



# Gathering data in the polar night

It takes dedication to be a polar researcher, living in the dark for weeks amidst severe storms and temperatures of down to -40 degrees. From the research vessel the *Polarstern*, frozen into the ice in the Arctic, Wageningen researcher Serdar Sakinan is braving the elements to do research on plankton and fish.

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**‘W**e work from the ship or from tents set up on the ice. The tents are heated to about 15°C. Not just for the people working in them, but also because our instruments can’t withstand such extremely low temperatures. The temperature outside sometimes goes down to -40°C. At lower temperatures we stop going out of doors,’ says Serdar Sakinan of Wageningen Marine Research, speaking from the German icebreaker *Polarstern*.

The ship serves as both lab and hotel for meteorologists, biologists, oceanographers, physicists and chemists from 17 different countries who want to learn more about the impact of climate change on the atmosphere and the ecosystem. Russian, Swedish and Chinese icebreakers supply the ship and bring new teams of the researchers and crew to take over. The ship will accommodate in total about 600 people in the course of the year. The MOSAIC expedition (Multidisciplinary drifting Observatory for the Study of Arctic Climate), for which preparations started back in 2011, costs about 160 million euros. Dutch projects from the Universities of Wageningen and Groningen are being conducted on board, thanks to a financial contribution from the Dutch Research Council NWO.

### FLOATING AROUND

The *Polarstern* embarked from Tromsø, Norway, on 20 September 2019, to float for a year around the North Pole, frozen to an ice floe. Sakinan boarded the ship at the end of January, to do research on the diet of the Arctic cod. On a previous expedition, young cod were found under the sea ice. It appears that they use the sea ice as a means of transport to get from their birthplace – the Russian and Canadian coasts – to the central Arctic Ocean. One of the aims of the study is to find out what the cod eat during the different seasons. These data will be collated with results from other studies on topics such as the distribution of cod.

The zooplankton under the ice form a potentially significant source of food for small shellfish such as amphipods, which are in turn food for cod. ‘We are collecting

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Clockwise from top left: researchers walk to their research location with their equipment on a sleigh; the *Polarstern*; the ice cracks; two polar bears visit the research location.

zooplankton in Ocean City, a large tent standing on the ice about 300 metres from the ship. We walk over there, pulling our equipment behind us on a sleigh. The tent is located over a big hole in the ice that we can lower nets into. Once we are finished, we make way for other scientists, who can then do whatever they need to do, like taking water samples. In the afternoon, we process the samples in the lab on board ship.’

### ACOUSTIC SIGNALS

When Sakinan started work on his research in February, it was dark around the clock, but it has gradually been getting lighter since March. ‘The Arctic Ocean is covered by a thick layer of sea ice for most of the year. So not

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## POLARSTERN FLOATS ALONG

Climate change is causing major changes in the polar region, but we lack data on this for half the year, the polar night. In this period, the pack ice and the low temperatures make it practically impossible to do research. Now, for the first time, the MOSAIC expedition (Multidisciplinary drifting Observatory for the Study of Arctic Climate) has been collecting data on a wide range of scientific subjects. When the Dutch delegation arrived on the research vessel *Polarstern* at the end of January 2020, it lay frozen into the ice about 300 kilometres from the geographical North Pole on the Russian side. The expectation – and the subject of a research question – is that ocean currents will carry the ship out of the ice somewhere between Greenland and Iceland by the end of summer 2020.

much light gets through, whereas everything needs light to grow. At lower latitudes, the plankton comes up at night, and sinks back down into the depths during the day. I was very curious to see how the plankton would behave under the specific diurnal variations in the Arctic region,' says Sakinan.

Sakinan detects the presence of plankton using acoustic signals, sending sound pulses down into the water and measuring the echoes that return. 'Zooplankton are very small, but there are a lot of them and they produce weak but measurable echoes. It was great to see that our acoustic measurements were right: when we pulled up the nets, they were teeming with plankton.'

A new team was due to arrive on the *Polarstern* in April, to

take over from the present group, but that has been postponed by about six weeks due to the coronavirus. 'We don't get so much news here, so at first we didn't realize what the scale of the coronavirus outbreak was,' says Sakinan. 'As soon as it did become clear, we were told we wouldn't be able to leave the ship for a while because the travel restrictions meant the new group of scientists and crew couldn't get here. At first I was very worried about my family in Turkey, especially my parents, who are getting on in age. But I've had more contact with them since then, and I know they are doing well.' ■

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