1
00:00:00,080 --> 00:00:35,110
foreign

2
00:00:39,430 --> 00:00:36,870
the earthquake that rocked southern

3
00:00:42,389 --> 00:00:39,440
california last january caught many by

4
00:00:44,950 --> 00:00:42,399
surprise but dr andrea donnellan a

5
00:00:47,750 --> 00:00:44,960
geophysicist from nasa's jet propulsion

6
00:00:48,790 --> 00:00:47,760
laboratory in pasadena actually saw it

7
00:00:50,470 --> 00:00:48,800
coming

8
00:00:52,389 --> 00:00:50,480
we knew that there was a likelihood of

9
00:00:54,470 --> 00:00:52,399
an earthquake here on a fault similar to

10
00:00:55,910 --> 00:00:54,480
the one that we saw and we had estimated

11
00:00:58,549 --> 00:00:55,920
the potential of there being about a

12
00:01:00,790 --> 00:00:58,559
magnitude 6.4 earthquake so we weren't

13
00:01:02,950 --> 00:01:00,800

surprised this earthquake occurred

14
00:01:05,109 --> 00:01:02,960
dr donald and her colleagues track

15
00:01:07,990 --> 00:01:05,119
changes in the earth's crust throughout

16
00:01:10,390 --> 00:01:08,000
the la area they do it with antennas

17
00:01:12,710 --> 00:01:10,400
like this receiving signals from a

18
00:01:15,750 --> 00:01:12,720
series of satellites called the global

19
00:01:17,830 --> 00:01:15,760
positioning system or gps

20
00:01:19,910 --> 00:01:17,840
it's a navigational system but we use it

21
00:01:20,950 --> 00:01:19,920
to very precisely measure motion of the

22
00:01:24,469 --> 00:01:20,960
ground

23
00:01:26,550 --> 00:01:24,479
being squeezed and pushed and we can

24
00:01:29,429 --> 00:01:26,560
assess earthquake hazard from that

25
00:01:31,670 --> 00:01:29,439
her research prior to the january quake

26
00:01:33,350 --> 00:01:31,680
indicated a buildup of stress along a

27
00:01:36,630 --> 00:01:33,360
fault running through the northridge

28
00:01:38,230 --> 00:01:36,640
california area exactly where disaster

29
00:01:40,630 --> 00:01:38,240
ultimately struck

30
00:01:42,950 --> 00:01:40,640
one of her goals now is to assess the

31
00:01:44,469 --> 00:01:42,960
impact of this northridge quake on

32
00:01:46,069 --> 00:01:44,479
future events

33
00:01:48,069 --> 00:01:46,079
studies indicate that the stress

34
00:01:49,670 --> 00:01:48,079
increased along the ventura basin which

35
00:01:51,830 --> 00:01:49,680
is being squeezed close so we want to

36
00:01:53,350 --> 00:01:51,840
monitor that region very carefully try

37
00:01:54,950 --> 00:01:53,360
and understand if the earthquake hazard

38
00:01:57,109 --> 00:01:54,960

has increased there

39
00:01:59,749 --> 00:01:57,119
although they can't predict precisely

40
00:02:01,510 --> 00:01:59,759
where and when an earthquake will occur

41
00:02:03,749 --> 00:02:01,520
dr donald and her colleagues

42
00:02:05,990 --> 00:02:03,759
identification of potential hot spots

43
00:02:08,150 --> 00:02:06,000
should help focus efforts to shore up

44
00:02:55,350 --> 00:02:08,160
buildings and homes so that when the

45
00:03:28,790 --> 00:03:07,670
so

46
00:03:28,800 --> 00:04:37,749
still play here

47
00:04:41,430 --> 00:04:39,590
the seismologist can measure an

48
00:04:43,830 --> 00:04:41,440
earthquake and see what happened after

49
00:04:45,270 --> 00:04:43,840
the fact but for the first time with gps

50
00:04:47,270 --> 00:04:45,280
and other techniques like it we can

51
00:04:48,870 --> 00:04:47,280
actually measure how the earth is moving

52
00:04:52,710 --> 00:04:48,880
and try and assess earthquake hazard

53
00:04:55,590 --> 00:04:54,629
oh mountain we found out went up 15

54
00:04:57,510 --> 00:04:55,600
inches

55
00:04:59,670 --> 00:04:57,520
and that means it went up and stayed up

56
00:05:03,590 --> 00:04:59,680
15 inches so the mountain actually grew

57
00:05:07,990 --> 00:05:05,430
the ultimate goal is to help quantify

58
00:05:09,749 --> 00:05:08,000
the earthquake hazard in the la area and

59
00:05:12,230 --> 00:05:09,759
we would like to help prioritize things

60
00:05:13,749 --> 00:05:12,240
like building code retrofits right now

61
00:05:15,270 --> 00:05:13,759
there's just a blanket if you find a

62
00:05:17,189 --> 00:05:15,280
building that needs fixed you fix it

63
00:05:22,550 --> 00:05:17,199

there's no priority on one area being

64
00:05:27,430 --> 00:05:24,870
we don't do prediction we do forecasting

65
00:05:29,510 --> 00:05:27,440
so we're looking on 10 or 20 or 50 year

66
00:05:30,870 --> 00:05:29,520
probabilities of earthquake occurrence

67
00:05:32,230 --> 00:05:30,880
and i do want to point out that we do

68
00:05:34,469 --> 00:05:32,240
this work in conjunction with the

69
00:05:37,430 --> 00:05:34,479
geologists and the seismologists that

70
00:05:38,790 --> 00:05:37,440
this is one more component to the puzzle

71
00:06:58,230 --> 00:05:38,800
but we don't do

72
00:07:15,990 --> 00:07:00,629
you can't just lean back a little bit

73
00:07:18,790 --> 00:07:17,350
and they used to

74
00:07:20,469 --> 00:07:18,800
shine lights across mountains and

75
00:07:22,309 --> 00:07:20,479
measure angles between mountain peaks

76
00:07:27,110 --> 00:07:22,319
that was a very imprecise technique

77
00:07:30,790 --> 00:07:28,710
what we're looking for now is the post

78
00:07:32,469 --> 00:07:30,800
seismic relaxation we call it to

79
00:07:37,350 --> 00:07:32,479
understand how this fault has affected

80
00:07:41,350 --> 00:07:39,029
we're doing that by putting in a network

81
00:07:42,710 --> 00:07:41,360
of continuous gps receivers so when

82
00:07:43,990 --> 00:07:42,720
there's an earthquake like we had in

83
00:07:46,150 --> 00:07:44,000
northridge we don't have to drive a

84
00:07:47,589 --> 00:07:46,160
truck up here and deploy the receiver we

85
00:07:51,029 --> 00:07:47,599
instantly have data as soon as the

86
00:07:54,070 --> 00:07:52,390
so we'd like to see these techniques

87
00:07:55,589 --> 00:07:54,080
used in northern california and they are

88
00:07:57,189 --> 00:07:55,599

to some extent we'd also like to see

89
00:07:59,110 --> 00:07:57,199
them in the pacific northwest and all

90
00:08:40,310 --> 00:07:59,120
over the world japan is setting up a

91
00:08:44,949 --> 00:08:41,990
now the blind thrust fault obviously it

92
00:08:46,070 --> 00:08:44,959
has a tip right about in here right

93
00:08:47,990 --> 00:08:46,080
roughly

94
00:08:50,150 --> 00:08:48,000
the coast of the proxy but it extends

95
00:08:51,670 --> 00:08:50,160
well back

96
00:08:53,590 --> 00:08:51,680
where depending where you want to put it

97
00:08:55,670 --> 00:08:53,600
it stands back at least back that this

98
00:08:57,190 --> 00:08:55,680
thing is locked or not and that's that's

99
00:08:58,630 --> 00:08:57,200
the main concern that i have well we can

100
00:09:00,389 --> 00:08:58,640
certainly put sides down here we see

101
00:09:01,910 --> 00:09:00,399
these rotations we also see then the

102
00:09:03,910 --> 00:09:01,920
displacements are a lot higher on this

103
00:09:05,990 --> 00:09:03,920
side okay much smaller here we have a

104
00:09:07,350 --> 00:09:06,000
lot higher strength okay so it is so the

105
00:09:09,509 --> 00:09:07,360
polar rotation is somewhere up in here

106
00:09:11,670 --> 00:09:09,519
it's actually here oh really it's really

107
00:09:13,910 --> 00:09:11,680
tight okay extremely tight what i'd

108
00:09:15,509 --> 00:09:13,920
really like to know is a is this ramp

109
00:09:17,910 --> 00:09:15,519
locked in which case we shouldn't see

110
00:09:19,750 --> 00:09:17,920
any strand accumulating across it which

111
00:09:21,509 --> 00:09:19,760
it sounds like we'll also see what's

112
00:09:22,630 --> 00:09:21,519
happening both seismically from here

113
00:09:24,150 --> 00:09:22,640

because the

114
00:09:25,910 --> 00:09:24,160
largest post seismic motion should be

115
00:09:36,310 --> 00:09:25,920
about a fault dimension away from the

116
00:09:40,310 --> 00:09:37,990
one way that i use andrea's data is to

117
00:09:41,110 --> 00:09:40,320
try to understand whether these faults

118
00:09:42,150 --> 00:09:41,120
are

119
00:09:44,790 --> 00:09:42,160
slipping

120
00:09:46,710 --> 00:09:44,800
very slowly but inexorably at depth and

121
00:09:48,870 --> 00:09:46,720
relieving strain that way or whether

122
00:09:50,550 --> 00:09:48,880
they're locked and accumulating strain

123
00:09:52,310 --> 00:09:50,560
over over hundreds and thousands of

124
00:09:56,470 --> 00:09:52,320
years and eventually that snaps loose as

125
00:09:59,509 --> 00:09:57,590
there are

126
00:10:00,550 --> 00:09:59,519
several faults within the metropolitan

127
00:10:02,470 --> 00:10:00,560
los angeles region that we're

128
00:10:04,310 --> 00:10:02,480
particularly concerned about five or six

129
00:10:06,310 --> 00:10:04,320
in particular that potentially could

130
00:10:07,509 --> 00:10:06,320
produce very large earthquakes by very

131
00:10:09,590 --> 00:10:07,519
large i mean

132
00:10:10,870 --> 00:10:09,600
well in excess of magnitude 7

133
00:10:14,069 --> 00:10:10,880
much much larger than the recent

134
00:10:17,430 --> 00:10:15,509
we're learning a lot from every new

135
00:10:19,430 --> 00:10:17,440
earthquake and all of these data

136
00:10:21,750 --> 00:10:19,440
eventually do come out in new building

137
00:10:23,750 --> 00:10:21,760
codes new building specifications that

138
00:10:25,750 --> 00:10:23,760

hopefully will present prevent you know