Simulating topographic controls on the abundance of larch forest in eastern Siberia, and its consequences under changing climate

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In eastern Siberia, larches (*Larix* spp.) often exist in pure stands, constructing the world's largest coniferous forest, of which changes can significantly affect the earth's albedo and the global carbon balance. Our previous studies tried to reconstruct this vegetation, aiming to forecast its structures and functions under changing climate.

In previous studies of simulating vegetation at large geographical scales, the examining area is divided into coarse grid cells such as 0.5 ×0.5 degree resolution, and topographical heterogeneities within each grid cell are just ignored. However, in Siberian larch area, which is located on the environmental edge of existence of forest ecosystem, abundance of larch trees largely depends on topographic condition at the scale of tens to hundreds meters. In our preliminary analysis, we found a quantitative pattern that topographic properties controls the abundance of larch forest via both drought and flooding stresses in eastern Siberia.

We, therefore, refined the hydrological sub-model of our dynamic vegetation model SEIB-DGVM, and validated whether the modified model can reconstruct the pattern, examined its impact on the estimation of biomass and vegetation productivity under the current and forecasted future climatic conditions.

