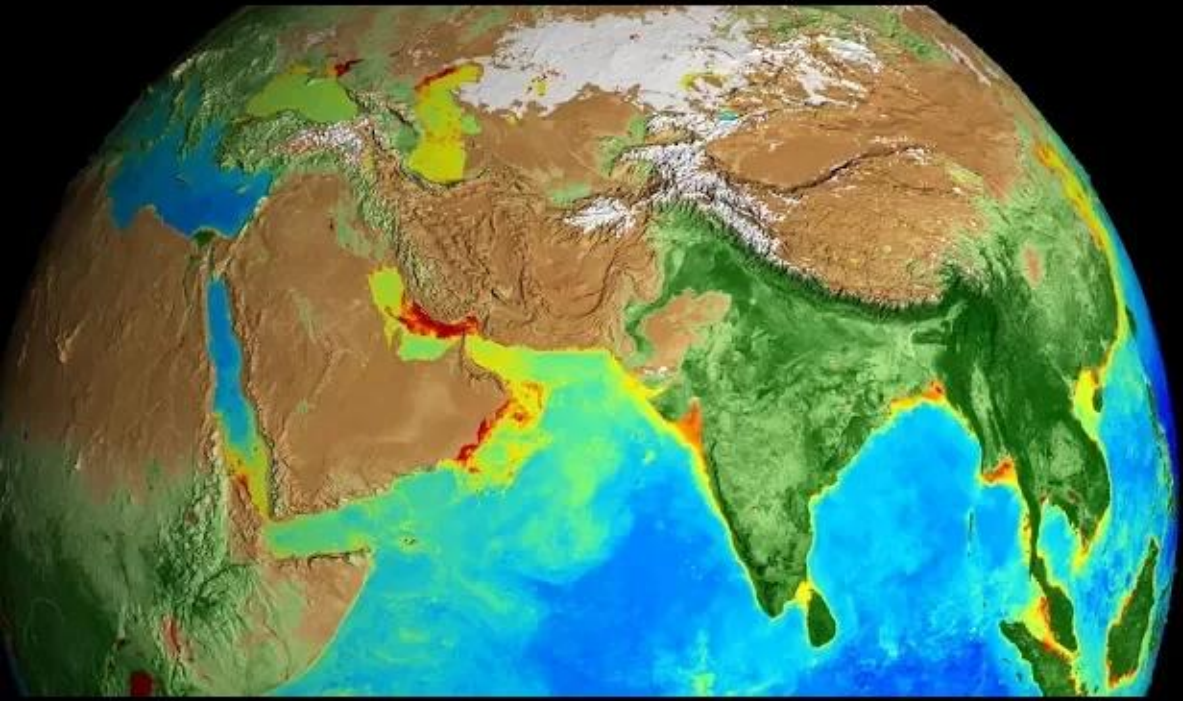

1
00:00:00,600 --> 00:00:04,050
3...2...1...0

2
00:00:04,070 --> 00:00:07,580
When you think of NASA you probably think of this

3
00:00:07,600 --> 00:00:11,720
But as soon as we made it beyond the limits of our atmosphere, one of the first things we did

4
00:00:11,740 --> 00:00:15,580
was turn our cameras around at look at this

5
00:00:15,600 --> 00:00:18,530
The first US satellite was launched in 1958.

6
00:00:18,550 --> 00:00:23,660
That’s eleven years before Neil Armstrong became the first person to walk on the moon.

7
00:00:23,680 --> 00:00:26,840
Explorer 1, built at the Jet Propulsion Laboratory,

8
00:00:26,860 --> 00:00:32,620
initiated a long legacy of satellites meant to take our understanding of Earth to new heights.

9
00:00:32,640 --> 00:00:37,830
In 1997, NASA launched a satellite that began a twenty-year continuous global record

10
00:00:37,850 --> 00:00:43,810
of the very thing that, as far as we know, makes Earth special: life.

11
00:00:43,830 --> 00:00:47,150
While most satellite missions capture data on the physical characteristics

12
00:00:47,160 --> 00:00:51,600
of our planet's climate and weather, others allow us to measure life itself.

13
00:00:52,700 --> 00:00:53,760

The result?

14
00:00:54,300 --> 00:00:58,840
The most complete view of global biology to date.

15
00:01:01,060 --> 00:01:04,040
The greatness of this data set is kind of hard to explain.

16
00:01:04,060 --> 00:01:10,080
It allowed me to understand the ocean in such an organic way.

17
00:01:10,100 --> 00:01:13,180
That’s the voice of oceanographer Dr. Ivona Cetinic.

18
00:01:13,200 --> 00:01:16,490
Dr. Ivona Cetinic. Ivona and the rest of the NASA Goddard Ocean Ecology Lab

19
00:01:16,510 --> 00:01:18,820
help oversee the twenty-year data set.

20
00:01:18,840 --> 00:01:21,300
If you take a closer look at this animation,

21
00:01:21,320 --> 00:01:26,960
you’ll see what looks like a repetitious ebb and flow on the land and surface of the ocean.

22
00:01:26,980 --> 00:01:30,980
We’re actually watching the planet breathe.

23
00:01:31,000 --> 00:01:36,580
About half of the total photosynthesis occurs on land and half in the oceans

24
00:01:36,600 --> 00:01:37,980
That’s Dr. Compton Tucker

25
00:01:38,000 --> 00:01:41,980
who pioneered satellite monitoring of vegetation on land.

26
00:01:42,000 --> 00:01:45,770
The spring and summer months kick off the growing season for plants on land

27
00:01:45,790 --> 00:01:47,770
illustrated in dark green

28
00:01:47,790 --> 00:01:50,420
and tiny microscopic plant-like organisms in the ocean called phytoplankton

29
00:01:50,440 --> 00:01:53,980
seen in light blue.

30
00:01:54,000 --> 00:01:58,050
They take carbon dioxide out of the atmosphere and use it for energy,

31
00:01:58,070 --> 00:02:02,420
causing the total amount of carbon in the air to drastically drop.

32
00:02:02,440 --> 00:02:04,390
The opposite is true during colder months.

33
00:02:04,410 --> 00:02:08,850
During winter in the Northern Hemisphere -- which is home to most of Earth's land plants

34
00:02:08,870 --> 00:02:12,530
carbon in the atmosphere increases, as plants go dormant.

35
00:02:12,550 --> 00:02:15,920
And then there are extremes zones in the ocean.

36
00:02:15,940 --> 00:02:21,310
Purple patches are nearly devoid of any phytoplankton – they’re basically deserts at sea

37
00:02:21,330 --> 00:02:25,220
while the red zones tell us that there’s either a high concentration of phytoplankton

38
00:02:25,240 --> 00:02:28,620

hugging the coastline or our satellite sensors are picking up

39
00:02:28,640 --> 00:02:31,620
on another input changing the color of the water.

40
00:02:34,010 --> 00:02:39,870
We have a marvelous biological diversity of plants and animals both on the land

41
00:02:39,890 --> 00:02:41,980
and also in the oceans.

42
00:02:42,000 --> 00:02:43,160
But hold on.

43
00:02:43,180 --> 00:02:46,780
If we have amazing biological diversity of plants and animals,

44
00:02:46,800 --> 00:02:50,990
why do scientists spend all their time observing plants?

45
00:02:51,010 --> 00:02:53,490
You know how they say you are what you eat?

46
00:02:53,510 --> 00:02:56,970
In the same way, if you want to understand life in the ocean

47
00:02:56,990 --> 00:02:59,510
you have to start from the base and that’s what phytoplankton is.

48
00:02:59,530 --> 00:03:03,490
If phytoplankton are changing then the whole ecosystem will change.

49
00:03:03,510 --> 00:03:06,930
The changes that Ivona is talking about are much easier to see

50
00:03:06,940 --> 00:03:09,220
when we can study a continuous global record.

51
00:03:10,000 --> 00:03:15,000
And that means not only being able to look into the past, but also into the future.

52
00:03:15,030 --> 00:03:19,530
It's this long-term data set that not only allows us to see exactly what's happening

53
00:03:19,550 --> 00:03:24,150
but to be able in so much better way to predict what's going to happen.

54
00:03:24,170 --> 00:03:27,180
A global perspective gives scientists the power to forecast events

55
00:03:27,200 --> 00:03:31,400
like harmful algal blooms, disease outbreaks and even famine.

56
00:03:32,340 --> 00:03:35,380
Maybe one of the most useful applications of the data

57
00:03:35,400 --> 00:03:38,470
is its ability to show us where we've been.

58
00:03:38,490 --> 00:03:41,690
In twenty years the planet has changed in noticeable ways

59
00:03:41,700 --> 00:03:45,280
and this data set gives us a visualization to prove it.

60
00:03:46,460 --> 00:03:49,300
Arctic greening coupled with retreating Arctic sea ice

61
00:03:49,320 --> 00:03:52,720
are probably one of the most well-known examples of this.

62
00:03:54,100 --> 00:03:59,860
If you look at the higher northern latitudes you see in the white where there's snow

63
00:03:59,870 --> 00:04:02,880

and that then moves further north and recedes.

64
00:04:02,900 --> 00:04:06,380
It’s then followed by very, very green colors,

65
00:04:06,400 --> 00:04:11,140
because plants are really photosynthesizing in those dark green periods

66
00:04:11,160 --> 00:04:14,620
Scientists think there are likely trillions of planets

67
00:04:14,640 --> 00:04:18,370
yet Earth is still the only planet we know of with life.

68
00:04:18,390 --> 00:04:19,990
With that in mind,

69
00:04:20,010 --> 00:04:23,140
our habitable home world seems evermore fragile and beautiful

70
00:04:23,160 --> 00:04:26,970
when considering the vastness of unlivable space.

71
00:04:26,990 --> 00:04:29,850
I have several friends and acquaintances who are astronauts.

72
00:04:29,860 --> 00:04:31,680
They all say the same thing.

73
00:04:31,700 --> 00:04:35,780
When they’re in orbit on the space shuttle or in the International Space Station

74
00:04:35,800 --> 00:04:40,020
and they look down at the Earth, they see one climate, one planet.

75
00:04:40,020 --> 00:04:42,420
We’re all in this together,