



CLOUD
PHYSICS
LIDAR

1
00:00:00,050 --> 00:00:04,080
[wind]

2
00:00:04,100 --> 00:00:08,130
[rain]
As the Hurricane and Severe

3
00:00:08,150 --> 00:00:12,170
Storm Sentinel campaign takes off, the Global Hawk aircraft

4
00:00:12,190 --> 00:00:16,200
will serve as a long-distance airborne laboratory designed to study the factors

5
00:00:16,220 --> 00:00:20,230
that can create and drastically change tropical cyclones.

6
00:00:20,250 --> 00:00:24,270
This airborne mission--

7
00:00:24,290 --> 00:00:28,290
HS3 for short--is studying those storms, and one of the

8
00:00:28,310 --> 00:00:32,310
targets of study is the Saharan Air Layer.

9
00:00:32,330 --> 00:00:36,340
This warm, dusty mass of air originates from the Sahara and

10
00:00:36,360 --> 00:00:40,370
drifts west into the Atlantic. The exact impact of the

11
00:00:40,390 --> 00:00:44,400
Saharan Air Layer is unclear. Research has shown that the SAL

12
00:00:44,420 --> 00:00:48,460
can weaken a storm by promoting downdrafts, and its

13

00:00:48,480 --> 00:00:52,500

strong winds can increase vertical wind shear in and around the storm.

14

00:00:52,520 --> 00:00:56,530

During the HS3 campaign, scientists will analyze the Saharan Air

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00:00:56,550 --> 00:01:00,550

Layer using a suite of instruments on board the unmanned Global Hawk

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00:01:00,570 --> 00:01:04,600

aircraft. One instrument, the Cloud Physics Lidar,

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00:01:04,620 --> 00:01:08,650

will gather data straight through storms and dusty air layers.

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00:01:08,670 --> 00:01:12,650

Braun: The Cloud Physics Lidar, or CPL, gives us the vertical profile

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00:01:12,670 --> 00:01:16,690

of the dust. So we can see not only where within the atmosphere it is, but

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00:01:16,710 --> 00:01:20,720

get a relative sense at least of how much dust there is

21

00:01:20,740 --> 00:01:24,750

and the extent to which it's getting wrapped into the storm circulation.

22

00:01:24,770 --> 00:01:28,770

The lidar works by sending 5,000 rapid light pulses a second

23

00:01:28,790 --> 00:01:32,810

that bounce and scatter off any particles they encounter. The light

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00:01:32,830 --> 00:01:36,830

that bounces back to the instrument can help distinguish the type of particle,

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00:01:36,850 --> 00:01:40,860

which then gives us a better look at the anatomy of the storm.

26

00:01:40,880 --> 00:01:44,900

Data from the Cloud Physics Lidar will not only improve models

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00:01:44,920 --> 00:01:48,920

of the Saharan Air Layer, but also expand the understanding of how

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00:01:48,940 --> 00:01:52,960

the dust interacts with the storms.

Braun: That's really the measurement challenge

29

00:01:52,980 --> 00:01:57,020

is to be able to collect the needed observations

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00:01:57,040 --> 00:02:01,050

of where the Saharan Air is, what its characteristics are, how

31

00:02:01,070 --> 00:02:05,080

much does it penetrate into a storm, and when it does, what

32

00:02:05,100 --> 00:02:09,140

is it actually doing to the storm? How is it inhibiting development? And those