Upscaling the ecology of Andean Grasslands

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Abstract

This is a study on the effect of environmental change on the ecosystem functioning and ecosystem stability of Tropical Andes grasslands, which hold one of the highest variety of fauna and flora species and its natural and semi-natural ecosystems deliver key ecosystem services to more than 50 million people living in the Andean mountain chain. Latest climate models predict a reduction up to -30% in the precipitation in the Central Andes for the coming decades with an increase in the occurrence of extreme events. These events are main drivers of ecosystem functioning, having also an effect in the management strategies, which are implemented to safeguard the economy while adapting to changes in the environment. Studies in the Andes showed that above and below-ground grasslands' productivity is dominated by a marked seasonal shift in carbon allocation. However, to date, the impact of environmental change on the Andean grassland's stability has not been evaluated. The aim of this study is to evaluate the changes in the ecosystem's functioning and land use management of grassland ecosystems at the Central Andes in Bolivia. I will conduct a local assessment of the vegetation dynamics and soil conditions along a gradient of grazing intensity. The results will be upscale to the landscape scale, to evaluate the stability of the ecosystems' productivity and to provide guidelines for future land use management in face of current changes in the climate. I hypothesise that grasslands at different grazing pressures will show changes in the ecosystem functioning. Next to that I hypothesise that higher biodiversity and functional biodiversity are important factors for stabilizing the studied ecosystems at a spatial landscape scale, which is relevant for future management of grasslands in the region and for the application of new policies that will improved the sustainable management of the Andean Grasslands.

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