Climate change impacts on the terrestrial biodiversity of Marion Island

Melodie A. McGeoch

Department of Conservation Ecology and Entomology, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa.

Observed and predicted impacts of global climate change on terrestrial biota include changes in individual performance, idiosyncratic species responses and as a consequence community reassembly, species range shifts and a change in the form and strength of species interactions[1-3]. However, generalizations that have been drawn about species responses to global change in many cases have a strong northern-hemisphere bias as a consequence of the comparative dearth of austral studies. The sub-Antarctic Prince Edward Islands are experiencing levels of climate change greater than the global average, in common with other parts of polar regions[3]. The biotic response hypotheses listed above were tested on Marion Island focusing predominantly on a keystone plant species (*Azorella selago*, Apiaceae) and its associated epiphytes and microarthropods. A combination of mensurate, natural climate gradient and field-experiment approaches were used to quantify both aspects of climate and species responses. A number of biologically-relevant changes in Marion Islands' climate were identified, including longer dry spells and an increase in the frequency of high evaporation events[4]. The temperature of the western side of the island was shown to be temperate in comparison with the eastern side[5], and both plant and microarthropod community characteristics were indeed shown to differ between island sides[6]. Responses to the altitudinal climate gradient on the island have also been shown in the microarthropod community and in the form of interspecific interactions in the plant community[6,7]. Both *A. selago* and springtail species responded negatively to experimental warming and drying, with comparatively idiosyncratic species-level responses[8,9]. To date there is thus strong evidence for the climate-sensitivity of Marion Islands' fauna and flora based on historical and current patterns of biotic variation across the island, as well as manipulative field experiments. Future multidisciplinary studies that include physiology, genetics, biogeomorphology and climate modelling will enable system-level understanding and a predictive glimpse of Marion Island under a future climate.

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