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[Interviewer] "Joining us now from NASA's Goddard Space Flight Center is Dr. Tom Wagner

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who is going to tell us a little bit more about Arctic sea ice. Thanks for joining us."

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[Wagner] "Thanks for having me." [Interviewer] "So last year was a record-breaking year for sea ice loss

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in the Arctic. What are we seeing this year?" [Wagner] "Well the good news is we're not on

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track for another record. But the bad news is the ice didn't really heal up anyway

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and it's still shrinking into one of the lowest years on record and about the thinnest ice we've ever had as well."

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[Interviewer] "So what does the long term trend look like?"

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[Wagner] "The long term trend is this. If you go back to like the 80s, we've lost more than half the sea ice that u

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to be around in the 80s. And we're continuing over this last decade

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this ever-increasing loss of ice during the summer, but also this

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startling thinning that's been going on as well. And so there's people who talk

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"hey are we going to be reaching ice-free summers in the next few years"

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probably not. We'll probably always form some ice over the North Pole where it's cold, but the point is

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there's so much ice lost that the Arctic is in a new state."

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[Interviewer] "But the Arctic is far away. How does sea ice melting

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impact us in the United States or globally?"

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[Wagner] "Loss of Arctic sea ice is profoundly important for the globe for a number of reasons.

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First of all it's one of the biggest knobs on global weather. This is one of the biggest

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physical changes on Earth. We have an ocean that used to be covered with a solid surface that's going away.

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It affects the position of the jet stream which will now extend further north

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and further south and cause blocking patterns that could increase those periods of

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extreme heat and extreme cold in the U.S. But that's just kind of the

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simplest thing. It could also affect storm tracks like Superstorm Sandy.

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It could also affect globally those weather patterns and those are the kind of cutting edge research questions

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that we're working on right now. But also too

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the Arctic has massive stores of methane in the permafrost and also

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on the seabed. As we lose the sea ice we have more heat

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going into the ocean and we can also transport that heat, cause more permafrost thawing,

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00:01:56,220 --> 00:02:00,250

destabilize the seabed, potentially trip the release

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of all this methane which could cause big spikes in global temperature.

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Also too the Arctic is overall the canary in the coalmine.

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The polar regions heat up faster than the rest of the planet.

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Basically in the tropics they're getting warmer too, but that heat gets invected up into the atmosphere

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and gets pushed north and south. So the polar regions are kind of where

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the place where you would expect to see right away the warming effects really take place

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and that's exactly what we're seeing in the Arctic. And finally the Arctic is just one of the

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most fascinating, least explored places on Earth. You know the amazing

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animals like polar bears. You have these unique whales like the Narwhals

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00:02:37,480 --> 00:02:41,630

and you have this really interesting ecosystem involving things like algae

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forming near the surface and sinking to the bed and creating this rich benthic environment that

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walrus then come in and exploit. And all of that is changing

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right now in real time.”

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[Interviewer] “So tell us what is NASA doing to better understand what’s going on in the Arctic?”

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[Wagner] “NASA does a couple of different things. First and foremost are the satellite studies.

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We use a range of satellites that document the sea ice and understand its connection to the global drivers of climate

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We also have some of the most sophisticated research aircraft in the world

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and we fly over the ice and shoot at it with lasers and radars

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and we have other devices to measure the variations of the Earth’s gravitational field

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and magnetic field. All to understand what’s going on with the ice.

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We don’t just work on the sea ice, we also study the glaciers of Alaska,

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the Canadian ice caps and the Greenland ice sheet where there's been a lot of changes in recent years."

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[Interviewer] "Can you tell us a little bit about some of the changes in Greenland?"

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[Wagner] "So last year for the first time in the record we had extensive

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melting across the entire surface of Greenland. Even the really high

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high cold parts. Also too are satellite data shows us that Greenland is

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not just losing more ice, it's accelerating in its ice loss.

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And it's losing ice not just from the warm south but also from the cold northern regions.

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And what people need to understand is that this isn't just one

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study or one type of data, we shoot bounce lasers off the ice

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to measure the height. We use radar to study how fast the ice is flowing.

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And we actually use a satellite called GRACE, which is a pair of satellites orbiting the Earth,

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, that directly measure the mass change itself. And we have people out on

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the ground walking around and looking at this and banging GPS devices and looking at how

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fast sea ice is flowing into the ocean. And the simple fact is we're losing

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a lot of ice out of Greenland." [Interviewer] "What can you tell us about Antarctica?"

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[Wagner] "Antarctica is also a fascinating place and we're losing

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a lot of ice from Antarctica particularly west Antarctica. With east Antarctica

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it's a little bit more ambiguous. The problem is again we're characterizing

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continental scale areas and we're looking at subtle changes in ice.

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In some areas along the coast from satellites we can see that we're losing

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30 feet of ice a year. Some of this is balanced by the amount of snowfall

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that falls in the interior of Antarctica and we're working out that balance now.

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But overall Antarctica looks like it's losing a lot of ice. Also too there's sea ice

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that surrounds Antarctica that's kind of analogous to the sea ice at the North Pole.

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The thing is though every year the Antarctic sea ice grows and then almost all of it retreats,

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but in recent years there's been a little more growth of sea ice in some areas.

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So overall the Antarctic sea ice has been increasing a bit. But it's a very

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different thing than what's going on in the Arctic."

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[Interviewer] "Where can we learn more about all of this?"