1
00:00:00,030 --> 00:00:04,190
[music] It's a long, 12-hour day,

2
00:00:04,210 --> 00:00:08,300
flying out of Chile to one of the farthest points Operation IceBridge

3
00:00:08,320 --> 00:00:12,370
can reach in the Antarctic, the Getz Ice Shelf.

4
00:00:12,390 --> 00:00:16,420
We know from satellite measurements that this 300 mile long floating ice shelf

5
00:00:16,440 --> 00:00:20,450
is losing mass, but with IceBridge data we hope to find out something

6
00:00:20,470 --> 00:00:24,600
about why and how fast this ice is disappearing.

7
00:00:24,620 --> 00:00:28,610
After crossing the windy Drake Passage

8
00:00:28,630 --> 00:00:32,640
at high altitude we descend and are treated to a tour

9
00:00:32,660 --> 00:00:36,680
of Antarctic ice in almost all its forms. We see different kinds of

10
00:00:36,700 --> 00:00:40,680
sea ice, from thin gray sheets to solid fields covered

11
00:00:40,700 --> 00:00:44,690
in snow and littered with icebergs.

12
00:00:44,710 --> 00:00:48,700
We see gigantic tabular icebergs, taller than a house

13
00:00:48,720 --> 00:00:52,750

and longer than a runway, that were once part of the largest

14
00:00:52,770 --> 00:00:56,930
piece of ice on Earth. And we see the ice sheets themselves,

15
00:00:56,950 --> 00:01:00,990
smooth in some areas, heavily crevassed in others.

16
00:01:01,010 --> 00:01:05,020
As we arrive at the survey area,

17
00:01:05,040 --> 00:01:09,220
we come across the calving front of Getz Ice Shelf.

18
00:01:09,240 --> 00:01:13,240
This 10-storey-tall face is currently

19
00:01:13,260 --> 00:01:17,430
where mighty icebergs break off into the ocean.

20
00:01:17,450 --> 00:01:21,450
Upstream a crack is forming,

21
00:01:21,470 --> 00:01:25,480
threatening to calve off a new tabular iceberg and move the

22
00:01:25,500 --> 00:01:29,580
calving front inland. Even from just a few thousand feet above,

23
00:01:29,600 --> 00:01:33,630
the scale is deceiving. The crack looks like something you could jump across,

24
00:01:33,650 --> 00:01:37,730
but our laser data tells us it’s 45 meters deep

25
00:01:37,750 --> 00:01:41,740
and with our digital photography we can estimate the width at more than a dozen meters.

26
00:01:41,760 --> 00:01:45,780
But back to why we're here.

27
00:01:45,800 --> 00:01:49,800
We need to get a better handle on the bathymetry below the ice shelf,

28
00:01:49,820 --> 00:01:53,820
basically the shape of the ocean floor below this floating

29
00:01:53,840 --> 00:01:57,890
ice tongue. The shape will help us calculate the circulation

30
00:01:57,910 --> 00:02:01,890
of the warm water … well, comparatively warm water

31
00:02:01,910 --> 00:02:06,040
that's eating away at the ice shelf from below.

32
00:02:06,060 --> 00:02:10,080
Our gravity meter, or gravimeter, actually senses the mass of rock

33
00:02:10,100 --> 00:02:14,080
below the ocean, giving us a picture of the grounding line, where the ice sheet

34
00:02:14,100 --> 00:02:18,120
leaves the support of land and begins to float on the water.

35
00:02:18,140 --> 00:02:22,150
But that's all on the marine side. We also need to understand what's happening inland.

36
00:02:22,170 --> 00:02:26,190
Our laser data tells us how much the surface of the ice shelf

37
00:02:26,210 --> 00:02:30,280
is lowering. And our ice-penetrating radar tells us the shape

38
00:02:30,300 --> 00:02:34,360

and elevation of the bedrock below the ice, which helps us estimate

39
00:02:34,380 --> 00:02:38,370
how much ice will flow into the water, and how fast.

40
00:02:38,390 --> 00:02:42,470
On the inland side we pass by a ridge in Marie Byrd Land.

41
00:02:42,490 --> 00:02:46,520
Most of the distinctive mountains peaking through the thick ice here

42
00:02:46,540 --> 00:02:50,530
are extinct volcanoes from the Cenozoic era. They’re a welcome scenic

43
00:02:50,550 --> 00:02:54,550
change from the wide flat landscape that covers so much of polar regions.

44
00:02:54,570 --> 00:02:58,590
After collecting nearly 5 hours of data,

45
00:02:58,610 --> 00:03:02,610
we head for home, and get a rare clear view of the

46
00:03:02,630 --> 00:03:06,620
Antarctic Peninsula, with its stunning mountain chain and almost Alpine glaciers.

47
00:03:06,640 --> 00:03:10,760
Out the port side of our DC-8 we

48
00:03:10,780 --> 00:03:14,830
watch the sun set at its incredibly slow polar pace,

49
00:03:14,850 --> 00:03:18,880
cross the Strait of Magellan, and prepare to land back in Chile