

The geography of megafauna defaunation in the Caucasus

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Abstract

Global environmental change in the form of anthropogenically driven biodiversity loss is a characteristic of the Anthropocene. Large mammals are especially impacted because they occupy large territories, often compete with livestock, or are unsustainably hunted. As a result, many species disappeared from their historical ranges and with them their provision of ecosystem services and biological diversity. This thesis aims to answer how megafauna distribution and, therefore, the taxonomic and functional diversity of megafauna communities changed from prehistorical to modern times in the Caucasus. I analyzed the dataset using 31 mammal communities in the Caucasus. To compare the ranges over time, I used existing literature to map two historical and one present range for each species. Based on this data, the results of the taxonomic diversity analysis shows that species richness has decreased in the whole ecoregion. To derive the change in the mammalian community over time, I applied the defaunation index, showing that the defaunation over time is 0.25 for the Caucasus. Assigning body mass as species importance, this value is even higher with 0.60. This indicates that mammals with higher body mass suffered more from defaunation since historical times. The compiled defaunation maps show that its northern sectors suffered most from defaunation – the parts of the Caucasus belonging to the Russian Federation. The results of the functional diversity analysis show a strong decline of about 15 % in functional richness between the historical and mid-twentieth century. For the time between mid-twentieth century and the present a small increase in functional richness can be observed. The maps show that the highest values for functional richness can be found in the south of the study region, whereas lower values occur mainly in the Northern Caucasus. These results may contribute to future conservation planning and restoration projects like reintroducing and creating new populations and help better understand how certain species will correspond to environmental changes.

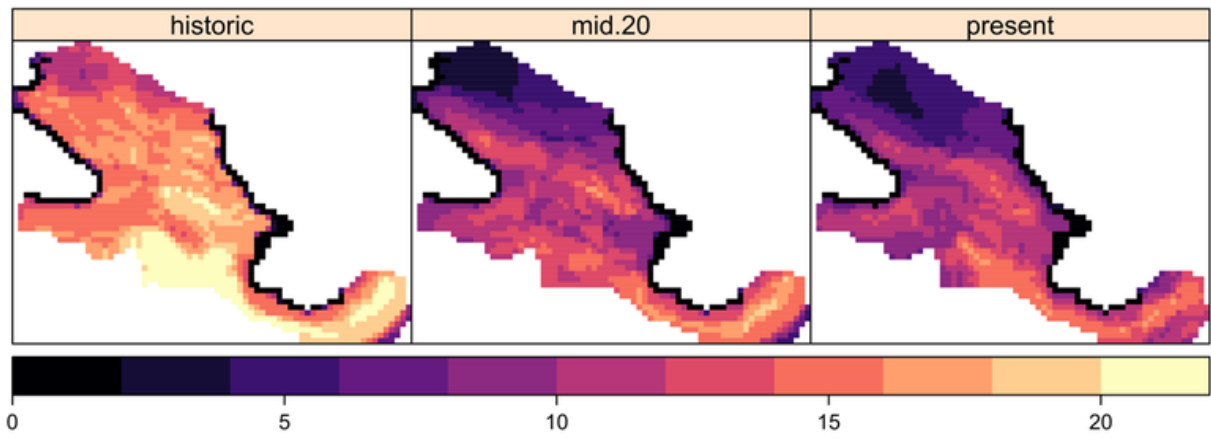


Figure 1: Species richness maps for the historic, mid-twentieth century, and present distribution in the Caucasus (number of species per pixel)