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Towards Late Quaternary sea ice reconstructions in the Arctic with sedimentary ancient DNA.

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Sea ice has a pivotal role in the regulation of the Arctic climate system, and by extension to the global climate. Our knowledge of its historical variation and extent is limited to the satellite records that only cover the last several decades, which considerably hampers our understanding on how past climate has influenced sea ice extent in the Arctic. Latest modelling efforts indicate that the Arctic may be sea ice free in summer by 2050, making the appreciation of the effects that such major change will have on Arctic ecosystems of paramount importance. Here, we will present the first results of the AGENSI project (www.agensi.eu) aiming at reconstructing the past sea ice evolution with sedimentary ancient DNA. Based on a large collection of surface sediments collected along multiple gradients of sea ice cover in the Arctic, we show that plankton DNA sinking to the seafloor can be used to predict the variation of surface sea ice cover. Further, we will present our current efforts to utilize this dataset to reconstruct the past sea ice variation in Late Quaternary sediment cores.