

How fast can you climb a mountain? Climate change, ant assemblages and a centre of endemism.

Caswell Munyai[†]; Stefan Foord; Roderick Baxter

[†] University of Venda, South Africa

Leading author: caswell.munyai@gmail.com

Elevational transects across mountains, although at a smaller scale, provide compressed versions of regional and continental variation and might be the most cost effective measure of ecosystem response to global climate change in the tropics. The pattern of ant diversity along a proposed long-term elevational transect across the western Soutpansberg mountains in the north-east South Africa, is investigated to see if it can be related to spatial and environmental variables and the indicator species for each vegetation type and aspect is identified. Ants were sampled with pitfalls laid in 2 X 5 grids, replicated 4 times in each elevation zone (44 in total). Habitat structure, temperature and soil parameters were collected in each replicate. There was no clear pattern of species richness and density along the whole transect but a mid-elevational peak in species richness and density was found at the northern aspect. Ant diversity patterns and assemblage structure were largely determined by regional environmental factors (32-56 %) followed by spatially structured environmental factors (5-46 %) with local processes explaining very little variation (1-4 %). Temperature, mean monthly and absolute minimum, in conjunction with percentage sand in the soil, presence of stone in the soil and pH, consistently explained significant amounts of species density, abundance and assemblage structure in particular. Only two of the vegetation types, viz. ANB and LS, and also the northern aspect had significant IndVal values larger than 70. The lower elevational indicator species of northern slope will move up hill at a rate proportional to their thermal tolerance following the regional increase in temperature due to steeper adiabatic lapse of this aspect. The findings of this study provide baseline data for long-term monitoring of the impacts of climate change on ant diversity of this mountain.