



[nasa.gov/MAVEN](http://nasa.gov/MAVEN)



1  
00:00:05,570 --> 00:00:03,230  
so NASA is getting ready to launch a new

2  
00:00:07,160 --> 00:00:05,580  
mission to Mars and here to talk a

3  
00:00:09,709 --> 00:00:07,170  
little bit more about the mission and

4  
00:00:12,560 --> 00:00:09,719  
and also you know what they're hoping to

5  
00:00:14,600 --> 00:00:12,570  
learn about Mars and maybe what its

6  
00:00:18,500 --> 00:00:14,610  
atmosphere looked like several billion

7  
00:00:19,670 --> 00:00:18,510  
years ago is dr. Jim Garvin who is going

8  
00:00:21,290 --> 00:00:19,680  
to tell us a little bit more about this

9  
00:00:24,080 --> 00:00:21,300  
thanks so much for joining us my

10  
00:00:26,689 --> 00:00:24,090  
pleasure so tell us when did Mars have

11  
00:00:29,419 --> 00:00:26,699  
weather like Earth and what it what did

12  
00:00:31,460 --> 00:00:29,429  
it look like a long time ago we think

13  
00:00:34,880 --> 00:00:31,470

billions of years ago perhaps as long

14

00:00:36,920 --> 00:00:34,890

ago as four billion years ago Mars had a

15

00:00:41,000 --> 00:00:36,930

climate state with a bigger atmosphere

16

00:00:44,270 --> 00:00:41,010

that supported surface water rain rivers

17

00:00:46,670 --> 00:00:44,280

perhaps shallow seas persistent surface

18

00:00:49,190 --> 00:00:46,680

water unlike the desert of today that

19

00:00:51,080 --> 00:00:49,200

allowed for a situation for the

20

00:00:53,600 --> 00:00:51,090

chemistry associated with that to be

21

00:00:55,970 --> 00:00:53,610

recorded in the rocks but that state of

22

00:00:58,010 --> 00:00:55,980

Mars is long gone we don't see that

23

00:01:00,770 --> 00:00:58,020

today from any of the voyages we've made

24

00:01:02,779 --> 00:01:00,780

to Mars with our robots since the 60s so

25

00:01:05,329 --> 00:01:02,789

something went wrong something went awry

26

00:01:07,580 --> 00:01:05,339

Mars behave differently figuring that

27

00:01:09,260 --> 00:01:07,590

out is central to understanding whether

28

00:01:13,160 --> 00:01:09,270

Mars could ever have preserved the

29

00:01:15,499 --> 00:01:13,170

record of past life so tell us a little

30

00:01:17,780 --> 00:01:15,509

bit about this new Mars mission and what

31

00:01:19,850 --> 00:01:17,790

kind of science it'll collect so our

32

00:01:22,820 --> 00:01:19,860

next mission to Mars is called maven

33

00:01:24,740 --> 00:01:22,830

it's all about interrogating the

34

00:01:28,190 --> 00:01:24,750

forensic science of the Mars atmosphere

35

00:01:29,960 --> 00:01:28,200

in reconnaissance mode measuring not

36

00:01:32,179 --> 00:01:29,970

only the atmosphere that we see today

37

00:01:33,950 --> 00:01:32,189

but using that atmosphere and it's

38

00:01:36,080 --> 00:01:33,960

interaction with the particles and

39

00:01:37,670 --> 00:01:36,090

fields streaming off the Sun to

40

00:01:40,370 --> 00:01:37,680

understand how it got to be in that

41

00:01:42,260 --> 00:01:40,380

state what possible pathways did the

42

00:01:44,960 --> 00:01:42,270

Mars we see today that we can measure

43

00:01:47,539 --> 00:01:44,970

from maven got it to this state relative

44

00:01:51,380 --> 00:01:47,549

to that Mars of the past the warm wet

45

00:01:52,609 --> 00:01:51,390

cloudy rainy river filled Mars that

46

00:01:54,800 --> 00:01:52,619

we've been seeing at the rock record

47

00:01:56,929 --> 00:01:54,810

level with curiosity what did that

48

00:01:59,330 --> 00:01:56,939

mavens all about making that connection

49

00:02:06,210 --> 00:01:59,340

connecting the dots from the atmosphere

50

00:02:10,930 --> 00:02:08,680

so tell us why is it so important to

51  
00:02:14,290 --> 00:02:10,940  
understand what happened to Mars's

52  
00:02:16,390 --> 00:02:14,300  
atmosphere because Mars atmosphere is a

53  
00:02:18,040 --> 00:02:16,400  
critical element in asking whether Mars

54  
00:02:19,570 --> 00:02:18,050  
ever could have been alive the

55  
00:02:22,120 --> 00:02:19,580  
atmosphere is part of the environment

56  
00:02:24,490 --> 00:02:22,130  
that allows conditions that we call

57  
00:02:27,070 --> 00:02:24,500  
those that are habitable habitability to

58  
00:02:28,810 --> 00:02:27,080  
persist we see in the past recorded in

59  
00:02:31,390 --> 00:02:28,820  
minerals and rocks and other things that

60  
00:02:33,460 --> 00:02:31,400  
Mars had all the right stuff the right

61  
00:02:36,010 --> 00:02:33,470  
conditions chemicals presence of water

62  
00:02:37,870 --> 00:02:36,020  
energy systems to potentially have

63  
00:02:40,000 --> 00:02:37,880

sustained the kind of life that we know

64

00:02:41,949 --> 00:02:40,010

on earth but now it doesn't the

65

00:02:44,590 --> 00:02:41,959

atmosphere is a record book it's a time

66

00:02:47,050 --> 00:02:44,600

capsule in a chemistry lab for how Mars

67

00:02:48,850 --> 00:02:47,060

works today and how it got to be the way

68

00:02:51,070 --> 00:02:48,860

it is today we need to see that

69

00:02:53,380 --> 00:02:51,080

atmosphere up close as it interacts with

70

00:02:55,720 --> 00:02:53,390

the solar wind now the Sun and with

71

00:02:58,180 --> 00:02:55,730

space space weather and how it might be

72

00:03:00,250 --> 00:02:58,190

evolving what's it losing to space what

73

00:03:02,170 --> 00:03:00,260

chemical reactions are ongoing what

74

00:03:05,140 --> 00:03:02,180

species that we can't really see easily

75

00:03:09,550 --> 00:03:05,150

are there how do those link back in time

76

00:03:11,020 --> 00:03:09,560

to that better Mars State so does this

77

00:03:13,540 --> 00:03:11,030

mean there could have been life on Mars

78

00:03:15,940 --> 00:03:13,550

at one point we don't know whether there

79

00:03:17,830 --> 00:03:15,950

was life on Mars but we know the kind of

80

00:03:19,360 --> 00:03:17,840

question is to look forward to read the

81

00:03:21,640 --> 00:03:19,370

records of what might have been the

82

00:03:23,380 --> 00:03:21,650

so-called preservation potential of what

83

00:03:25,690 --> 00:03:23,390

we would call signs of life bio

84

00:03:28,330 --> 00:03:25,700

signatures they're recorded in rocks and

85

00:03:29,830 --> 00:03:28,340

chemicals even in atmospheres we know

86

00:03:32,199 --> 00:03:29,840

some of the kinds of things to look for

87

00:03:34,420 --> 00:03:32,209

but we need a better picture of the

88

00:03:36,670 --> 00:03:34,430

whole atmosphere system the rock system

89

00:03:37,780 --> 00:03:36,680

even the interior of Mars to be most

90

00:03:40,270 --> 00:03:37,790

informed on how to ask that question

91

00:03:42,780 --> 00:03:40,280

because Mars is the first good place to

92

00:03:45,910 --> 00:03:42,790

ask are we alone at least in the past

93

00:03:47,740 --> 00:03:45,920

with respect to things like life so we

94

00:03:50,050 --> 00:03:47,750

got to be smart about asking it's a big

95

00:03:52,180 --> 00:03:50,060

place it's a big atmosphere even for a