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The Marine Geophysical Record of Past Ice Sheets

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An understanding of the former configuration and dynamics of ice sheets is essential to constrain numerical models of past environmental conditions and predict the likely future responses of ice sheets to climate change. Evidence of past ice-sheet activity is often well-preserved on and beneath the seafloor of glaciated continental margins, where it can be analysed using a variety of marine geophysical techniques. In this presentation, I will describe how marine geophysical data can be used to investigate former ice-sheet behaviour at different temporal scales, drawing on recent examples from my research. First, 2D and 3D seismic data show how mid- and high-latitude continental margins have been shaped by the repeated advance and retreat of ice sheets during the last three million years. Secondly, bathymetric data enable the interpretation of glacial landforms preserved on the seafloor, revealing the dynamic behaviour of ice masses since the Last Glacial Maximum. Finally, the recent application of autonomous underwater vehicles to acquire high-resolution geophysical data provides a step-change in our ability to image submarine landforms and facilitates new interpretations about ice dynamics at fine temporal and spatial scales.