



Expedition MOSAIC

This Evening Sees the Start of MOSAIC - the Greatest Arctic Research Expedition of All Time

Frozen in the Arctic sea ice, scientists from 17 nations will investigate the epicentre of climate change on board the research icebreaker Polarstern for an entire year.

[20. September 2019] After a decade of preparations, it's finally time: this evening at 8:30 p.m. the German icebreaker Polarstern will depart from the Norwegian port of Tromsø. Escorted by the Russian icebreaker Akademik Fedorov, she will set sail for the Central Arctic. On board researchers will investigate a region that is virtually inaccessible in winter, and which is crucial for the global climate. They will gather urgently needed data on the interactions between the atmosphere, ocean and sea ice, as well as on the ecosystem. Thanks to the collaboration between international experts, the one-year-long ice drift past the North Pole will take climate research to a completely new level.



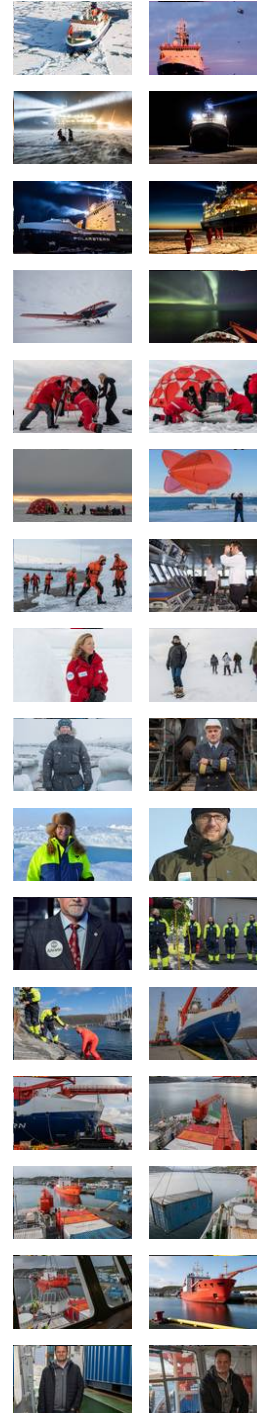
Hardly any region has warmed as much as the Arctic over recent decades. At the same time, we lack year-round observations from the ice-covered Arctic Ocean. For the first time, the MOSAIC expedition will drift in the ice with a modern research icebreaker for an entire year, allowing scientists to investigate the Arctic winter in the vicinity of the North Pole. The climate processes there are a missing piece of the puzzle that is needed in order to make better prognoses regarding global climate change. It's thought that the extreme warming in the Arctic has an enormous impact on the middle latitudes.

The MOSAIC expedition, led by the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) entails unprecedented challenges. An international fleet of 4 icebreakers, helicopters and aircraft will supply the team on its epic voyage. A total of 600 international participants, half of which are researchers, will be part of the mission. This evening at 8:30 p.m. local time, a delegation of scientists and politicians, including the Federal Minister for Education and Research, Anja Karliczek, will see RV Polarstern off from Tromsø, followed by the Akademik Fedorov, which sets sail at 9:00 p.m.

Anja Karliczek, German Federal Minister of Education and Research, BMBF:

"Climate change is the greatest challenge facing humankind. The MOSAIC mission is proof that, despite all of the setbacks in the worldwide climate protection process, there is still a strong desire at international level to take on this challenge. It is a promising signal for climate change mitigation that scientists from 17 different countries will come together to conduct research in the Arctic Ocean, the epicentre of climate change. Germany is fully committed to safeguarding the global climate, as demonstrated by the fact that researchers from the Alfred Wegener Institute will be leading the mission on board the Polarstern and that Germany will bear half of the mission's costs. I would like to wish the expedition participants all the best. Thanks to their great personal commitment, the scientists will make an outstanding contribution towards helping humanity overcome the challenges of climate change and preserving our world as we know it for future generations. Everyone on this expedition, and also those in their home countries supporting them from afar, are heroes of our time."

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Antje Boetius, Director, Alfred Wegener Institute:

“Since 2011 our scientists have been working to make the vision of a major mission in the North-Pole region a reality. During the expedition, Polarstern will be become frozen in the ice, and will provide safe accommodation while research is undertaken outside on the sea ice under extreme conditions . We have a network of the best international Arctic researchers from various disciplines to get the mission off the ground. Back in 2011, we couldn't have imagined imagine how thin the sea ice and how warm the winters would become. It's high time for the expedition to get underway and to gather data on and images of a region that is changing faster than we can study it.”

Markus Rex, Head of MOSAiC, Alfred Wegener Institute:

“This mission is ground breaking. Never before has there been such a complex Arctic expedition. For the first time we will be able to measure the climate processes in the Central Arctic in winter. And so for the first time we will be able to understand this region and correctly represent it in climate models. The Arctic is the epicentre of global warming and has already undergone dramatic changes. And it is the weather kitchen for our weather in Europe. Extreme weather conditions like outbreaks of cold Arctic air here in winter, or heat waves in summer are linked to the changes in the Arctic. At the same time, the uncertainties in our climate models are nowhere bigger than in the Arctic. There aren't any reliable prognoses of how the Arctic climate will develop further or what that will mean for our weather. Our mission is to change that.”

Stefan Schwarze, Captain RV Polarstern, F. Laeisz Shipping Group, Germany:

“RV Polarstern is about 40 years old, and it is an excellent icebreaker - and one of the best vessels to sail the seas. It is often the case that good icebreakers are bad sea-going vessels. But this is not true at all for Polarstern, making her genuinely unique in this respect. Polarstern is central to MOSAiC - the hub everything revolves around, and everyone returns to. If something goes wrong, Polarstern always remains solid as a rock. If everything goes wrong, Polarstern needs to remain our last stronghold - and I will make sure of that. That's my task.”

The two icebreakers will remain in visual contact as they head across the Barents and Kara Seas on course for the Central Arctic. After roughly two weeks they are expected to reach the target region at 130 degrees east and 85 degrees north. The first of a total of six teams will then search for a suitable ice floe to set up the complex research camp on. But the researchers will be working against the clock, since just a few days after their arrival the sun will cease to rise above the horizon. The critical sea ice in the target region poses a further challenge. This year, the sea-ice extent there has decreased significantly. Satellite images also show barely any old sea ice, and instead mainly thin, first-year ice.

The expedition participants will connect the research camp with a network of measuring stations set up over a radius of 50 kilometres by researchers using the escort icebreaker Akademik Fedorov . The MOSAiC School on board the Akademik Fedorov offers 20 young polar researchers, undergraduates and PhD students the unique opportunity to take part in the initial phase of the expedition and to learn about conducting polar expeditions at firsthand. As soon as the so-called distributed network has been completed, the two icebreakers will come together for a final exchange of crew and supplies before the Akademik Fedorov returns to Tromsø, where she is due to arrive on 30 October. The researchers on board Polarstern will remain there until mid-December, when they will be replaced by the second team. The expedition will be resupplied, and there will be further team changes over the coming year. There is also an accompanying flight campaign planned for spring 2020, for which a landing strip will be carved out of the sea ice. In late summer 2020, between Greenland and Svalbard, the Polarstern will free herself from the ice and head back to her homeport of Bremerhaven, Germany, where she is expected to arrive in mid-October 2020.

The budget for the expedition is roughly 140 million euros. During the course of the year, circa 300 researchers from 17 countries will be on board, from Belgium, Canada, China, Denmark, Finland, France, Germany, Great Britain, Japan, the Netherlands, Norway, Poland, Russia, Spain, Sweden, Switzerland and the USA. They will be supported on land by researchers from Austria and South Korea. The questions that the researchers will be investigating during the expedition are closely linked. Together they will study the entire climate system in the CentralArctic for the first time. They will gather data on five subareas: atmosphere, sea ice, ocean, ecosystems and biogeochemistry, in order to gain insights into the interactions that shape the Arctic climate and life in the Arctic Ocean.

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The Alfred Wegener Institute pursues research in the polar regions and the oceans of mid and high latitudes. As one of the 19 centres of the Helmholtz Association it coordinates polar research in Germany and provides ships like the research icebreaker Polarstern and stations for the international scientific community.

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Topic pages

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You can find the latest news from the Arctic via the MOSAiC channels on Twitter (@MOSAICArctic) and on Instagram (@mosaic_expedition) using the hashtags #MOSAICexpedition, #Arctic and #icedrift. There is more information on the expedition at: www.mosaic-expedition.org. The MOSAiC web app allows you to follow Polarstern's drift route live: www.follow.mosaic-expedition.org.

Research Focuses

Atmosphere

Complex cloud processes and snow fall, sun and heat radiation, eddies and small vortices, air temperatures as low as minus 40 degrees Celsius and a comparatively warm ocean below, with only a thin layer of cracked ice separating it from the atmosphere. MOSAiC will investigate how these and many other factors together affect the heat balance and the Arctic climate.

Sea Ice

The Arctic sea ice is changing. The MOSAiC expedition will monitor the lifecycle of the ice for an entire year - how it forms, alters, drifts and cracks, how it thaws, and how, as it does so, it determines the energy flow between the air and the water.

Ocean

The Arctic Ocean is not an isolated body of water. MOSAiC will investigate which currents and vortices in the ocean transport heat to the Arctic and carry it to the surface there; the relationship between the ocean, atmosphere and ice; and how they interact during the course of an entire year.

Ecosystem

How do Arctic life forms survive extreme cold, solid ice cover and months of darkness during the polar night, and what sort of metabolisms do they have? The MOSAiC expedition will explore this mystery of life, which continues under what appear to be extremely adverse conditions, throughout a complete annual cycle.

Biogeochemistry

What's in the Arctic Ocean doesn't stay in the Arctic Ocean: The ocean, ice and atmosphere are constantly exchanging gases, leading to, among other things, changes in cloud characteristics. During a complete annual cycle, MOSAiC will monitor these gases and other important chemical compounds in the water, ice and air.

[Further printable photos and infographics can be found in the MOSAiC media library.](#)

