



meters per second (m/s)

OSCAR Ocean Currents

1  
00:00:00,040 --> 00:00:04,040  
Silence

2  
00:00:04,060 --> 00:00:08,070  
Music

3  
00:00:08,090 --> 00:00:12,100  
Earth is the water planet.

4  
00:00:12,120 --> 00:00:16,130  
Although forty percent of Earth's population

5  
00:00:16,150 --> 00:00:20,180  
lives within or near coastal regions,

6  
00:00:20,200 --> 00:00:24,210  
the ocean impacts people everywhere.

7  
00:00:24,230 --> 00:00:28,240  
Most of Earth's water

8  
00:00:28,260 --> 00:00:32,280  
is stored in the ocean - a driving force

9  
00:00:32,300 --> 00:00:36,310  
for weather and climate.

10  
00:00:36,330 --> 00:00:40,360  
Music

11  
00:00:40,380 --> 00:00:44,410  
The Earth's surface is warmed unevenly

12  
00:00:44,430 --> 00:00:48,470  
by the sun. Heat, a form of energy,

13  
00:00:48,490 --> 00:00:52,540

helps drive ocean and atmospheric circulation.

14

00:00:52,560 --> 00:00:56,560

The ocean absorbs and stores more heat than

15

00:00:56,580 --> 00:01:00,580

the atmosphere. Both the atmosphere and ocean move heat;

16

00:01:00,600 --> 00:01:04,600

the atmosphere does this quickly, the ocean slowly.

17

00:01:04,620 --> 00:01:08,710

Music

18

00:01:08,730 --> 00:01:12,750

At the ocean's surface, winds drive currents.

19

00:01:20,820 --> 00:01:16,800

Music

20

00:01:20,840 --> 00:01:24,840

Multiple forces keep the global ocean conveyor belt

21

00:01:24,860 --> 00:01:28,960

or Thermohaline Circulation in

22

00:01:28,980 --> 00:01:32,980

perpetual motion. Below the surface,

23

00:01:33,000 --> 00:01:37,010

deeper currents are driven by differences in density.

24

00:01:49,100 --> 00:01:41,030

Music

25

00:01:49,120 --> 00:01:53,210

Mixing and upwelling in the ocean, transport

26

00:01:53,230 --> 00:01:57,270

nutrient rich waters to the ocean's surface.

27

00:01:57,290 --> 00:02:01,390

Nutrients sustain biological productivity in the ocean.

28

00:02:01,410 --> 00:02:05,480

Extreme variations in sea surface height and sea surface temperature

29

00:02:05,500 --> 00:02:09,520

affect ocean and atmospheric circulation.

30

00:02:09,540 --> 00:02:13,570

Music

31

00:02:13,590 --> 00:02:17,600

El Nino and La Nina

32

00:02:17,620 --> 00:02:21,640

occur when changing wind patterns displace

33

00:02:21,660 --> 00:02:25,720

warm and cool water in the equatorial Pacific.

34

00:02:25,740 --> 00:02:29,780

Both have global impacts.

35

00:02:29,800 --> 00:02:33,870

During either of these

36

00:02:33,890 --> 00:02:38,000

events the replacement of cold water by warm water

37

00:02:38,020 --> 00:02:42,030

leads to air temperature swings and changes in humidity.

38

00:02:42,050 --> 00:02:46,060

Music

39

00:02:46,080 --> 00:02:50,120

This alters weather patterns by steering storms

40

00:02:50,140 --> 00:02:54,160

and rainfall to new locations.

41

00:02:54,180 --> 00:02:58,210

Music

42

00:02:58,230 --> 00:03:02,300

Shifts in rainfall affect plant growth

43

00:03:02,320 --> 00:03:06,340

and areas impacted by drought.

44

00:03:18,610 --> 00:03:10,410

Music

45

00:03:18,630 --> 00:03:22,710

When heat is exchanged between the ocean's surface to the

46

00:03:22,730 --> 00:03:26,780

atmosphere, it influences climate. For example,

47

00:03:26,800 --> 00:03:30,920

heat and moisture carried by the Gulf Stream northward bring warmer

48

00:03:30,940 --> 00:03:34,960

temperatures and a moderate climate to Europe.

49

00:03:34,980 --> 00:03:39,030

An eddy is a circular moving body of water that spins

50

00:03:39,050 --> 00:03:43,110

off a main current. Eddies play a major role transporting heat

51  
00:03:43,130 --> 00:03:47,200  
and nutrients.

52  
00:03:47,220 --> 00:03:51,260  
Thunderstorms are a frequent

53  
00:03:51,280 --> 00:03:55,350  
occurrence in the tropics. Some of these may become

54  
00:03:55,370 --> 00:03:59,380  
organized into large rotating systems with strong winds,

55  
00:03:59,400 --> 00:04:03,410  
growing into tropical storms or hurricanes.

56  
00:04:03,430 --> 00:04:07,510  
Tropical ocean basins

57  
00:04:07,530 --> 00:04:11,560  
like the Caribbean and the Gulf of Mexico retain

58  
00:04:11,580 --> 00:04:15,600  
substantial heat making these regions favorable for

59  
00:04:15,620 --> 00:04:19,660  
rapid storm intensification.

60  
00:04:19,680 --> 00:04:23,700  
By extracting large amounts of heat

61  
00:04:23,720 --> 00:04:27,740  
from the ocean, storms can become massive and

62  
00:04:27,760 --> 00:04:31,790  
destructive hurricanes.

63  
00:04:39,900 --> 00:04:35,840

Music

64

00:04:39,920 --> 00:04:44,030

Silence

65

00:04:56,170 --> 00:04:48,130

Music

66

00:04:56,190 --> 00:05:00,190

A driving force for weather and climate,

67

00:05:00,210 --> 00:05:04,220

the ocean is essential to life on Earth.

68

00:05:04,240 --> 00:05:08,240

It is the primary storehouse of Earth's water.

69

00:05:08,260 --> 00:05:12,290

Music

70

00:05:12,310 --> 00:05:16,320

Without the ocean

71

00:05:16,340 --> 00:05:20,350

our planet would be uninhabitable.

72

00:05:20,370 --> 00:05:24,390

NASA satellites

73

00:05:24,410 --> 00:05:28,430

and their unique view from space are helping

74

00:05:28,450 --> 00:05:32,470

to unveil the vast and largely unexplored

75

00:05:32,490 --> 00:05:36,540

ocean.

76

00:05:48,700 --> 00:05:40,590

Music