



Influence of Climate-induced Vegetation Shifts on Future Land Use and Associated Land Carbon Fluxes in Northern Eurasia

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Land ecosystems in northern Eurasia will be under a variety of pressures in the 21st century that will affect both their structure and function. Climate change and land-use change are likely to be the major pressures. Climate change will lead to changes in disturbance regimes such as fire and changes in the distribution of plant and animal species. Land-use changes, driven by population growth, resource consumption and a broad set of economic considerations, will interact with climate-driven changes to reshape the earth's landscape. Here we present results of an integrated assessment analysis for the region that examines the consequences of concurrent pressures on land ecosystems associated with climate and land-use changes. Preliminary results indicate that climate-induced vegetation shifts allow more areas in northern Eurasia to be used for food crop production (an additional 23%) and pastures (an additional 38%), but limits the additional area to be used as managed forests (38% less) by the end of the 21st century than is projected when vegetation shifts are not considered and no climate policy is implemented. In contrast, under a climate policy, climate-induced vegetation shifts had little influence on food production, but allow more area to be used for cellulosic biofuel production (an additional 23%), and less additional area to be used for pasture (50% less) and managed forests (28% less) over this same time period. Fire associated with climate-induced vegetation shifts causes the region to become a carbon source over the 21st century whereas the region is projected to be a carbon sink if no vegetation shifts are assumed to occur. Thus, consideration of vegetation shifts should be included in future assessments of environmental change on terrestrial carbon budgets in this region.