GC41C-0828: Impacts of climate change on biomass and species composition across Russia using a forest gap model

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The Northern Hemisphere's boreal forests and, in particular, the Siberian boreal forest zone, may have a particularly strong effect on the Earth's climate through mechanisms involving changes in the regional surface albedo. Warmer climate has been implicated in the conversion of Russia's Siberian larch forests to evergreen conifer forests implying a potential positive feedback cycle: a warmer climate can accelerate the natural succession from larch to evergreen conifer forest; the resultant albedo change then can promote additional climate warming. Land cover changes in this region can lead to alterations in regional climate through modifications in surface albedo and land/atmosphere energy fluxes, as well as in global climate through changes in C sequestration and release patterns. Utilization of the individual based forest gap model, FAREAST, with historical climate data allowed us to generate baseline biomass and species dynamics across this diverse region. FAREAST has been updated to accommodate daily climate as generated by global climate models to explore detailed impacts of future climate on composition. Biomass and species dynamics resulting from IPCC climate output data for multiple climate change scenarios in comparison to baseline forest structure are used to evaluate detailed changes in forest composition and biomass across Russia for stands of various ages. These results are used to identify the location, age and species composition of forests which are vulnerable to climate change. Assessing the forest vulnerability in congruence with the age and species distribution is a powerful tool in understanding forest response to climate change in addition to the forests role in climate/cover feedback associated with land/atmosphere energy fluxes.