
NASA

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00:00:00,520 --> 00:00:04,510
We're here with Dr. Tom Wagner, cryospheric scientist with NASA.

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00:00:04,530 --> 00:00:08,700
Dr. Wagner, Operation Ice Bridge has scientists flying over the Arctic

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00:00:08,720 --> 00:00:12,760
this spring. Why are the poles so important to Earth's health?

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00:00:12,780 --> 00:00:16,770
The poles are important for a few reasons. The most important is this: changes at the poles profoundly

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affect the climate on the whole rest of the planet, and what people need to realize

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the planet is one big interconnected system. As you lose ice from the poles,

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you wind up with dark ocean water exposed, which absorbs sunlight

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and it continues the heating up of the ocean that's already going on today.

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Also, too, if you are interested in sea level rise around the planet, the poles are

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where the majority of the ice is. And as that ice melts and goes into the ocean, it

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raises sea level. And about half of the tenth of an inch a year sea

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level rise we see now comes from polar ice.

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Why do we study this with planes, and not satellites?

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Planes and satellites are complementary tools for studying it. Satellites give us this bird's-eye reconnaissance v

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of the whole plane and they are actually the things that we use to figure out that the ice was actually

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melting and changing. What we're doing though, now, is we're following up with detailed

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studies with aircraft. What we can do with planes, too, we can do

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different things we can't do by satellites. One of the most important things

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is we can use ice-penetrating radar to map not just the surfaces of the ice, but also

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to map the bed that's underneath it. On top of that too, one of the most important

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questions for us is how thick is the ice, and how is that thickness changing.

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And for that we use LIDAR on the aircraft, and we do detailed studies of how

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glaciers in Greenland flow and draw down and also how are changes in the thickness

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of the Arctic sea ice occuring and how is that correlated with changes in the ocean.

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Well the sea ice in the Arctic grows thicker and returns during the winter. How is the ice fairing this season?

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Right. Well, what happens is every year the ice grows

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out to about, maybe two times the size of the continental US

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It used to be that that ice would melt back every year to about the size of the continental US,

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now it's melting back to less than half the size of the US.

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And so what we're trying - and on top of that, it's thinner now than it's

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ever been. And this year it looks like we're heading towards another one of those record

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lows. But what's important is this: we need to understand how

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that ice is connected to the ocean and the atmosphere so we can do better projections on it.

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And what we do with Ice Bridge is we do the detailed work that will allow us to do that.

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Ice Bridge isn't just looking at sea ice, but glaciers, too. Why are they important to study?

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Glaciers, which is ice that is up on land,

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are really important for us to study because as that ice melts

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or it flows into the sea, it raises sea level directly.

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There are places in Greenland where the glaciers flow at up to

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100 feet per day. They're already contributing

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to sea level rise. What we're worried about is that those glaciers

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could speed up in a warming world. And so what we're doing is we're going out

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and mapping them with every tool that we can to get a better handle on these processes.

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Each successive Ice Bridge campaign is broadened in scope. What's new this year?

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We're doing a couple of new things this year.

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First thing is, we're going to a bunch of important glaciers and ice caps in northern Canada.

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Those are also really important contributors to sea level rise and they appear

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to be undergoing really rapid change right now, we're losing a lot of ice from them.

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The other things is, because of our altimetry measurements, literally LIDAR or lasers

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in the plane that tells us how high the ice is, we've realized how important

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those measurements are so we're sending a second aircraft this year that's going to do a lot of detailed

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flight lines over Greenland.

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Can you tell us a little bit more

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00:03:33,510 --> 00:03:37,680
about what's it like for this airborne campaign to be up there in the Arctic?

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Yeah, well, first thing - there's a lot of long hours, because

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what you do is you get up really really early in the morning and you report to the hangar

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00:03:45,800 --> 00:03:49,830
and you try to see if the weather is safe enough for you to fly that day. And if the weather's

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fit to fly, you go and get into this airplane which is this astounding beast

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00:03:53,930 --> 00:03:57,980
filled with all kinds of the most fascinating scientific gear you can imagine

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and then you get on a really noisy flight and you go fly for eight hours

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over places like the sea ice or over the interior of the Greenland ice sheet.

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You see some fantastic sights. You know, over the sea ice, if you're

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00:04:10,060 --> 00:04:14,220

lucky, you're going to see big cracks and things moving around. Maybe you'll get really

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lucky and see some wildlife, see some seals or you know, things like whales and

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polar bears. If you're flying over Greenland, you're going to see these coastal areas

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where you've got these rivers of ice meeting the ocean and you're going to see rock that's

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some of the oldest rocks on planet Earth, billions of years old.

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00:04:30,740 --> 00:04:34,740
And it's a lot of hard work, but for the scientists who do it, we really enjoy it.