1
00:00:16,310 --> 00:00:13,589
earth's atmosphere

2
00:00:18,950 --> 00:00:16,320
it's the air we breathe the force that

3
00:00:21,510 --> 00:00:18,960
regulates our temperature weather and

4
00:00:23,349 --> 00:00:21,520
importantly what cleanses pollutants

5
00:00:25,349 --> 00:00:23,359
from the environment

6
00:00:27,509 --> 00:00:25,359
we've begun to realize that our

7
00:00:30,070 --> 00:00:27,519
atmosphere has no geographical

8
00:00:32,470 --> 00:00:30,080
boundaries when it comes to pollution

9
00:00:34,870 --> 00:00:32,480
airborne industrial waste in one area

10
00:00:37,350 --> 00:00:34,880
can litter forests thousands of miles

11
00:00:40,310 --> 00:00:37,360
away with acid rain

12
00:00:43,110 --> 00:00:40,320
due to our everyday activities a host of

13
00:00:44,869 --> 00:00:43,120

gases such as carbon dioxide and methane

14
00:00:46,790 --> 00:00:44,879
are being released into the atmosphere

15
00:00:49,430 --> 00:00:46,800
of the watering rates

16
00:00:51,670 --> 00:00:49,440
these greenhouse gases are known to trap

17
00:00:54,229 --> 00:00:51,680
heat near the surface of the earth that

18
00:00:56,830 --> 00:00:54,239
otherwise would radiate into space

19
00:00:59,990 --> 00:00:56,840
potentially causing serious global

20
00:01:01,990 --> 00:01:00,000
warming this problem has been studied by

21
00:01:04,229 --> 00:01:02,000
scientists for many years

22
00:01:06,390 --> 00:01:04,239
but never with the detail an airborne

23
00:01:09,429 --> 00:01:06,400
observatory can make flying at all

24
00:01:11,670 --> 00:01:09,439
levels of the atmosphere to do this us

25
00:01:14,149 --> 00:01:11,680
and canadian scientists teamed up to

26
00:01:16,550 --> 00:01:14,159
study greenhouse gases in the remote

27
00:01:19,270 --> 00:01:16,560
northern latitudes of canada

28
00:01:22,469 --> 00:01:19,280
the program called able for

29
00:01:24,870 --> 00:01:22,479
atmospheric boundary layer experiment is

30
00:01:26,870 --> 00:01:24,880
the third in a series of nasa-sponsored

31
00:01:29,749 --> 00:01:26,880
research expedition

32
00:01:32,550 --> 00:01:29,759
initiated in the early 80s abel will

33
00:01:34,390 --> 00:01:32,560
eventually study major ecosystems around

34
00:01:36,950 --> 00:01:34,400
the globe to better understand the

35
00:01:39,190 --> 00:01:36,960
dynamics of our atmosphere

36
00:01:41,429 --> 00:01:39,200
with the help of mcgill university a

37
00:01:43,590 --> 00:01:41,439
ground-based site was chosen in northern

38
00:01:45,670 --> 00:01:43,600

quebec that featured a forest and

39
00:01:47,510 --> 00:01:45,680
wetlands environment

40
00:01:49,990 --> 00:01:47,520
scientists from harvard and the state

41
00:01:52,230 --> 00:01:50,000
university of new york built a 100 foot

42
00:01:54,069 --> 00:01:52,240
tower at the forest site to sample

43
00:01:56,230 --> 00:01:54,079
atmospheric chemistry and collect

44
00:01:58,550 --> 00:01:56,240
meteorological data

45
00:02:01,270 --> 00:01:58,560
meanwhile nasa biospherics researcher

46
00:02:03,429 --> 00:02:01,280
gary whiting and assistant joel canez

47
00:02:06,469 --> 00:02:03,439
spent countless hours at the nearby

48
00:02:11,830 --> 00:02:06,479
wetlands measuring gases given off by

49
00:02:15,190 --> 00:02:13,670
detailed studies of the marsh plants

50
00:02:17,430 --> 00:02:15,200
were also made by a group from the

51
00:02:19,110 --> 00:02:17,440
university of delaware to characterize

52
00:02:20,869 --> 00:02:19,120
their growth patterns and how they

53
00:02:22,630 --> 00:02:20,879
transport methane gas into the

54
00:02:24,949 --> 00:02:22,640
atmosphere

55
00:02:27,350 --> 00:02:24,959
because of their hollow stems these

56
00:02:30,309 --> 00:02:27,360
plants are very efficient transporters

57
00:02:31,750 --> 00:02:30,319
of methane piping the gas directly into

58
00:02:33,830 --> 00:02:31,760
the sky

59
00:02:36,790 --> 00:02:33,840
many other measurements such as balloon

60
00:02:41,350 --> 00:02:36,800
sawns track local winds temperatures and

61
00:02:46,309 --> 00:02:43,910
an electric aircraft from nasa's wallops

62
00:02:48,470 --> 00:02:46,319
flight facility virginia threw repeated

63
00:02:51,030 --> 00:02:48,480

missions over the sites

64
00:02:53,990 --> 00:02:51,040
seven experiments took air samples and

65
00:02:56,710 --> 00:02:54,000
measured various chemical concentrations

66
00:02:58,630 --> 00:02:56,720
dr ed browell of nasa's langley research

67
00:03:01,350 --> 00:02:58,640
center used an instrument that shoots a

68
00:03:03,509 --> 00:03:01,360
laser beam above and below the aircraft

69
00:03:04,869 --> 00:03:03,519
to plot a cross-sectional view of the

70
00:03:07,030 --> 00:03:04,879
atmosphere

71
00:03:09,430 --> 00:03:07,040
the reddish-orange colors represent

72
00:03:12,949 --> 00:03:09,440
regions containing higher concentrations

73
00:03:16,070 --> 00:03:12,959
of ozone another greenhouse gas

74
00:03:18,869 --> 00:03:16,080
studying atmospheric events from the sky

75
00:03:21,110 --> 00:03:18,879
and the ground giving scientists an