TERRA

YEARS OF OBSERVATION

1
00:00:23,090 --> 00:00:20,720
the earth is changing understanding

2
00:00:24,830 --> 00:00:23,100
those changes and their consequences is

3
00:00:33,770 --> 00:00:24,840
perhaps the most significant scientific

4
00:00:37,639 --> 00:00:33,780
challenge of our time on December 18th

5
00:00:40,430 --> 00:00:37,649
1999 NASA launched Terra the first of

6
00:00:42,590 --> 00:00:40,440
three Earth observing system missions it

7
00:00:44,270 --> 00:00:42,600
observes our planet's land water and

8
00:00:48,799 --> 00:00:44,280
atmosphere from a height of more than

9
00:00:50,630 --> 00:00:48,809
700 kilometers Terra carries a suite of

10
00:00:53,299 --> 00:00:50,640
five instruments including one from

11
00:00:54,470 --> 00:00:53,309
Japan and one from Canada each is

12
00:00:57,799 --> 00:00:54,480
designed to provide a different

13
00:01:00,080 --> 00:00:57,809

complementary view of Earth taras

14
00:01:02,270 --> 00:01:00,090
instruments collect 72 different types

15
00:01:03,799 --> 00:01:02,280
of measurements helping scientists build

16
00:01:05,710 --> 00:01:03,809
a more complete picture of how the

17
00:01:10,700 --> 00:01:05,720
Earth's climate and environment work

18
00:01:13,070 --> 00:01:10,710
those measurements now span 10 years the

19
00:01:15,850 --> 00:01:13,080
Tero spacecraft and the instruments on

20
00:01:18,670 --> 00:01:15,860
them are our really a critical part of

21
00:01:22,280 --> 00:01:18,680
understanding how the system is changing

22
00:01:24,440 --> 00:01:22,290
having a dedicated space craft with the

23
00:01:26,390 --> 00:01:24,450
synergy of the instruments accuracies

24
00:01:28,940 --> 00:01:26,400
these instruments provide on a platform

25
00:01:31,100 --> 00:01:28,950
that's in a stable orbit really has

26
00:01:32,520 --> 00:01:31,110
enabled us to do things that we couldn't

27
00:01:36,510 --> 00:01:32,530
do prior to

28
00:01:38,370 --> 00:01:36,520
Tutera NASA along with scientists and

29
00:01:40,649 --> 00:01:38,380
engineers from the United States Japan

30
00:01:42,510 --> 00:01:40,659
and Canada keep the satellite and its

31
00:01:45,560 --> 00:01:42,520
pioneering instruments in orbit and

32
00:01:47,520 --> 00:01:45,570
sending valuable data back to earth over

33
00:01:49,680 --> 00:01:47,530
the past decade

34
00:01:52,050 --> 00:01:49,690
taras satellite observations have led to

35
00:01:54,030 --> 00:01:52,060
a wide range of discoveries published in

36
00:01:58,740 --> 00:01:54,040
more than 3,000 scientific journal

37
00:02:00,180 --> 00:01:58,750
articles around the world Terra

38
00:02:05,609 --> 00:02:00,190

instruments provide the most detailed

39
00:02:07,320 --> 00:02:05,619
daily view of earth over time the images

40
00:02:09,840 --> 00:02:07,330
show seasonal patterns of plant growth

41
00:02:11,460 --> 00:02:09,850
more clearly than ever before helping

42
00:02:14,280 --> 00:02:11,470
scientists understand how plants

43
00:02:16,770 --> 00:02:14,290
critical to life on Earth are responding

44
00:02:18,330 --> 00:02:16,780
to our changing climate for the first

45
00:02:21,479 --> 00:02:18,340
time we actually have a scientific

46
00:02:24,360 --> 00:02:21,489
instrument designed for measuring the

47
00:02:26,550 --> 00:02:24,370
land surface on on a daily basis it's

48
00:02:29,130 --> 00:02:26,560
been a major breakthrough for all of us

49
00:02:30,840 --> 00:02:29,140
I'm astounded at how much uptake there

50
00:02:33,150 --> 00:02:30,850
has been at this data and how many

51
00:02:35,880 --> 00:02:33,160
people are using it to study the land

52
00:02:39,060 --> 00:02:35,890
surface both for applications such as

53
00:02:42,060 --> 00:02:39,070
food security and agriculture monitoring

54
00:02:44,759 --> 00:02:42,070
in addition to forest monitoring and

55
00:02:48,270 --> 00:02:44,769
looking at the more scientific questions

56
00:02:49,280 --> 00:02:48,280
of land-use change and carbon and energy

57
00:02:51,900 --> 00:02:49,290
cycles

58
00:02:53,720 --> 00:02:51,910
taras instruments together also show the

59
00:02:56,090 --> 00:02:53,730
impact of fire around the world

60
00:02:58,440 --> 00:02:56,100
thousands of fires burn every day

61
00:03:01,770 --> 00:02:58,450
transforming the landscape and releasing

62
00:03:04,199 --> 00:03:01,780
carbon into the atmosphere tera revealed

63
00:03:06,690 --> 00:03:04,209

that large fires inject smoke high into

64
00:03:08,729 --> 00:03:06,700
the atmosphere that smoke and other

65
00:03:10,770 --> 00:03:08,739
pollution travel long distances

66
00:03:15,090 --> 00:03:10,780
affecting air quality half a world away

67
00:03:16,289 --> 00:03:15,100
and for the first time Terra showed that

68
00:03:20,009 --> 00:03:16,299
the pollution we put in the atmosphere

69
00:03:21,900 --> 00:03:20,019
actually changes clouds these changes

70
00:03:23,819 --> 00:03:21,910
happen all over the world but they're

71
00:03:25,680 --> 00:03:23,829
easiest to see over the ocean where

72
00:03:29,220 --> 00:03:25,690
ships leave a trail of pollution in a

73
00:03:31,979 --> 00:03:29,230
pristine sky the particles have two

74
00:03:33,840 --> 00:03:31,989
effects they can just like haze they

75
00:03:37,680 --> 00:03:33,850
cause a blanket the reflect more

76
00:03:39,120 --> 00:03:37,690
sunlight making cool the earth and cool

77
00:03:41,550 --> 00:03:39,130
the surface actually they're blocking

78
00:03:43,589 --> 00:03:41,560
sunlight that's so-called aerosol direct

79
00:03:45,550 --> 00:03:43,599
effect the indirect effect as particles

80
00:03:48,400 --> 00:03:45,560
modified clouds

81
00:03:49,840 --> 00:03:48,410
caused them to get smaller drops reflect

82
00:03:52,030 --> 00:03:49,850
more and that has a cooling effect to

83
00:03:53,890 --> 00:03:52,040
can counterbalance greenhouse effect

84
00:03:58,090 --> 00:03:53,900
it's the largest uncertainty in climate

85
00:04:00,430 --> 00:03:58,100
is so it was an indirect effect by

86
00:04:02,320 --> 00:04:00,440
changing clouds people alter rainfall

87
00:04:05,620 --> 00:04:02,330
and the way the earth reflects and

88
00:04:11,530 --> 00:04:05,630

absorbs energy from the Sun both impact

89
00:04:14,560 --> 00:04:11,540
our climate and climate in turn impacts

90
00:04:16,750 --> 00:04:14,570
our lives that's why for the last 10

91
00:04:21,870 --> 00:04:16,760
years Terra's been dedicated to learning

92
00:04:27,340 --> 00:04:24,670
with its daily observations over many

93
00:04:29,830 --> 00:04:27,350
years Terra helps scientists understand

94
00:04:32,170 --> 00:04:29,840
how our world is transforming today and