

# Ancient ice

Simon Belt, Guillaume Massé and colleagues rammed their way through sheets of ice, spotting some polar bears on the way, in their attempt to reconstruct Arctic sea-ice records covering thousands of years.

## ■ What was the objective of the current work?

We wanted to reconstruct sea-ice conditions in the deepwater connection between the Arctic and Atlantic oceans, known as the Fram Strait, over the past 30,000 years. We did this by examining the abundance of lipids produced by sea-ice diatoms (our sea-ice proxy), and phytoplankton sterols (our open-ocean proxy), in sediment cores from the region. We hoped that the record would provide a context for the rapid decline in Arctic sea-ice over the past 30 years, and might prove to be useful to climate modellers.

## ■ Why did you choose this particular location for the fieldwork?

Previously, we had collected marine sediment cores from all over the Canadian Arctic, including the Northwest Passage. These cores provided us with palaeoclimate data stretching back hundreds to thousands of years. At the same time we also collected ice cores, material from sediment traps below the ice and phytoplankton from open-water trawls, to make sure that the chemicals identified in the sediments originated in sea ice. These early results confirmed the utility of our sea-ice and open-ocean proxies, and led us to this collaboration with Juliane Müller and Rüdiger Stein concerning the Fram Strait.

## ■ Did you encounter any difficulties?

Rapid changes in Arctic weather, particularly at sea, often dictated where we sampled in the Canadian Arctic. At the end of the summer, open channels rapidly became blocked by ice drifting from the north, forcing us to re-route the ship's course. However, as a result, we sampled at the heart of the Northwest Passage for the first time.

## ■ Any low points?

Getting up at 3:30 in the morning only to discover that the sampling schedule had been changed owing to



SIMON BELT

Guillaume Massé and colleagues dig down into the ice in northern Canada to look for sea-ice proxies.

changes in weather and sea conditions. The snoring of a cabin colleague. And being thrown out of bed as the ice-breaker ploughed through thick sea-ice. The abrupt movement of the ship as it crashed through near complete ice cover was extraordinary — the ship would ram the ice, back up and have another go until some headway was made. The wave-calming influence of the sea ice did prevent sea-sickness, however.

## ■ What were the highlights of the expedition?

Polar bears; in particular a mother and cub who approached the ship during an interview for *BBC News*. Sailing through the region in the Northwest Passage where Sir John Franklin's ill-fated expedition terminated in the mid-nineteenth century was fascinating. Some of the more relaxing moments included lying on the helicopter deck on clear calm nights and gazing in amazement at the aurora borealis. We also got to watch an entire series of *24*, and dined on at least four meals a day (no meal repeated in six weeks). The

scientific highlight had to be receiving news from our laboratory back in the UK that our proxies were present in the sediments we were sampling — we had no idea whether they would be there. I now use a screen shot of that e-mail in presentations!

## ■ Did you learn anything new about yourself or your team members?

We learnt that you can turn a disposable boiler suit, aluminium foil and laboratory tubing into a 70s disco costume.

## ■ Was it straightforward to get the samples back to the lab?

We returned to the UK with a sufficient number of samples in our hand luggage to make the first analyses exciting, and to make customs officers look quizzically at our collection of Arctic mud, sea-ice and maple syrup. Luckily, we passed through unhindered.

*This is the Backstory to the work by Juliane Müller and colleagues, published on page 772 of this issue.*

