

Title: Ecology of freshwater diatom assemblages from Campbell Island (sub-Antarctic Region)

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Summary: Diatoms (Bacillariophyta) are one of the most abundant and diverse algal groups in Polar ecosystems. Their characteristic silica outer shell (= valve) and the significant responses on changes in their physical and chemical environment make them excellent bio-indicators used in both applied environmental, biogeographical and paleo-ecological studies.

Especially in Polar regions, diatoms proved to be very useful indicators of environmental and climatic changes. It is generally accepted that the current climate changes will have their greatest impact in Polar regions. Unfortunately, our knowledge of both the species composition of polar diatom communities and their ecological preferences are only poorly known, mainly due to historic force-fitting and incorrect identifications of the composing species.



Campbell Island (52°33'S/169°08'E) is a small (112 km²), uninhabited sub-Antarctic island belonging to New Zealand, and is the main island of the Campbell Island group. The island is mountainous, rising to over 750 m in the south. A long fjord, Perseverance Harbour, nearly bisects it, opening out to the sea on the east coast. Campbell Island has a maritime tundra climate with a limited amount of annual sunshine, a frequent cloud cover, a fairly high amount of precipitation and a mean annual temperature of 7 °C. The island has an extensive

vegetation cover with more than 100 native species.

In 2019-2020, a first study was performed on the moss-inhabiting diatom assemblages from Campbell Island, based on the analysis of 60 historic moss samples, collected during a bryological expedition in 1969-1970. A highly diverse and unique diatom flora was recorded, containing several newly described species.

In the present proposal, we would like to extend the study of the diversity of the Campbell Island flora by analysing the diatom assemblages in 45 aquatic samples, collected in 2015 from lakes, pools and rivers. The diatoms in the samples will be investigated using light microscopy and, when needed, scanning electron microscopy techniques. Based on our current knowledge of the diatom composition in the moss samples, it is likely that new species will be discovered. The obtained data will be analysed with multivariate techniques to determine the main diatom assemblages found on the island. Since each sample was also physico-chemically investigated (pH, salinity, nutrients, major ions), it will be possible to characterize the environmental preferences of each assemblage.

Keywords: Antarctic Region – morphological research – microscopical algae

Practical info: This proposal does not include field work. All samples have been collected during a previous expedition to the island. A substantial part of the research will involve microscopical analysis. Samples will be analyzed in the Diatom, Phycology & Myxomycete Unit at Meise Botanic Garden. As most of the research will be performed in Meise Botanic Garden, disposing of a personal car is a plus.