



GL  MAR
Ph.D. Defence



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Title of the Thesis Colloquium:

**Unravelling the long-term response
of marine plankton biodiversity
to climate change
since the Last Glacial Maximum**

30 November 2023 - 16.00 hrs.
MARUM I, room 2070
and online via Zoom

Unravelling the long-term response of marine plankton biodiversity to climate change since the Last Glacial Maximum

Current global warming is already affecting global marine biodiversity and is expected to have a stronger effect in the future. Detectable responses to ongoing climate change have been observed in observational data of many marine plankton groups. However, these observations primarily capture small-scale changes due to their limited time frame, necessitating broader analyses for a comprehensive understanding of long-term biodiversity shifts in marine plankton.

Here, the fossil record of planktonic foraminifera, coccolithophores, and dinoflagellate cysts have been used to determine how their biodiversity responded to past climate change with a magnitude that is comparable to projected future warming. The compiled time series are located in the North Atlantic Ocean, cover a latitudinal range of 75°N to 6°S and span the past 24,000 years – the period from the Last Glacial Maximum (LGM) to the current warm period.

All three examined groups exhibit analogous patterns of biodiversity change and overall assemblage change over time. In general, assemblages started to change with the onset of global warming around 16,000 to 17,000 years ago and sustained a consistent rate of change throughout the current warm period, extending to at least 4,000 to 5,000 years ago. The climatic shift from the LGM to the current warm period resulted in a prolonged period of change in both zoo- and phytoplankton assemblages. This change persisted well beyond the deglacial warming and is likely associated with new ecological interactions. It is conceivable that there was also a shift in the predominant drivers of plankton assemblage dynamics, transitioning from a dominance of abiotic factors during the last deglaciation to a greater influence of biotic factors with the onset of the Holocene. These findings indicate that future global warming may also have long-term consequences for marine plankton communities.