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Moss species on the move in East Antarctic terrestrial communities

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Abstract

Antarctica has experienced major changes in temperature, wind speed and stratospheric ozone levels over the last 50 years. Whilst West Antarctica and the peninsula showed rapid warming and associated ecosystem change, East Antarctica appeared to be little impacted by climate warming, thus biological changes were predicted to be relatively slow. Detecting the biological effects of Antarctic climate change has also been hindered by the paucity of long-term data sets, particularly for organisms that have been exposed to these changes throughout their lives. We monitored vegetation communities in the Windmill Islands, East Antarctica from 2000 to 2014 and found significant changes in moss species composition. In addition, we have shown that radiocarbon signals preserved along shoots of the dominant Antarctic moss flora can be used to determine accurate growth rates over a period of several decades, allowing us to explore the influence of environmental variables on growth. Carbon stable isotopic measurements suggest that the observed effects of climate variation on growth are mediated through changes in water availability and most likely linked to the more positive phase of the Southern Annular Mode and changing westerly wind patterns. For cold remote locations like Antarctica, where climate records are limited and of relatively short duration, this illustrates that mosses can act as microclimate proxies and have the potential to increase our knowledge of coastal Antarctic climate change.

Keywords

terrestrial, antarctic, communities, east, species, moss, move

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nomenclatural acts. We anticipate that this platform will also be used to fulfill the pending requirements for the registration of new bryophyte names. Our goal is to engage the bryological community at large (via the IAPT Bryophyte Nomenclature Committee and the International Association of Bryologists) in a bottom-up community approach to the maintenance of bryophyte name data, with all its associated metadata, in this centralized resource. In an increasingly digitally connected world pooling our resources and expertise into one community-based tool will allow us to share tasks, advance together, and work towards the production of a global bryophyte consensus checklist. A unified approach will also ensure that this taxonomic backbone of accepted names, synonyms and consensus classification will become the nomenclatural reference used by global initiatives such as the World Flora Online, Catalogue of Life Plus, and the Global Biodiversity Information Facility. The flow of digital data regarding bryophytes will be greatly enhanced if our efforts succeed.

OR-38
Moss species on the move in East Antarctic terrestrial communities

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Antarctica has experienced major changes in temperature, wind speed and stratospheric ozone levels over the last 50 years. Whilst West Antarctica and the peninsula showed rapid warming and associated ecosystem change, East Antarctica appeared to be little impacted by climate warming, thus biological changes were predicted to be relatively slow. Detecting the biological effects of Antarctic climate change has also been hindered by the paucity of long-term data sets, particularly for organisms that have been exposed to these changes throughout their lives. We monitored vegetation communities in the Windmill Islands, East Antarctica from 2000 to 2014 and found significant changes in moss species composition. In addition, we have shown that radiocarbon signals preserved along shoots of the dominant Antarctic moss flora can be used to determine accurate growth rates over a period of several decades, allowing us to explore the influence of environmental variables on growth. Carbon stable isotopic measurements suggest that the observed effects of climate variation on growth are mediated through changes in water availability and most likely linked to the more positive phase of the Southern Annular Mode and changing westerly wind patterns. For cold remote locations like Antarctica, where climate records are limited and of relatively short duration, this illustrates that mosses can act as microclimate proxies and have the potential to increase our knowledge of coastal Antarctic climate change.

OR-39
Elevational patterns of bryophyte and lichen biomass and species richness on different substrates in the tropical montane forest of Baru volcano, Panama

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A distinctive condition of tropical montane cloud forest is the abundant presence of bryophytes and lichens on all available substrates, from the forest floor to the canopy. These cryptogams have important ecological functions, but they are threatened by climatic change. Current elevational patterns may indicate climate dependencies of these organisms, but these patterns have been described for only few tropical mountains so far. Most of those studies were focused on epiphytes and none have previously addressed substrate-specific patterns. We therefore analyzed patterns in the abundance and diversity of bryophytes in an elevational gradient on the western slope of Baru Volcano, Panama, explicitly taking into account different substrates. The bryophyte and lichen layer was collected from 600-cm^2 plots on six substrate types with