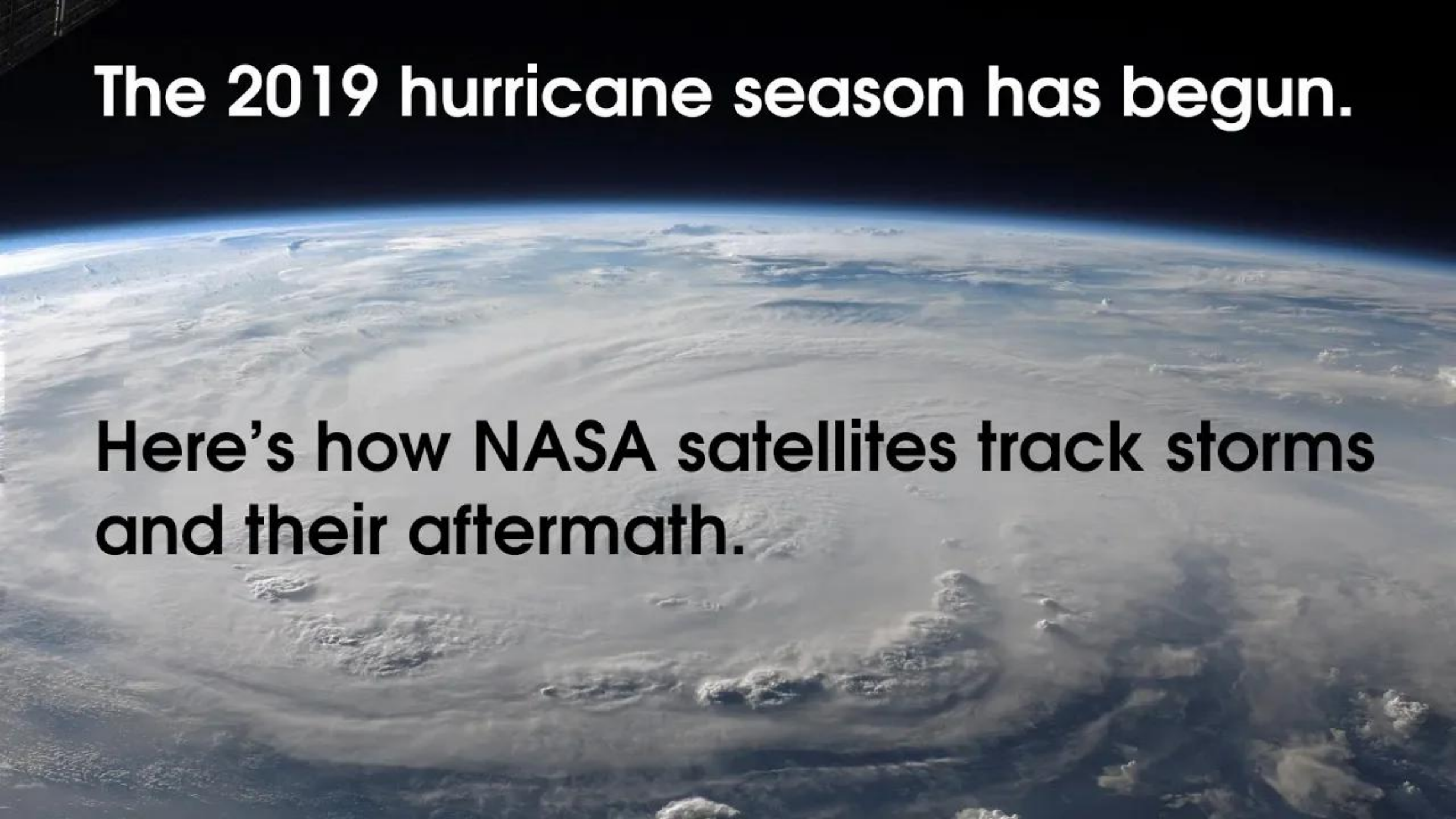
The 2019 hurricane season has begun.
Here's how NASA satellites track storms and their aftermath.

1
00:00:01,000 --> 00:00:06,920
In 2018, Hurricanes Florence and Michael made catastrophic landfalls over the United States.

2
00:00:06,920 --> 00:00:10,380
They caused extreme flooding, record-breaking winds,

3
00:00:10,380 --> 00:00:13,610
and storm surges that devastated communities.

4
00:00:13,610 --> 00:00:18,040
Understanding how hurricanes behave is critical to saving lives.

5
00:00:18,040 --> 00:00:21,360
How a hurricane forms, develops and dissipates

6
00:00:21,360 --> 00:00:23,400
is a complex problem though;

7
00:00:23,400 --> 00:00:27,280
it involves many different processes that are highly interconnected.

8
00:00:27,280 --> 00:00:31,530
But from space and the air, NASA satellites and aircraft

9
00:00:31,530 --> 00:00:37,380
can break down the underlying physics by monitoring each component of a hurricane.

10
00:00:37,380 --> 00:00:40,750
There are key ingredients for hurricanes to form.

11
00:00:40,750 --> 00:00:44,260
First, we need warm waters that provide fuel for the storms.

12
00:00:44,260 --> 00:00:47,350
Water evaporates from the warm ocean

13
00:00:47,350 --> 00:00:51,860

and creates humid air, which then rises and cools to form clouds and rain.

14
00:00:51,860 --> 00:00:58,180
3D structures to look for inside storms are long rain bands and a near-circular eyewall.

15
00:00:58,180 --> 00:01:01,500
The warmer the ocean, the stronger the storm can be,

16
00:01:01,500 --> 00:01:03,080
which often means heavy rainfall

17
00:01:03,080 --> 00:01:06,000
and extreme winds.

18
00:01:06,000 --> 00:01:09,480
Understanding each component is just part of the puzzle.

19
00:01:09,480 --> 00:01:15,620
The key is to figure out how they fit together and to do this, scientists step into the digital world.

20
00:01:15,620 --> 00:01:18,990
This is a computer-generated model of a hurricane.

21
00:01:18,990 --> 00:01:24,070
Inside this digital environment, the atmosphere is programmed to behave

22
00:01:24,070 --> 00:01:28,440
as much as possible like the real world, governed by the laws of physics.

23
00:01:28,440 --> 00:01:34,200
What makes this a valuable research tool is that scientists can put satellite observations

24
00:01:34,200 --> 00:01:38,040
into this digital world to see how the entire system evolves.

25
00:01:38,040 --> 00:01:43,220
The impact of a hurricane lasts long after the storm has dissipated.

26
00:01:43,220 --> 00:01:47,820
Satellites and aircraft can also be used to monitor damage and recovery.

27
00:01:47,820 --> 00:01:54,120
In 2017, Hurricane Maria caused the longest electric power blackout

28
00:01:54,120 --> 00:01:56,090
in U.S. history in Puerto Rico.

29
00:01:56,090 --> 00:01:59,990
Over the following year, satellite data helped first responders

30
00:01:59,990 --> 00:02:02,780
monitor where and when power was restored.

31
00:02:02,780 --> 00:02:08,300
And after Hurricane Maria, aircraft were used to map the island's recovering forests.

32
00:02:08,300 --> 00:02:16,260
Satellites, aircraft, and computer models help us understand each stage of a hurricane including the aftermath.

33
00:02:16,260 --> 00:02:21,100
As we learn more, not only will other agencies better forecast weather,