Combining modern surface-to-seafloor eDNA datasets to unlock the potential of sedimentary ancient DNA.

Tristan Cordier[1]

[1]NORCE Climate and Environment - Norwegian Research Centre AS and Bjerknes Centre for Climate Research, Bergen, Norway

Recent ocean explorations using environmental genomics tools have revolutionized our understanding of plankton biodiversity at global scale and along the water column. These plankton genomic resources provide a fantastic opportunity to separate the plankton DNA signatures that have settled on deep seafloor sediments from indigenous benthic biodiversity. Combining modern surface-to-seafloor eDNA datasets not only allow us to specifically link plankton and benthic biodiversity to modern ocean ecosystems processes, but also unlock the potential of sedimentary ancient DNA (sedaDNA) for paleoceanography.
I will first give an overview of environmental genomics methods and the conceptual framework for using sedaDNA signal for paleo-reconstructions. Then, I will show how modern surface-to-seafloor eDNA datasets opens new research avenues in (paleo)ceanography. I will present ongoing work that aims at delivering sedaDNA-based reconstructions of Late Quaternary sea ice conditions in polar ecosystems and of the biological carbon pump in the North Atlantic. Finally, I will discuss technical challenges in sedaDNA data analysis and highlight potential solutions to mitigate those.