EPISODE FOUR:
GLACIAL PACE

1
00:00:00,450 --> 00:00:01,450
Tuesday was cold

2
00:00:01,450 --> 00:00:02,830
I almost froze my toes

3
00:00:02,830 --> 00:00:05,190
What's it gonna be next week who knows

4
00:00:05,190 --> 00:00:06,440
That's climate

5
00:00:06,440 --> 00:00:08,610
Oh, that's the climate you got

6
00:00:08,610 --> 00:00:10,110
You take a bunch of weather

7
00:00:10,110 --> 00:00:11,230
and you average it together

8
00:00:11,230 --> 00:00:13,520
and you're doin' the climate rock

9
00:00:20,280 --> 00:00:23,290
NASA Explorers

10
00:00:24,110 --> 00:00:26,260
Cryosphere

11
00:00:27,990 --> 00:00:30,040
Glacial Pace

12
00:00:30,040 --> 00:00:33,730
Episode Four

13
00:00:38,330 --> 00:00:42,530

“At a glacial pace” – it means something’s happening so slowly

14
00:00:42,530 --> 00:00:44,840
you can barely tell it’s happening at all.

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00:00:44,840 --> 00:00:50,790
That used to describe the very incremental movement glaciers and ice sheets experienced each year.

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00:00:50,790 --> 00:00:52,950
But now, that’s changing.

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00:00:52,950 --> 00:00:57,650
We’re tagging along with three NASA scientists to understand the different lengths they go

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00:00:57,650 --> 00:01:00,270
to not only investigate glaciers and ice sheets,

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00:01:00,270 --> 00:01:05,630
but also communicate their often-complicated science, to the public.

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00:01:05,630 --> 00:01:07,550
First, let’s get oriented

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00:01:07,550 --> 00:01:14,510
Ice sheets, in pink, pretty much occur in only two places – Antarctica and Greenland.

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00:01:14,510 --> 00:01:18,940
Glaciers, in yellow, play a key role draining melt off the ice sheet

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00:01:18,940 --> 00:01:24,510
Glaciers are also found in the high mountains…but we’ll get to those in another episode.

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00:01:24,510 --> 00:01:27,790
So we know that something is happening in Greenland right now,

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00:01:27,790 --> 00:01:31,290
that is unprecedented in the last several thousand years.

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00:01:33,160 --> 00:01:37,200
That’s Dr. Josh Willis, oceanographer at the Jet Propulsion Laboratory.

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00:01:37,200 --> 00:01:42,740
Josh and his team are tackling one of the major environmental challenges of the 21st century

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00:01:42,740 --> 00:01:47,770
trying to answer fundamental questions about how melting glaciers impact sea level rise.

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00:01:48,600 --> 00:01:53,030
With my mission, Oceans Melting Greenland, or “OMG” for short,

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00:01:53,030 --> 00:01:59,130
we’re trying to understand just how much of Greenland’s melt is caused by the oceans.

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00:01:59,620 --> 00:02:03,260
Along with being one of NASA’s top scientists working on the cryosphere,

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00:02:03,260 --> 00:02:08,960
Josh is passionate about demystifying climate change in typically unconventional ways.

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00:02:08,960 --> 00:02:13,030
I think by reaching out to people with a little bit of humor, a little bit of fun,

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00:02:13,030 --> 00:02:18,060
maybe a song, you really have the opportunity to help people understand

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00:02:18,060 --> 00:02:20,400
and come to terms with what we’re doing to our planet.

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00:02:20,400 --> 00:02:24,000
Because it's definitely happening and it's definitely a big deal

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00:02:24,000 --> 00:02:25,600
and we need to start preparing for it

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00:02:31,040 --> 00:02:37,550

Down at the opposite pole, Dr. Kelly Brunt is getting ready for a major expedition.

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00:02:37,550 --> 00:02:40,380
In December and January this coming year,

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00:02:40,380 --> 00:02:47,460
I'll actually be in Antarctica down near the south pole collecting ground-based GPS data.

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00:02:47,460 --> 00:02:51,340
This is actually Kelly's second expedition to the south pole.

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00:02:51,340 --> 00:02:54,800
The first occurred in December and January of last year.

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00:02:54,800 --> 00:02:58,830
Both surveys are critical and will help validate data collected by

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00:02:58,830 --> 00:03:01,970
NASA's airborne campaign, Operation IceBridge

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00:03:01,970 --> 00:03:05,440
and the recently launched satellite mission ICESat-2.

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00:03:05,440 --> 00:03:10,790
All three of these layers, that ground-based, that airborne and the satellite are all tied together.

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00:03:10,790 --> 00:03:14,290
The ground-based helps validate both the satellite and the airborne

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00:03:14,290 --> 00:03:17,020
helps give us more validation data for the satellites

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00:03:17,020 --> 00:03:19,940
but also a bigger story with respect to the depth

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00:03:19,940 --> 00:03:23,270
of the ice sheet and what's going on underneath the surface.

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00:03:23,270 --> 00:03:26,180
While some scientists are taking measurements in the field,

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00:03:26,180 --> 00:03:29,980
others are looking for answers in physics and lines of code.

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00:03:29,980 --> 00:03:36,480
For me, these projections that we're doing, they do have a very personal meaning.

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00:03:36,480 --> 00:03:40,040
Dr. Sophie Nowicki is an ice sheet modeler.

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00:03:40,040 --> 00:03:45,550
That means she and her team have the important job of forecasting how ice will change the future

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00:03:45,550 --> 00:03:49,150
which also predicts changes in sea level rise.

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00:03:49,150 --> 00:03:53,800
It's a job she doesn't take lightly, especially since urban planning and infrastructure

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00:03:53,800 --> 00:03:58,620
use her team's models to make decisions about the future and safety of their communities.

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00:03:58,620 --> 00:04:02,100
When we make those projections that are one hundred years in the future,

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00:04:02,100 --> 00:04:05,440
a hundred years can seem so far away – like I don't have to worry about it,

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00:04:05,440 --> 00:04:06,330
it's just too far.

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00:04:06,330 --> 00:04:07,940
But actually, they're not.

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00:04:07,940 --> 00:04:15,030

It’s really that the future we’re looking at that our children or grandchildren will see to experience.

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00:04:15,030 --> 00:04:17,350
Whether is learning to communicate in new ways,

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00:04:17,350 --> 00:04:20,810
traversing a swath of Antarctica in a massive piston bully

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00:04:20,810 --> 00:04:24,460
or taking responsibly for an impactful climate forecast,

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00:04:24,460 --> 00:04:28,730
our NASA scientists are pushing the limits of discovery every day.

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00:04:28,730 --> 00:04:33,560
But on a very human level, they’re people with families and friends who have a stake

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00:04:33,560 --> 00:04:37,810
in finding out why and how the planet is changing as rapidly as it is.

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00:04:42,280 --> 00:04:44,930
On the next episode of Cryosphere

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00:04:44,930 --> 00:04:47,890
Every place, at least so far, that we have found life

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00:04:47,890 --> 00:04:49,720
we've found water along with it

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00:04:49,720 --> 00:04:53,620
and so when we try to understand the thresholds for life

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00:04:53,620 --> 00:04:57,570
where life might exist, elsewhere in our solar system and the universe