# Environmental and anthropogenic factors co-shape community-level plant species richness across the Western Siberian Arctic

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## Abstract

Aim The Arctic ecosystems are exposed to amplified climate warming and in some regions to rapidly developing economic activity. This study aims to identify, model and map the patterns of community-level plant species richness in the Western Siberian Arctic and the environmental and anthropogenic factors driving those patterns. With our results and methods, we aim at contributing towards conservation efforts for arctic species richness. Location Western Siberian Arctic, Russia. Methods We investigated the relative impact of environmental and anthropogenic factors on community-level plant species richness of the Western Siberian Arctic, using macroecological models trained with an extensive, newly assembled geobotanical dataset. We included vascular plants, mosses and lichens in our analysis, as non-vascular plants substantially contribute to species richness and ecosystem functions in the Arctic. Results We found that the mean community-level plant species richness in this vast Arctic region does not decrease with increasing latitude. Instead, we identified an increase in species richness from South-West to North-East, which can be explained by climatic, topographical and anthropogenic factors. We found that the lowest species richness is associated with a medium ([?] 35 km) distance to infrastructure while neighboring (<10 km) and remote ([?] 100 km) areas have relatively high species richness. We also show that the existing protected areas cover only a small part of the areas with the highest species richness. Conclusions Our results reveal complex spatial patterns of community-level species richness distribution in the Western Siberian Arctic. We suggest that the impact of economic activities on species richness is ambiguous and not limited to areas directly affected by infrastructure. We show that economic activities along with other factors contribute to heterogeneous distribution of species richness on a broad scale. Our approach and results can be used to develop nature protection strategies for other arctic regions facing similar challenges.

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