



Photo: Torsten Heller/AF Expeditionen

On Thin Ice

White caps above and below – it goes without saying that these are part of our image of the blue planet. But for how much longer? In the case of the North Pole, at least, whose cover consists entirely of sea ice, it is an essential question. After all, nowhere in the world is climate change as visible as it is in the Arctic. Never before, since reliable records have been available, was the September minimum – the expansion of the Arctic Sea ice at the end of the summer – as low as it was in 2012. The Arctic ice is not only an indicator of climate change, but also an important factor in the climate system: the smaller the ice areas become in the Arctic summer, the less sunlight is reflected and the more is absorbed by the ice-free ocean. In winter, the ice insulates the relatively warm water from the much colder air; without this “cap,” the ocean would release gigantic volumes of heat into the atmosphere. The ice cover is therefore extremely important for the temperatures at the North Pole.

Dirk Notz from the Max Planck Institute for Meteorology in Hamburg would like to explain the role of the sea ice, its complex internal structure, and thus also the conditions necessary for its formation and stability. To this end, he and his team measure, among other things, the thickness of the ice on the ice floes and its composition of pockets of freshwater ice, brine and gas. All of the data is included in complex numerical simulations. The most important discovery to date: Contrary to what was originally feared, there doesn't appear to be any tipping point in the climate system, after which it would be impossible to prevent the complete loss of the Arctic ice cap. According to the model calculations, the state of the sea ice is closely related to the prevailing climate conditions at all times. This also means that if greenhouse gas emissions continue to increase at the current rate, then by the end of the century, the Arctic will be completely free of ice in September at the latest.