

Impacts of climate change on the distribution of species and communities in the Chilean Mediterranean ecosystem

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Abstract

The Mediterranean region of Chile is considered a biodiversity hot spot. An increase in temperature and decrease in precipitation, as projected for the end of this century by global circulation models, would likely change the distribution of the sclerophyllous thorny shrubland and woodland. In order to assess those potential impacts, the MAXENT algorithm was used to project potential changes in the distribution of the Mediterranean ecosystem. Ecological niche models were fitted and used to project the potential distribution of these forest ecosystems by the end of the century. Projections were made using data from the PRECIS model for the A2 and B2 climate change scenarios and two strategies of occupancy: free migration and non-migration. Distribution models of sclerophyllous, woodland and shrubland performed accurately representing current species' distribution. When we assume non-migration responses under climate change scenarios, results reveal a decrease in the distribution area for all the species. The areas where the highest reduction in a suitable environment was found are located along the coastline, where higher temperature increases have been projected. For native ecosystems from the Andean Range region, such as communities dominated by thorny species, a stable habitat was found, associated with a higher adaptation capability to future climatic projections. Hence, in the future, buffer zones originated by "topo-climatic" conditions might play a key role in protecting Central Chile biodiversity..

Keywords

Bioclimatic models, Ecological niche, Climate change, Mediterranean ecosystems, MAXENT.