



ALFRED-WEGENER-INSTITUT  
HELMHOLTZ-ZENTRUM FÜR POLAR-  
UND MEERESFORSCHUNG

## Expedition

# Antarctic season ends this weekend

**Polarstern expected back in Bremerhaven**

[27. June 2019] **After half a year in the Southern Hemisphere, the research icebreaker Polarstern will soon return to her homeport, Bremerhaven. Following a season of work focusing on sea ice, the icebreaker will now be prepared for her next challenge: the greatest Arctic research expedition of all time, which will begin this September.**



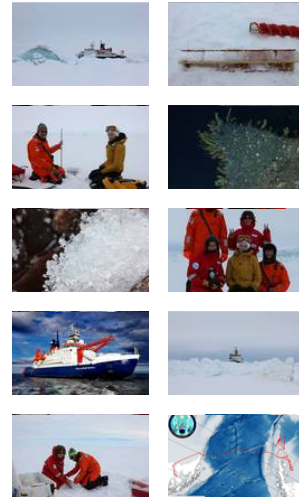
Metre-thick sea ice as far as the eye can see: this March, when the research icebreaker Polarstern set course for the Larsen C Ice Shelf in the Weddell Sea during the central segment of the season, the ice proved impassable. Instead of the original plan of taking a closer look at the seafloor and marine organisms under where the massive iceberg A68 had calved, the researchers on board had to quickly come up with an alternative research agenda: tough luck for them, but a fortunate twist for sea-ice experts from the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI). "For the first time in 13 years, we had the opportunity to measure the ice thickness in the northwestern Weddell Sea, and to closely examine the characteristics of the ice and snow cover, as well as the microorganisms living in the ice that depend on it," reports AWI geophysicist Prof Christian Haas. "The sea ice had a mean thickness of three to four metres, which is unchanged since our last Polarstern expedition here in 2006." For Haas, this finding came as no surprise: "Though there are regional differences and short-term variations, in many parts of the Antarctic Ocean the sea-ice extent has barely changed at all for decades. [More information on this topic is regularly presented on the AWI's Sea Ice Portal.](#) Unlike the Arctic, where the sea-ice extent has been declining markedly for decades, the sea-ice situation around Antarctica is relatively stable thanks its isolated geographic position and its unique climate conditions."



Sea ice science in Antarctica (Photo: Erika Allhusen)

The AWI sea-ice researcher had studied satellite remote sensing imagery beforehand. But the question of whether these observations, obtained from space, accurately depict the thickness and characteristics of

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the sea ice is one of the questions that Haas and his team set out to answer. To do so, they went on flights with Polarstern's on-board helicopter, which towed an electromagnetic ice-thickness sensor, the 'EM-Bird', above the surface of the ice. They also scanned the ice by hauling another electromagnetic sensor over the ice on foot. Lastly, they gathered ice cores from the floes, so as to determine the ice's biophysical properties and the amount of biomass it contained. All of these data will help to improve satellite-based products: the more that is known about the actual conditions on site, the better the corresponding satellite data can subsequently be calibrated and interpreted.



Life on the bottom of the sea (Photo: OFOS, Autun Purser)

Instead of analysing these aspects below the mammoth iceberg, they decided to explore the effects of sea-ice cover on the sediments and ecosystem on the seafloor; after all, dense, thick ice prevents algal growth and primary production in the ocean, which turns the seafloor into a barren underwater desert. Moving along a gradient from thick sea ice to loose ice cover, and ultimately to open water, the team used nets to retrieve fish from the water column, collected samples from the seafloor, and used a remotely operated underwater vehicle (ROV) to photograph and film organisms on the ocean floor. The next step will be to take the samples and data collected back to their home labs for analysis. Accordingly, they've succeeded in gathering important information on the largely unknown ecological conditions in the Weddell Sea - even if they never got to take a peek at the former Larsen C Ice Shelf.

In contrast, the international research team of biologists and geologists who had originally planned to investigate the seafloor characteristics and biodiversity near the Larsen C Ice Shelf had to be a bit more flexible.

## The Polarstern's Antarctic season at a glance

- Embarked from Bremerhaven on 10 November 2018 - transit with coursework for students from the POLMAR graduate school; arrived in Cape Town, South Africa, on 11 December 2018 (PS116)



Polarstern (Photo: Erika Allhusen)

- Embarked from Cape Town on 15 December 2018 - long-term oceanographic research in the Weddell Sea and resupply for the Neumayer Station III; arrived in Punta Arenas, Chile, on 7 February 2019 (PS117)
- Embarked from Punta Arenas on 18 February 2019 - Larsen C Ice Shelf region with sea-ice physics, biology, oceanography, geology and bathymetry, arrived in Punta Arenas on 10 April 2019 (PS118)
- Embarked from Punta Arenas on 15 April 2019 - geoscientific work in the



The Institute

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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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Scotia Sea; arrived in Port Stanley (South Shetland Islands) on 31 May 2019 (PS119)

· Embarked from Port Stanley on 2 June 2019 in Port Stanley: South North Atlantic Transit (SoNoAT) coursework and networking for young investigators; expected to arrive in Bremerhaven on 29 June 2019 (PS120)

### Outlook: upcoming Polarstern expeditions

Until mid-August 2019, Polarstern will be at the Lloyd Werft shipyards in Bremerhaven. During her time there, she'll receive routine maintenance and repairs; at the same time, certain measures will be



Polarstern (Photo: Nina-Marie Lesic)

taken in preparation for her upcoming overwintering in the Arctic, e.g. the installation of a new fuel-tank heating system. She'll then depart on a biological-oceanographic expedition to the AWI's long-term observatory 'Hausgarten' in the Fram Strait between Greenland and Svalbard.

From mid-September the ship will be anchored in the Norwegian port of Tromsø, where it will be made ready for the greatest Arctic research expedition of all time: MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate). On 20 September 2019 the German research icebreaker will depart Tromsø bound for the Arctic, where it will spend an entire year drifting through the Arctic Ocean with the ice. Regularly resupplied by additional icebreakers and aircraft, a total of 600 people from 17 countries will take part in the expedition. And many times that number of researchers will ultimately use the vast datasets obtained in order to take climate and ecosystem research to the next level. The Polarstern isn't expected back in her homeport, Bremerhaven, until October 2020.

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The decision to abandon plans to travel to the Larsen C Ice Shelf: [PS 118 - Weekly Report No. 3](#)