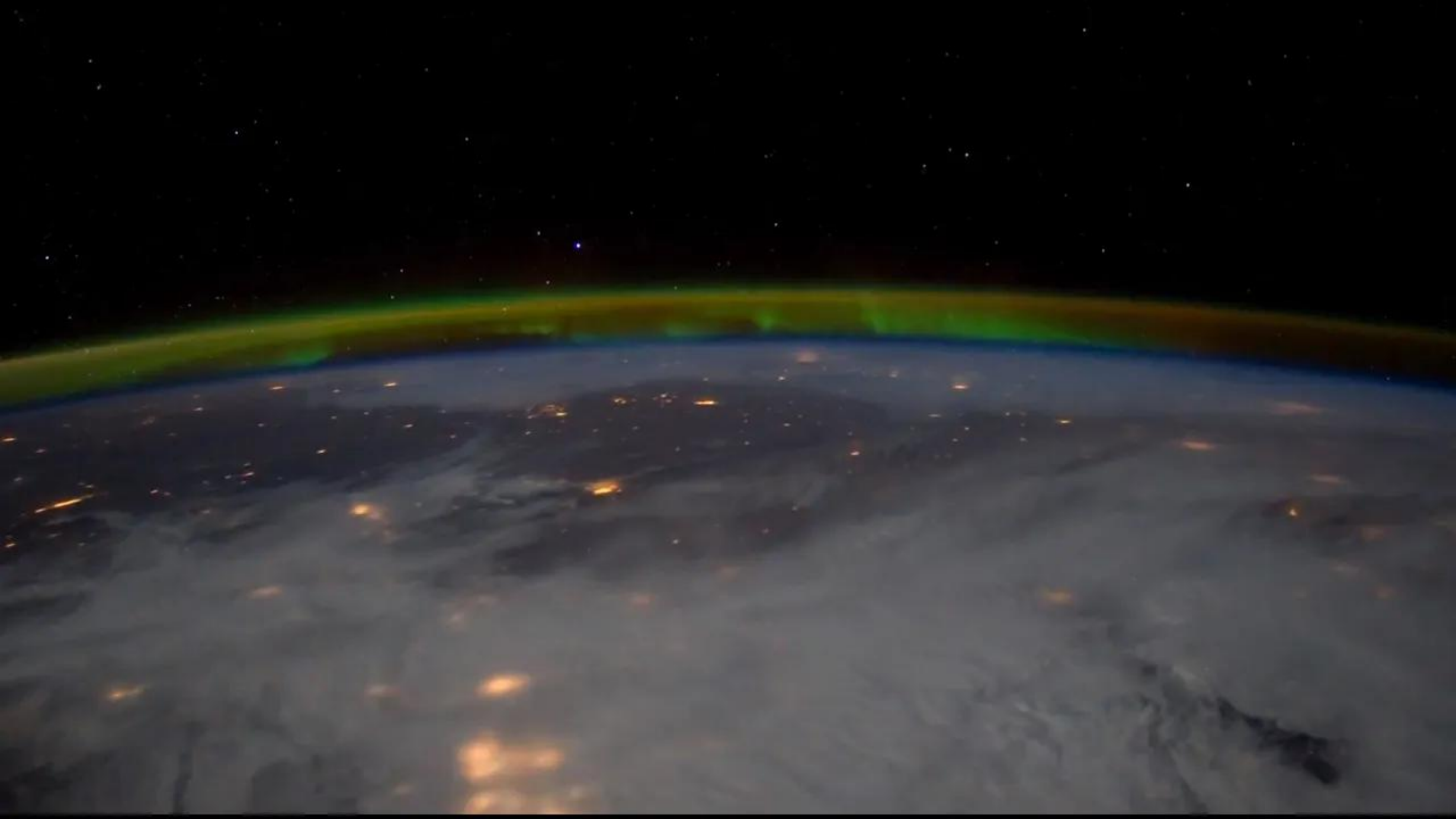

1
00:00:00,000 --> 00:00:03,000
Our atmosphere,

2
00:00:03,000 --> 00:00:06,000
just a thin layer of gasses surrounding our planet.

3
00:00:06,000 --> 00:00:09,000
Absorbing solar radiation.

4
00:00:09,000 --> 00:00:13,000
Retaining heat to warm the Earth's surface.

5
00:00:13,000 --> 00:00:18,000
A delicate mixture of gasses separating life on Earth from the rest of the cosmos.

6
00:00:18,000 --> 00:00:21,000
But when this mixture of gasses gets out of balance,

7
00:00:21,000 --> 00:00:24,000
the temperature rises and alters our climate.

8
00:00:24,000 --> 00:00:29,000
Carbon is an essential component of Earth's atmosphere,

9
00:00:29,000 --> 00:00:33,000
but it's also the primary driver of our warming climate...

10
00:00:33,000 --> 00:00:36,000
and NASA scientists are learning more about by studying how carbon dioxide

11
00:00:36,000 --> 00:00:39,000
moves through the atmosphere, ocean, and plant life.

12
00:00:39,000 --> 00:00:46,000
MUSIC

13
00:00:46,000 --> 00:00:49,000

When people burn fossil fuels and clear forests,

14
00:00:49,000 --> 00:00:52,000
carbon dioxide is released into the atmosphere.

15
00:00:52,000 --> 00:00:54,000
But only half of that carbon stays in the atmosphere

16
00:00:54,000 --> 00:00:58,000
warming our planet and contributing to climate change.

17
00:00:58,000 --> 00:01:01,000
The other half is removed from the air by the planet's ecosystems

18
00:01:01,000 --> 00:01:03,000
and ocean.

19
00:01:03,000 --> 00:01:05,000
A huge question is,

20
00:01:05,000 --> 00:01:08,000
in the future, as the carbon dioxide builds up,

21
00:01:08,000 --> 00:01:13,000
will the land and the ocean continue to take up that fifty percent.

22
00:01:13,000 --> 00:01:16,000
Do they get saturated, they're full and they quit at some point?

23
00:01:16,000 --> 00:01:19,000
Or do they always just take up more and more and more?

24
00:01:19,000 --> 00:01:21,000
In some regions,

25
00:01:21,000 --> 00:01:23,000
forests are releasing more carbon than they're storing.

26
00:01:23,000 --> 00:01:25,000
Forests gain carbon as they grow,

27
00:01:25,000 --> 00:01:27,000
and they release it as the die and decompose.

28
00:01:27,000 --> 00:01:31,000
And processes like drought, pests, fire, and deforestation

29
00:01:31,000 --> 00:01:33,000
contribute to the release of carbon.

30
00:01:33,000 --> 00:01:38,000
Like vegetation on land, ocean water absorbs carbon dioxide

31
00:01:38,000 --> 00:01:42,000
from fossil fuel emissions. Doing so, however,

32
00:01:42,000 --> 00:01:47,000
changes the chemistry of seawater, with wide ranging impacts on marine ecosystems.

33
00:01:47,000 --> 00:01:50,000
And, as surface water in the ocean continues to warm,

34
00:01:50,000 --> 00:01:55,000
carbon uptake will slow down at some point.

35
00:01:55,000 --> 00:01:59,000
Models of atmospheric CO2 help us understand what our satellites see

36
00:01:59,000 --> 00:02:03,000
so we get a more complete picture of this global carbon cycle.

37
00:02:03,000 --> 00:02:07,000
We can check our models against atmospheric observations like those provided by OCO-2,

38
00:02:07,000 --> 00:02:10,000

and if they look reasonable, then we have confidence in using these models

39
00:02:10,000 --> 00:02:13,000
to predict how carbon is going to change in the future.

40
00:02:13,000 --> 00:02:16,000
NASA is utilizing it's unique science capabilities

41
00:02:16,000 --> 00:02:19,000
to increase our understanding of our home planet,

42
00:02:19,000 --> 00:02:21,000
improve lives,

43
00:02:21,000 --> 00:02:24,000
and safeguard our future.