1
00:00:19,030 --> 00:00:11,000
[music playing]

2
00:00:19,050 --> 00:00:23,050
[Narrator] Aerosols are suspended throughout Earth’s atmosphere,

3
00:00:23,070 --> 00:00:27,080
and the tiny, varied particles play a mysterious role

4
00:00:27,100 --> 00:00:30,110
in human induced climate change.

5
00:00:30,130 --> 00:00:33,140
Just like people, every aerosol particle is unique.

6
00:00:33,160 --> 00:00:37,180
Sometimes aerosols occur naturally, from things like volcanoes,

7
00:00:37,200 --> 00:00:41,180
but they can also originate from human activity.

8
00:00:41,200 --> 00:00:48,180
Aerosols are short-lived, but have an active lifetime!

9
00:00:48,200 --> 00:00:52,180
In just a short expanse of time, particles can change their size

10
00:00:52,200 --> 00:00:56,190
and composition and even travel across vast oceans.

11
00:00:56,210 --> 00:01:03,200
Aerosols are difficult to study, and one important new area of research

12
00:01:03,220 --> 00:01:07,200
involves how these particles impact clouds.

13
00:01:07,220 --> 00:01:10,210

Without aerosols, clouds could not exist.

14
00:01:10,230 --> 00:01:14,210
[Michael Mishchenko] An aerosol particle can serve as a cloud condensation nucleus.

15
00:01:14,230 --> 00:01:20,220
[Narrator] The introduction of too many aerosols will modify a cloud's natural properties.

16
00:01:20,240 --> 00:01:25,220
[Michael Mishchenko] The more aerosol particles we have in the atmosphere,

17
00:01:25,240 --> 00:01:30,230
the more cloud droplets we can have.

18
00:01:30,250 --> 00:01:35,240
[Narrator] Clouds play an important role in regulating Earth's climate;

19
00:01:35,260 --> 00:01:43,240
aerosol-rich clouds become bigger, brighter, and longer lasting.

20
00:01:43,260 --> 00:01:46,260
Aerosols impact clouds in other ways.

21
00:01:46,270 --> 00:01:51,270
Some aerosol particles primarily reflect solar radiation and cool the atmosphere,

22
00:01:51,290 --> 00:01:55,280
and others absorb radiation, which warms the air.

23
00:01:55,300 --> 00:02:01,290
When aerosols heat the atmosphere, they create an environment where clouds can't thrive.

24
00:02:01,310 --> 00:02:08,290
The suppression of clouds leads to further warming of the atmosphere by solar radiation.

25
00:02:08,310 --> 00:02:15,300
Researchers are still working to understand the role of these curious particles.

26
00:02:15,320 --> 00:02:18,310
[Michael Mishchenko] We need to study the distribution of particles globally,

27
00:02:18,330 --> 00:02:21,320
and the only way to do that is from satellites.

28
00:02:21,340 --> 00:02:27,330
[Narrator] New tools will soon help scientists study aerosols.

29
00:02:27,350 --> 00:02:33,340
The Aerosol Polarimetry Sensor, or APS, is among a suite of instruments

30
00:02:33,360 --> 00:02:36,350
onboard NASA’s upcoming Glory mission.

31
00:02:36,370 --> 00:02:40,370
The APS will provide a global dataset of aerosol distribution

32
00:02:40,390 --> 00:02:44,380
with unprecedented accuracy and specificity.

33
00:02:44,400 --> 00:02:50,390
Unique data from the Glory mission, along with NASA’s fleet of Earth observing satellites,

34
00:02:50,410 --> 00:02:58,410
will help researchers investigate the intricacies of Earth’s changing climate.