Submitted Abstract

ID IMC22-FSAbstr- 152

First Author First Name Last Name	 Brodie (1) Verrall
Submitting Author First Name Last Name	 Brodie Verrall
Correspondence	brodie.verrall@griffithuni.edu.au
Co-Authors **>> E-Mails will be not listed**	Green, Ken (2); Pickering, Catherine (1)
Organisations	1: Griffith University, Australia 2: Australian National University, Australia
Country	Australia
Region	Oceania
Title	Temporal Dynamics In Alpine Snowpatch Plants Along A Snowmelt Gradient Explained By Functional Traits And Strategies.
Keywords	Climate-Induced Vegetation Dynamics, Community Diversity And Composition, Community-Weighted Trait Means, Long-Term Ecological Monitoring, Plant Strategies
Type	List Of Focus Session
Focus Session ID	61

Abstract

Snowpatches (synonymous with 'snowbed') are discrete periglacial ecosystems that occur in topographical depressions on lee aspects of mountain ridgelines where snow amasses throughout the winter. These ecosystems are characterised by short growing seasons as snow persists months after the general thaw, resulting in distinctive and highly specialised plant communities. These communities are threatened by climate change, especially in marginal alpine environments such as Australia where re-surveys have already detected changes in vegetation. Dynamics in snowpatches were further explored through a third survey based on the hypothesis that there would be snowmelt dependant responses to climate change, with increases in competitive generalists and reduction in specialists where snow persists the longest. Seven of the most persistent snowpatches in Australia were categorised into early, mid and late snowmelt zones based on growing season length. Soil temperatures were recorded from winter 2003 to autumn 2020 to assess microclimate dynamics. Plant composition was visually assessed at 84 1 m^2 quadrats in 2007, 2013 and 2020. Diversity, cover and composition, along with community trait-weighted means and plant strategies were assessed to understand vegetation dynamics and impacts of microclimate changes over time. Growing season length and temperatures have increased in the late melt zone, while changes were less consistent in the early and mid melt zones. There was little fluctuation in diversity, which stabilised over time. However, there were increases in graminoid cover and declines in snowpatch specialists through time in mid and late melt zones. Community trait-weighted means for height, leaf area and leaf weight also increased, particularly in mid and late melt zones, while plant strategies shifted away from compositions of ruderal-tolerant to stress-tolerant. Snowpatch plant communities are changing in response to longer growing seasons and warmer temperatures, with the most pronounced changes in areas where snow persists the longest. The results demonstrate the loss of defining biotic and abiotic characteristics of snowpatches as they approach ecosystem collapse. However, further research is required to assess how factors such as plasticity of snowpatch specialists, snowpatch seedbanks and changing biotic interactions may influence snowpatch plant communities as the climate continues to warm.