



1
00:00:20,710 --> 00:00:17,830

yeah the sun is the source of

2
00:00:23,590 --> 00:00:20,720

life-sustaining energy here on earth

3
00:00:27,029 --> 00:00:23,600

much of how it works and affects us

4
00:00:29,429 --> 00:00:27,039

remains a source of scientific mystery

5
00:00:31,310 --> 00:00:29,439

sunspots were first recorded by humans

6
00:00:33,510 --> 00:00:31,320

in the 1600s

7
00:00:35,590 --> 00:00:33,520

astrophysicists have since linked

8
00:00:36,870 --> 00:00:35,600

heightened sunspot activity with the

9
00:00:39,190 --> 00:00:36,880

solar wind

10
00:00:41,830 --> 00:00:39,200

it's a million mile an hour force of

11
00:00:44,790 --> 00:00:41,840

magnetically charged particles emanating

12
00:00:46,950 --> 00:00:44,800

from the sun's upper atmosphere ebbing

13
00:00:49,750 --> 00:00:46,960

and flowing in minimum and maximum

14

00:00:52,229 --> 00:00:49,760

intensities over 11-year cycles the

15

00:00:54,549 --> 00:00:52,239

so-called space weather can seriously

16

00:00:56,229 --> 00:00:54,559

affect how things work here on earth

17

00:00:59,189 --> 00:00:56,239

such as disrupting satellite

18

00:01:01,910 --> 00:00:59,199

communications telephone service and

19

00:01:03,830 --> 00:01:01,920

personal electronics it would help

20

00:01:05,990 --> 00:01:03,840

our technology

21

00:01:08,070 --> 00:01:06,000

to safeguard the technology by knowing

22

00:01:09,910 --> 00:01:08,080

when and in what intensity space weather

23

00:01:11,910 --> 00:01:09,920

occurs and where these effects might

24

00:01:13,030 --> 00:01:11,920

show up to two

25

00:01:15,830 --> 00:01:13,040

one

26

00:01:17,910 --> 00:01:15,840

ignition and liftoff of discovery and

27

00:01:20,149 --> 00:01:17,920

the ulysses spacecraft bound for the

28

00:01:22,149 --> 00:01:20,159

polar regions of the sun until the

29

00:01:24,310 --> 00:01:22,159

launch of ulysses from space shuttle

30

00:01:26,390 --> 00:01:24,320

discovery in 1990

31

00:01:28,710 --> 00:01:26,400

data for understanding and predicting

32

00:01:31,350 --> 00:01:28,720

space weather had come from a limited

33

00:01:33,030 --> 00:01:31,360

sampling area the plane extending from

34

00:01:35,590 --> 00:01:33,040

the sun's equator

35

00:01:38,950 --> 00:01:35,600

ulysses has since made three orbits

36

00:01:41,030 --> 00:01:38,960

above and below the poles of the sun

37

00:01:43,030 --> 00:01:41,040

vastly expanding the territory from

38

00:01:45,830 --> 00:01:43,040

where raw space weather data are

39

00:01:47,590 --> 00:01:45,840

gathered so ulysses was really the first

40

00:01:50,469 --> 00:01:47,600

spacecraft that

41

00:01:51,510 --> 00:01:50,479

leaped out of this confinement

42

00:01:53,830 --> 00:01:51,520

and

43

00:01:56,310 --> 00:01:53,840

gives us a view of the global

44

00:01:58,950 --> 00:01:56,320

heliosphere ulysses has found that the

45

00:02:01,190 --> 00:01:58,960

solar minimum we're in right now is

46

00:02:03,590 --> 00:02:01,200

producing the lowest levels of solar

47

00:02:05,990 --> 00:02:03,600

wind seen since accurate readings became

48

00:02:09,109 --> 00:02:06,000

available a half century ago

49

00:02:11,350 --> 00:02:09,119

but for heliophysicists these data raise

50

00:02:13,990 --> 00:02:11,360

as many questions as they answer the

51
00:02:15,990 --> 00:02:14,000
space age is only 50 years now

52
00:02:17,670 --> 00:02:16,000
and

53
00:02:19,910 --> 00:02:17,680
the sun just operates on longer time

54
00:02:21,670 --> 00:02:19,920
scales than these 50 years so we might

55
00:02:23,910 --> 00:02:21,680
have glimpsed just the surface of what

56
00:02:26,710 --> 00:02:23,920
is really going on by expanding its

57
00:02:28,790 --> 00:02:26,720
reach both in time and space

58
00:02:31,509 --> 00:02:28,800
ulysses is helping the discipline of

59
00:02:33,830 --> 00:02:31,519
space weather prediction grow beyond its

60
00:02:35,270 --> 00:02:33,840
infancy for the betterment of life here

61
00:02:37,990 --> 00:02:35,280
on earth

62
00:02:44,309 --> 00:02:38,000
for more about ulysses the heliosphere