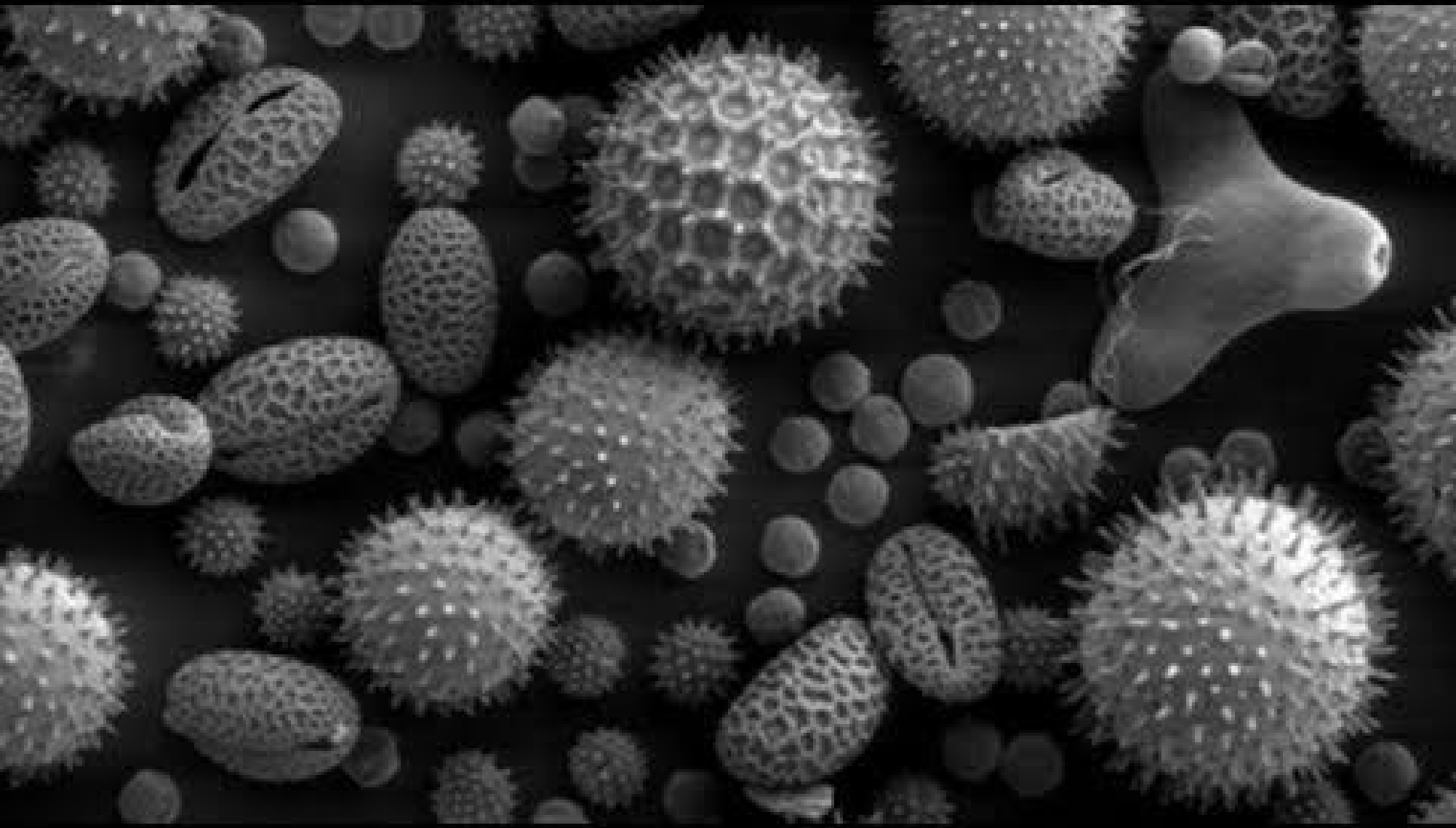

1
00:00:22,970 --> 00:00:20,960
the really hard thing about

2
00:00:28,540 --> 00:00:22,980
understanding the human impact on

3
00:00:31,930 --> 00:00:28,550
climate is the effect of aerosols their

4
00:00:35,299 --> 00:00:31,940
effect on the planets radiation balance

5
00:00:37,549 --> 00:00:35,309
depends upon what altitude they're at it

6
00:00:40,970 --> 00:00:37,559
depends upon what size the particles are

7
00:00:43,670 --> 00:00:40,980
and it depends upon whether they absorb

8
00:00:46,549 --> 00:00:43,680
sunlight or just reflected but in

9
00:00:50,180 --> 00:00:46,559
addition there's an even harder problem

10
00:00:56,959 --> 00:00:50,190
and that's the fact that aerosols have

11
00:00:59,569 --> 00:00:56,969
an influence on clouds we've had

12
00:01:02,209 --> 00:00:59,579
measurements of greenhouse gases but we

13
00:01:04,759 --> 00:01:02,219

haven't had measurements accurate enough

14
00:01:13,550 --> 00:01:04,769
of the other major forcing which is

15
00:01:21,330 --> 00:01:18,240
what glory does is fill in that missing

16
00:01:23,460 --> 00:01:21,340
data the big thing about glory is it

17
00:01:25,410 --> 00:01:23,470
will finally make aerosol measurements

18
00:01:29,929 --> 00:01:25,420
with an accuracy that allows you to

19
00:01:32,550 --> 00:01:29,939
determine their role in climate change

20
00:01:34,679 --> 00:01:32,560
Gloria is going to fly two instruments

21
00:01:37,590 --> 00:01:34,689
for us the first one is called the

22
00:01:39,899 --> 00:01:37,600
aerosol polarimetry center or aps it

23
00:01:42,539 --> 00:01:39,909
will be the most advanced sensor of its

24
00:01:44,639 --> 00:01:42,549
kind when we fly it and the mission of

25
00:01:47,100 --> 00:01:44,649
the APS sensor is to help us

26
00:01:48,990 --> 00:01:47,110
characterize the particles that are in

27
00:01:51,180 --> 00:01:49,000
the atmosphere both man-made particles

28
00:01:52,469 --> 00:01:51,190
from pollution and also naturally

29
00:01:54,240 --> 00:01:52,479
occurring particles from things like

30
00:01:56,760 --> 00:01:54,250
forest fires and volcanoes and those

31
00:01:58,440 --> 00:01:56,770
types of things this is a very complex

32
00:02:01,109 --> 00:01:58,450
instrument one of a kind is the first

33
00:02:04,289 --> 00:02:01,119
instrument that will study aerosols that

34
00:02:08,270 --> 00:02:04,299
was specifically designed to study the

35
00:02:10,830 --> 00:02:08,280
least understood cause of climate change

36
00:02:12,330 --> 00:02:10,840
represented by aerosoles would call it a

37
00:02:16,680 --> 00:02:12,340
polarimeter because it measures the

38
00:02:20,069 --> 00:02:16,690

polarization of light light is a wave

39
00:02:22,289 --> 00:02:20,079
and the wave can either be going along

40
00:02:26,220 --> 00:02:22,299
it this way or it can be going along in

41
00:02:30,539 --> 00:02:26,230
this way and which way it prefers to go

42
00:02:33,210 --> 00:02:30,549
is its polarization state if you take

43
00:02:36,599 --> 00:02:33,220
sunlight where sunlight doesn't have any

44
00:02:39,270 --> 00:02:36,609
preferred orientation and you scatter it

45
00:02:40,680 --> 00:02:39,280
off little particles when you look at

46
00:02:42,780 --> 00:02:40,690
the light that gets scattered by those

47
00:02:46,289 --> 00:02:42,790
particles it will have a preferred state

48
00:02:48,780 --> 00:02:46,299
and so you end up with polarized signal

49
00:02:52,110 --> 00:02:48,790
so that's the signal that we're looking

50
00:02:55,380 --> 00:02:52,120
at with the APS my measuring

51
00:02:57,479 --> 00:02:55,390
polarization of light we can tell much

52
00:02:59,970 --> 00:02:57,489
more about the size of the aerosol

53
00:03:02,250 --> 00:02:59,980
particles about their shapes and even

54
00:03:03,449 --> 00:03:02,260
above their chemical composition one of

55
00:03:05,250 --> 00:03:03,459
the reasons that it's important to

56
00:03:08,129 --> 00:03:05,260
measure the aerosols from space is we

57
00:03:09,569 --> 00:03:08,139
get a global picture but the other thing

58
00:03:11,910 --> 00:03:09,579
that glory does which has never been

59
00:03:13,770 --> 00:03:11,920
done before is measure all of the

60
00:03:16,710 --> 00:03:13,780
radiation parameters so you can

61
00:03:17,860 --> 00:03:16,720
characterize the aerosol properties much

62
00:03:20,649 --> 00:03:17,870
more accurately

63
00:03:23,170 --> 00:03:20,659

and finally it looks at a given place

64
00:03:25,119 --> 00:03:23,180
from several different angles so that

65
00:03:27,300 --> 00:03:25,129
tells you the full information on the

66
00:03:30,369 --> 00:03:27,310
radiation field and that allows you to

67
00:03:32,949 --> 00:03:30,379
infer aerosol properties much more

68
00:03:35,410 --> 00:03:32,959
accurately than any previous instrument

69
00:03:38,740 --> 00:03:35,420
is done it is this egra so that will

70
00:03:40,180 --> 00:03:38,750
allow us a to for example discriminate

71
00:03:42,399 --> 00:03:40,190
between natural and anthropogenic

72
00:03:44,770 --> 00:03:42,409
aerosols and this is really important

73
00:03:46,839 --> 00:03:44,780
especially for policymakers we have no

74
00:03:48,640 --> 00:03:46,849
influence on the natural particles but

75
00:03:57,550 --> 00:03:48,650
we have a lot of influence of the

76
00:04:00,490 --> 00:03:57,560
anthropogenic man-made particles the

77
00:04:03,210 --> 00:04:00,500
data from glory is primarily for the

78
00:04:05,890 --> 00:04:03,220
purpose of telling us what the

79
00:04:10,270 --> 00:04:05,900
mechanisms are that force the climate

80
00:04:12,759 --> 00:04:10,280
models how aerosols are changing and how

81
00:04:16,750 --> 00:04:12,769
clouds are changing because of aerosols

82
00:04:21,430 --> 00:04:16,760
but also the detailed information on the

83
00:04:23,920 --> 00:04:21,440
clouds is useful in itself for helping

84
00:04:25,659 --> 00:04:23,930
us improve our cloud models and clouds

85
00:04:30,619 --> 00:04:25,669
are an important part of the climate

86
00:04:36,830 --> 00:04:33,929
we're finally going to make polarization

87
00:04:39,600 --> 00:04:36,840
measurements of the Earth from space

88
00:04:42,869 --> 00:04:39,610

we've actually made more precise

89
00:04:46,110 --> 00:04:42,879
measurements of the aerosols on other

90
00:04:48,600 --> 00:04:46,120
planets than we have of the earth given

91
00:04:50,700 --> 00:04:48,610
the fact that aerosols have comparable

92
00:04:52,260 --> 00:04:50,710
importance to that of greenhouse gases