SPECIES DISTRIBUTION MODELING OF MARINE PELAGIC DIATOMS

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Species distribution models (SDMs) aim at predicting the potential distribution of a species using statistical or machine learning approaches by combining geo-referenced taxon occurrence data and layers of environmental parameters. During the last two decades, the methodology became a standard approach in biogeography as well as conservation and climate change science, though with a strong bias towards terrestrial organisms. Marine organisms are clearly underrepresented and there is little experience with the applicability of SDMs for planktonic organisms. This study evaluates the performance of species distribution modeling methods for marine pelagic diatoms. Occurrence data are mainly harvested from the GBIF network and other public resources. Environmental parameters include sea surface temperature, pH value, salinity, radiation, sea ice coverage and nutrient concentrations. The main modeling method used is maximum entropy. First results of this study will be presented to give an overview to the current availability of data records, a selection of environmental parameters and model evaluation by the example of a few key diatom taxa of the Southern Ocean.
In summary, the resulting potential distribution maps of the models agree well with species distributions expected based on background knowledge. Especially abiotic variables, like sea surface temperature and nutrients (nitrate, phosphate and silicate) are excellent explanatory variables. Our experiments clearly show that SDM methods are suitable to model the geographic distribution of pelagic diatoms. In a next step, we will project niche models on expected future environmental conditions for different IPCC scenarios to explore potential biogeographic shifts in response to climate change.