

An overview of diatom research on Continental Antarctica

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The diatom flora of the Antarctic Realm is in the process of revision. Comprised of the three sub-Regions of the Sub-Antarctic, the Maritime Antarctic, and Continental Antarctica, the non-marine diatom flora of the Antarctic Realm was long thought to consist of cosmopolitan species with global distributions. Using modern LM and SEM methods and the “fine-grained” taxonomic approach, more stringently defined descriptions of species have been used to re-investigate records within the Antarctic Realm. Recent work within the Sub-Antarctic and Maritime Antarctic regions have revealed a wealth of endemic taxa across both aquatic and terrestrial ecologies. Seeing this, a renewed attention has been given to Continental Antarctica to determine if this subregion displays similar patterns of species endemism. In this talk, we first provide a historical overview of diatom research in Antarctica. Then, the results of recent re-investigation of two localities within East Antarctica are presented: the Vestfold Hills and Windmill Islands. The first, the Vestfold Hills, is noted for the diversity of over 300 waterbodies. Here, we examined 30 saline lakes using a modern taxonomic approach to determine if an increased understanding of taxonomy alters the ecological interpretation of the lakes. The second study site is located within the Windmill Islands and takes advantage of the well-characterized moss and lichen vegetation beds. Using the updated diatom flora from the Vestfold Hills, we examined the terrestrial diatom flora inhabiting two moss and two lichen vegetation types in the Windmill Islands nearby to ASPA 135. Results show that salinity and alkalinity structure aquatic diatom communities in the Vestfold Hills, whereas underlying terrestrial vegetation types determine diatom community structure in the Windmill Islands. Overall, we see an increase in Antarctic endemic taxa, alongside cosmopolitan and marine species. The updated flora and ecological records from the Vestfold Hills and Windmill Islands can now be widely applied across Antarctic study sites. Our results provide renewed datapoints for large, global microbial biodiversity and biogeographical studies, as well as providing a baseline for monitoring climate change impacts within the Antarctic Realm.