



1
00:00:00,900 --> 00:00:03,480
How can you see the atmosphere?

2
00:00:03,500 --> 00:00:05,730
The answer is blowing in the wind.

3
00:00:05,750 --> 00:00:07,940
Tiny particles, known as aerosols,

4
00:00:07,960 --> 00:00:10,320
are carried by the air around the globe.

5
00:00:11,240 --> 00:00:14,050
This visualization uses data from NASA satellites

6
00:00:14,070 --> 00:00:16,710
combined with our knowledge of physics and meteorology

7
00:00:16,730 --> 00:00:19,800
to track three aerosols: dust, smoke, and sea salt.

8
00:00:21,820 --> 00:00:23,680
Sea salt, shown here in blue,

9
00:00:23,700 --> 00:00:26,680
is picked up by winds passing over the ocean.

10
00:00:26,700 --> 00:00:29,330
As tropical storms and hurricanes form,

11
00:00:29,350 --> 00:00:35,640
the salt particles are concentrated into the spiraling shape we all recognize.

12
00:00:35,660 --> 00:00:39,400
With their movements, we can follow the formation of Hurricane Irma

13
00:00:39,420 --> 00:00:42,230

and see the dust from the Sahara, shown in tan,

14

00:00:42,250 --> 00:00:47,080

get washed out of the storm center by the rain.

15

00:00:47,100 --> 00:00:49,280

Advances in computing speed allow scientists

16

00:00:49,300 --> 00:00:52,380

to include more details of these physical processes

17

00:00:52,400 --> 00:00:56,600

in their simulations of how the aerosols interact with the storm systems.

18

00:00:58,000 --> 00:01:01,120

The increased resolution of the computer simulation

19

00:01:01,130 --> 00:01:02,590

is apparent in fine details

20

00:01:02,600 --> 00:01:06,760

like the hurricane bands spiraling counter-clockwise.

21

00:01:09,260 --> 00:01:12,820

Computer simulations let us see how different processes fit together

22

00:01:12,850 --> 00:01:15,380

and evolve as a system.

23

00:01:15,400 --> 00:01:18,200

By using mathematical models to represent nature

24

00:01:18,220 --> 00:01:20,980

we can separate the system into component parts

25

00:01:21,000 --> 00:01:24,650

and better understand the underlying physics of each.

26

00:01:24,660 --> 00:01:29,180

Today's research improves next year's weather forecasting ability.

27

00:01:33,000 --> 00:01:35,500

Hurricane Ophelia was very unusual.

28

00:01:35,520 --> 00:01:38,220

It headed northeast, pulling in Saharan dust

29

00:01:38,240 --> 00:01:40,730

and smoke from wildfires in Portugal,

30

00:01:40,750 --> 00:01:43,730

carrying both to Ireland and the UK.

31

00:01:43,740 --> 00:01:48,280

This aerosol interaction was very different from other storms of the season.

32

00:01:50,320 --> 00:01:52,540

As computing speed continues to increase,

33

00:01:52,560 --> 00:01:56,980

scientists will be able to bring more scientific details into the simulations,