

# Scientists prepare for year-long expedition to Arctic center

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In this Wednesday, July 3, 2019 file photo the German Arctic research vessel 'Polarstern' is docked for maintenance in Bremerhaven, Germany. About 100 researchers will set sail Friday from Tromso, Norway, aboard the German icebreaker 'Polarstern' in an effort to understand how climate change is affecting the Arctic and regions beyond. (AP Photos/Frank Jordans, file)

Researchers from more than a dozen nations prepared Friday to launch

the biggest and most complex expedition ever attempted in the central Arctic—a yearlong journey through the ice they hope will improve the scientific models that underpin our understanding of climate change.

The 140-million euro (\$158 million) expedition will see scientists from 19 countries including Germany, the United States, Britain, France, Russia and China work together in one of the most inhospitable regions of the planet.

"The Arctic is the epicenter of global climate change," said Markus Rex of Germany's Alfred Wegener Institute for Polar and Ocean Research, who will lead the expedition. "At the same time the Arctic is the region of the planet where we understand the climate system least."

Packed full of scientific equipment, the German icebreaker RV Polarstern will leave the port of Tromsø in northern Norway accompanied by a Russian vessel to search for a suitably large floe on which to anchor and set up base.

As the days get shorter and the sea freezes around it, the Polarstern will slowly drift off on its own toward the North Pole while rotating teams of dozens of scientists spend two months each conducting research on the ice.

Stefanie Arndt, a sea ice physicist who has been preparing for the expedition for nine years, said darkness will be the biggest challenge.

"Everyone worries about the cold but the psychological aspect of not seeing anything and knowing there are polar bears out there is something that shouldn't be underestimated," she told The Associated Press in a telephone interview.

Scientists involved in the Multidisciplinary drifting Observatory for the

Study of Arctic Climate, or MOSAiC for short, have undergone firearms training. The camp will be also be secured by a perimeter fence and fireworks to scare off prowling predators.



The German icebreaker and research vessel Polarstern at shore in Tromsø, Norway, Wednesday Sept. 19, 2019. Scientists from more than a dozen nations are preparing to launch the biggest and most complex research expedition ever attempted in the central Arctic. About 100 researchers will set sail Friday from Tromsø, Norway, aboard the German icebreaker Polarstern in an effort to understand how climate change is affecting the Arctic and regions beyond. (Rune Stoltz Bertinussen/NTB Scanpix via AP)

Arndt, who will join the mission in mid-February, said the unique

advantage of MOSAiC compared with other expeditions is the fact that researchers will be able to observe processes in the Arctic across an entire seasonal cycle.

"What's particularly interesting is the transition from winter to spring," she said, a time when the ice is normally too thick for ships to reach the Central Arctic.

Recording changes in the density, size and type of snow will help scientists better understand the flows of energy in the Arctic.

"For example, how much light the snow reflects back into the atmosphere, how much it absorbs and how much light reaches the upper ocean," said Arndt. "This has big implications for the ecosystem."

Energy from light affects algae growth and ocean temperatures, which in turn influence how much sea ice melts from below.

Understanding these and other complex processes occurring in the Arctic is essential for the increasingly sophisticated computer models scientists use to predict weather and climate. Experts believe that any disruption to the Arctic's delicate cycle of freeze-and-thaw will be felt further south, though it's still not clear how.

"The Arctic is changing pretty dramatically right now and that's something we need to get into," said Matthew Shupe, an atmospheric scientist at the University of Colorado who will take part in the expedition.

Recent changes in the jet stream—a current of air that circles and insulates the Arctic like a giant thermos—have allowed warm, moist winds from low latitudes to move north. At the same time, chilly blasts of Arctic air—the dreaded polar vortices—have brought deep freeze



conditions to the continental U.S. and Europe.



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"A lot of this right now is a hot topic," said Shupe.

Concerns about global warming have spread far beyond the scientific

community in recent years. The expedition starts on the same day as global climate protests and ahead of a U.N. climate summit in New York next week.

Rex, the expedition head, said the cooperation between scientists from many different countries stands in contrast to the geostrategic jostling that big powers have started engaging in as the Arctic, with its untapped riches, begins to open up to exploration.

He put the fact that Germany, hitherto a second-league player in the Arctic, is leading the expedition down to the country's technical and logistical expertise.

"We're doing it because we can, and nobody else can do it," said Rex.

Anja Karliczek, the German minister for science, said that as a major industrial nation Germany needs to shoulder part of the responsibility for tackling climate change, and financing half of the expedition's costs was in the country's interests.

Unlike Russia, China and Sweden, which will also be sending icebreakers to supply the expedition, the United States won't be contributing a vessel.

"A U.S.-flagged ship would have been a nice addition to MOSAiC," said Shupe. "On the other hand I think that the U.S. is making extraordinary contributions," he said, citing scientific and financial support from American institutions such as the National Science Foundation, the Department of Energy, the National Oceanic and Atmospheric Administration, and NASA.

**More information:** MOSAiC mission: [www.mosaic-expedition.org/](http://www.mosaic-expedition.org/)

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