Jul 13th, 2:50 PM - 3:10 PM

A simulation platform to assess forest landscape resilience

Werner Rammer
Institute of Silviculture, Department of Forest- and Soil Sciences, University of Natural Resources and Life Sciences (BOKU), werner.rammer@boku.ac.at

Rupert Seidl
Institute of Silviculture, Department of Forest- and Soil Sciences , University of Natural Resources and Life Sciences (BOKU), rupert.seidl@boku.ac.at

International Environmental Modelling and Software Society (iEMSs)
8th International Congress on Environmental Modelling and Software
Toulouse, France, Sabine Sauvage, José-Miguel Sánchez-Pérez, Andrea Rizzoli (Eds.)
http://www.iemss.org/society/index.php/iemss-2016-proceedings

A simulation platform to assess forest landscape resilience

Werner Rammer[1], Rupert Seidl[2]
[1] *werner.rammer@boku.ac.at , Institute of Silviculture, Department of Forest- and Soil Sciences, University of Natural Resources and Life Sciences (BOKU), Vienna*
[2] *rupert.seidl@boku.ac.at , Institute of Silviculture, Department of Forest- and Soil Sciences , University of Natural Resources and Life Sciences (BOKU), Vienna*

Abstract: Forest ecosystems suffer increasingly from pressures such as anthropogenic climatic change, while at the same time being subject to an increasing societal demand for ecosystem services. In addition to direct climate effects on tree growth and regeneration recent research suggests that climate-induced changes in disturbance regimes will likely increase the volatility of future forest trajectories. Addressing these challenges requires a coupled human and natural systems perspective, as most of Europe's forests are heavily influenced by management, and forests are a crucial component in the emerging bioeconomy. Methodologically, assessments of the long-term socio-ecological resilience of forest ecosystems require approaches that combine social and ecological processes. Here we present iLand, the individual based landscape and disturbance model, offering a versatile and powerful platform for such analyses. iLand is a process-based landscape model that simulates growth, regeneration and mortality of individual trees. It has a modular structure and contains sub-modules for abiotic (forest fire, wind) and biotic (bark beetles) disturbance agents. Furthermore, it is coupled with an agent-based model of forest management, simulating realistic management activities of single or multiple managing agents, which dynamically adapt their management strategies to changing conditions. Applying the model to a 6,500 ha landscape in Austria we here investigate the potential of different management strategies and responses – deduced from a stakeholder process with local managers – to improve forest resilience to changing climate and disturbance regimes. We demonstrate how scenario analysis by means of dynamic simulation modeling can help to identify pathways of future resilience in forest ecosystem management.

Keywords*:* forest ecology; ecosystem modelling; climate change; resilience