
721.8 m
above sea level

1
00:00:08,370 --> 00:00:04,190
[Music]

2
00:00:08,390 --> 00:00:12,550
we have a very good handle of how our Earth looks like. We can see oceans,

3
00:00:12,570 --> 00:00:18,490
we can see the sea ice, we can see our forests, but it's much, much

4
00:00:18,510 --> 00:00:22,510
harder to measure how high things are on a global scale. Almost impossible.

5
00:00:22,530 --> 00:00:26,530
Neumann: ICESat-2 adds the third dimension, the elevation. Repeating measurements

6
00:00:26,550 --> 00:00:30,630
from ICESat-2 will allow us to measure changes in the ice sheets or in the

7
00:00:30,650 --> 00:00:34,800
ocean or in land.
Markus: ICESat-2 is designed to measure

8
00:00:34,820 --> 00:00:38,980
the changes that are going on in the cryosphere, in the polar regions.

9
00:00:39,000 --> 00:00:43,000
Neumann: All the change is at the edges. Those are the steeply sloping parts of the glacier

10
00:00:43,020 --> 00:00:47,040
interact with the ocean, and that's where all the action is, that's where all the mass is being lost.

11
00:00:47,060 --> 00:00:51,140
Markus: In order to estimate the mass changes, we need to know the height

12
00:00:51,160 --> 00:00:55,160
of things. The mission, ICESat-2,

13

00:00:55,180 --> 00:00:59,190
carries a single instrument. It's called ATLAS, the Advanced Topographic

14
00:00:59,210 --> 00:01:03,240
Laser Altimeter System.
Neumann: ATLAS sends out

15
00:01:03,260 --> 00:01:07,380
small pulses of laser light 10,000 times a second, and by

16
00:01:07,400 --> 00:01:11,410
measuring precisely how long it takes that light to go from the spacecraft

17
00:01:11,430 --> 00:01:15,480
down to the Earth and back up to the spacecraft allows us to figure out

18
00:01:15,500 --> 00:01:19,620
what the height of the surface is beneath ICESat-2.

19
00:01:19,640 --> 00:01:23,650
Markus: We need to measure the time of flight of a single photon, or a single laser pulse,

20
00:01:23,670 --> 00:01:27,720
with the precision of a billionth of a second.
Neumann: NASA engineers had to come up with

21
00:01:27,740 --> 00:01:31,730
entirely new ways of measuring time very precisely.

22
00:01:31,750 --> 00:01:35,880
Markus: A billionth of a second translates to an elevation-change precision of

23
00:01:35,900 --> 00:01:40,070
just a few centimeters. Climate change is amplified in

24
00:01:40,090 --> 00:01:44,100
the polar regions. ICESat-2 is designed to measure those

25

00:01:44,120 --> 00:01:48,280
areas and will help us to understand what's going on with our planet.