosphere freezes onto the ground, forming a seasonal polar cap.

11
00:00:44,000 --> 00:00:49,000
The ground gets covered with a bright layer of seasonal carbon dioxide ice,

12
00:00:49,000 --> 00:00:52,000
or 'dry ice,' that's about one to two feet thick.

13
00:00:52,000 --> 00:00:58,000

When we flip between images taken at different times in the spring, we can see the dry ice

14
00:00:58,000 --> 00:01:04,000
cracks form under the sun's heat as the solid carbon dioxide turns into gas.

15
00:01:04,000 --> 00:01:09,000
The gas beneath the ice escapes, carrying dark sand and dust that move,

16
00:01:09,000 --> 00:01:13,000
as we can see, down the steep sides of the dunes.

17
00:01:13,000 --> 00:01:19,000
We are now looking at different parts of the vast field of dunes. These are called Barchan dunes.

18
00:01:19,000 --> 00:01:22,000
At the start of this time-lapse, the dunes are covered

19
00:01:22,000 --> 00:01:26,000
with seasonal dry ice so everything is roughly the same color.

20
00:01:26,000 --> 00:01:29,000
The dark streaks and splotches are sand from the dune.

21
00:01:29,000 --> 00:01:35,000
There are small splotches of sand at the crest of the dune. Then we start seeing the ice crack.

22
00:01:35,000 --> 00:01:41,000
Sand is pushed to the top of the ice layer by the escaping gas outlining the cracks.

23
00:01:41,000 --> 00:01:47,000
As time goes on, the cracks widen and fresh bright frost condenses in the vicinity.

24
00:01:47,000 --> 00:01:52,000
Now, we see sand coming from the crest of the dune and sliding down the steep dune slopes.

25
00:01:52,000 --> 00:01:58,000
A ferocious wind has picked up, blowing sand and dust across the dune.

26
00:01:58,000 --> 00:02:04,000
Until the dark sand dune is free of seasonal ice. Let's watch that whole sequence again.

27
00:02:04,000 --> 00:02:07,000
We start with ice-covered dunes in the early Spring.

28
00:02:07,000 --> 00:02:13,000
Some areas of the ice rupture and crack, allowing sand and dust to escape along with the escaping gas.

29
00:02:13,000 --> 00:02:19,000
The gas from the dry ice destabilizes the slopes, reshaping the dunes.

30
00:02:19,000 --> 00:02:24,000
This activity happens every Spring in the vast dune fields of the Martian polar regions.