



Climate change impact on the vegetation habitats in Russia

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The inhomogeneity of climate changes can cause essential modifications in structure, species composition, and seasonal dynamics of terrestrial ecosystems. An increased global surface temperature, changed precipitation amounts, an increased duration of the frost-free period may lead to degradation and fragmentation of the habitats of many plant species and to the occurrence of new existence conditions for individual plant communities. We analyzed the regional changes in the vegetation habitats in Russia under anthropogenic warming corresponding to a 1°C increase in the annual mean global surface temperature. We used outputs of the atmosphere-ocean general circulation model HadCM3 (Met Office Hadley Centre, United Kingdom) and the intermediate-complexity climate model developed at the Institute of Atmospheric Physics, Russian Academy of Sciences. Principal distinctions between the habitats of different phytocenoses can be analyzed and their adaptation to particular climatic conditions can be compared using their phytoclimatic habitats.

The phytoclimatic habitats of plant communities allow us to determine the limits of climatic factors permissible for individual phytocenoses or vegetation types. Due to the overlapping of phytoclimatic habitats for different phytocenoses, the "phytocenotic habitat-climatic factor" relationship is not one-to-one. To estimate response of the phytocenoses habitats to possible climate changes, we used magnitudes of changes in net primary production for phytocenoses under these climate scenarios. Our results point to the mosaic structures of possible phytocenoses changes in its recent habitats. The results obtained are used to determine the zonal phytocenoses that are most sensitive to climate changes. Our model estimates show the spatial tendencies and measure for possible structural changes of the recent phytocenoses over the territory of Russia

for global climate warming in the first half of the 21st century.

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