Arctic Paleoclimate:

Marine Sediments as archives of Late Quaternary Glacial History

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The Arctic is currently in a state of rapid transition because of its amplified response to ongoing global warming. The last few decades have been characterized by retreating glaciers, melting ice caps and, most notably, a dramatic loss of sea ice cover in the Arctic Ocean. Based on historical observations, the current rate of change is unprecedented in recent centuries. To study these complex systems on a longer time perspective, records of climatic and oceanographic variability from natural archives such as sediment cores need to be investigated.

In this seminar, I will discuss how marine sediments can be used to reconstruct past glacial conditions by employing a wide variety of methods including micropaleontology, geochemistry, sedimentology and mineralogy. I will present results from two broad case studies. First, I will focus on the deglaciation of North America and how the melting of the Laurentide Ice Sheet left traces in sediments of the Labrador Sea. Analyses of more than 20 sediment cores from the Labrador margin are used to reconstruct glacial meltwater events: their origin, pathways, timing and impact on ocean circulation and climate. Second, I will switch to the Arctic Ocean and show recent work from sediment cores in the Chukchi Sea. I will present new, high-resolution sea ice reconstructions and discuss the observed sea ice retreat of recent years in the context of natural variability during the late Holocene.

Photo: Floating ice in Nuuk Fjord, Greenland (C. Pearce)