

TRACE: Tracing the footprints of deglacial and early Holocene meltwater pulses in the European Arctic from Barents Sea sediments

At the end of the last Ice Age, huge amounts of meltwater flowed into the oceans, sometimes in sudden bursts that disrupted climate and ocean circulation around the world. While major events like Meltwater Pulse-1A and the Younger Dryas are well known, we still know very little about smaller, but equally important, freshwater outbursts from ancient lakes, especially those around the Baltic region, during the early Holocene (about 11,000–9,000 years ago).

This project, called **TRACE**, explores how these meltwater surges from the Baltic area may have reached the Barents Sea and influenced the climate in the European Arctic. Our early data from one marine sediment core already shows clear signs of meltwater that match the timing of known ancient lake floods, suggesting that these events left stronger traces in the Arctic than previously thought.

To investigate further, we will study five sediment cores from the Barents Sea using a wide range of scientific tools. These include chemical markers (like alkenones and stable isotopes), microfossils (like foraminifera and diatoms), sediment characteristics, and even ancient DNA from land plants carried into the sea. We will pay special attention to clues that can show us when and where freshwater entered the ocean, and how that may have changed ocean circulation, including the Atlantic Meridional Overturning Circulation.

By connecting ancient Baltic lake discharges with changes in Arctic marine conditions for the first time, **TRACE** will fill an important gap in our understanding of past climate shifts. The results could also help us better predict how today's Arctic meltwater may affect our climate in the future as global warming accelerates.