



1
00:00:11,030 --> 00:00:07,780

[Music]

2
00:00:14,720 --> 00:00:11,040

Soho stands for solar Heliospheric

3
00:00:17,120 --> 00:00:14,730

Observatory and it's a mission that was

4
00:00:22,090 --> 00:00:17,130

launched by ESA the European Space

5
00:00:26,269 --> 00:00:22,100

Agency and NASA in 1995 to study the Sun

6
00:00:29,269 --> 00:00:26,279

the Sun is a star and the universe is

7
00:00:31,609 --> 00:00:29,279

made up of stars but the Sun is very

8
00:00:34,069 --> 00:00:31,619

close to us we're able to see the Sun in

9
00:00:37,010 --> 00:00:34,079

great details so if we can understand

10
00:00:38,810 --> 00:00:37,020

our Sun the mount allows us to have a

11
00:00:40,970 --> 00:00:38,820

better understanding of the rest of the

12
00:00:45,799 --> 00:00:40,980

stars and then consequently the rest of

13
00:00:47,029 --> 00:00:45,809

the universe well the first time I saw a

14

00:00:50,209 --> 00:00:47,039

Soho image

15

00:00:53,869 --> 00:00:50,219

my reaction was basically wow it's blown

16

00:00:56,900 --> 00:00:53,879

away I've never seen the the kinds of

17

00:01:00,200 --> 00:00:56,910

detail the kinds of structure the kinds

18

00:01:02,330 --> 00:01:00,210

of dynamics that were going on and any

19

00:01:04,160 --> 00:01:02,340

sort of image of the Sun before I think

20

00:01:08,580 --> 00:01:04,170

that this is probably true for a lot of

21

00:01:13,360 --> 00:01:10,960

one of the ways that Soho studies the

22

00:01:16,450 --> 00:01:13,370

corona is using what we call a

23

00:01:19,240 --> 00:01:16,460

coronagraph and so a coronagraph creates

24

00:01:21,730 --> 00:01:19,250

an artificial eclipse because the Sun

25

00:01:24,510 --> 00:01:21,740

itself the surface of the Sun is about a

26

00:01:27,850 --> 00:01:24,520

million times brighter than this outer

27

00:01:30,520 --> 00:01:27,860

structure of the corona we need to block

28

00:01:36,310 --> 00:01:30,530

that bright disc out so you can see the

29

00:01:38,670 --> 00:01:36,320

much fainter outer corona using Soho and

30

00:01:41,440 --> 00:01:38,680

using technique called helioseismology

31

00:01:43,780 --> 00:01:41,450

very similar to seismology on the earth

32

00:01:46,240 --> 00:01:43,790

we're actually able to see inside the

33

00:01:50,410 --> 00:01:46,250

Sun and so what we were able to do is

34

00:01:51,969 --> 00:01:50,420

see the layer of the Sun just below the

35

00:01:54,070 --> 00:01:51,979

visible surface that we call the

36

00:01:57,219 --> 00:01:54,080

convection zone and that's where all

37

00:01:59,050 --> 00:01:57,229

sorts of dynamics are going on the

38

00:02:02,260 --> 00:01:59,060

inside of the Sun is bubbling up to the

39

00:02:06,520 --> 00:02:02,270

surface and that's really where all of

40

00:02:08,800 --> 00:02:06,530

the the solar phenomena that we see is

41

00:02:11,260 --> 00:02:08,810

first developed and so we were able to

42

00:02:15,070 --> 00:02:11,270

see underneath the surface and see these

43

00:02:16,390 --> 00:02:15,080

flows of solar plasma see the formation

44

00:02:17,949 --> 00:02:16,400

of sunspots

45

00:02:19,900 --> 00:02:17,959

and this is something that's never been

46

00:02:23,570 --> 00:02:19,910

done before we're actually able to see

47

00:02:36,850 --> 00:02:34,270

[Music]

48

00:02:40,750 --> 00:02:36,860

I have been staring at images from Soho

49

00:02:42,610 --> 00:02:40,760

for months and on months and the data

50

00:02:45,010 --> 00:02:42,620

was beautiful but then when I saw trace

51
00:02:47,380 --> 00:02:45,020
you got to see these fine detail these

52
00:02:49,750 --> 00:02:47,390
tiny loops that you completely didn't

53
00:02:51,520 --> 00:02:49,760
even imagine where there and then you

54
00:02:56,500 --> 00:02:51,530
see them and there it's like nothing

55
00:02:59,740 --> 00:02:56,510
you've ever seen you're seeing details

56
00:03:01,449 --> 00:02:59,750
of the coronal loops in the previous

57
00:03:02,680 --> 00:03:01,459
images you would from other satellites

58
00:03:03,940 --> 00:03:02,690
it would look like it was just one big

59
00:03:05,260 --> 00:03:03,950
loop and when you're actually good to

60
00:03:07,900 --> 00:03:05,270
see trace you can see it's all these

61
00:03:10,870 --> 00:03:07,910
teeny tiny finally they almost look like

62
00:03:12,759 --> 00:03:10,880
threads and there's teeny tiny loops and

63
00:03:16,420 --> 00:03:12,769

they're just breaking off and reforming

64

00:03:17,860 --> 00:03:16,430

and throwing claz m'a one loop can be

65

00:03:19,840 --> 00:03:17,870

vastly different temperature than the

66

00:03:22,120 --> 00:03:19,850

next loop and so that has been a big

67

00:03:23,770 --> 00:03:22,130

thing it's helped with magnetic data

68

00:03:25,180 --> 00:03:23,780

they're able to see that when the loops

69

00:03:28,270 --> 00:03:25,190

break off they can see the way that

70

00:03:30,009 --> 00:03:28,280

magnetic field is twisting and so the

71

00:03:32,440 --> 00:03:30,019

instruments on Soho work closely with

72

00:03:34,330 --> 00:03:32,450

trace or and vice versa so that we can

73

00:03:36,150 --> 00:03:34,340

use all the data together to better

74

00:03:44,860 --> 00:03:36,160

understand things