

Title of the symposium:

Using landscape simulation models to help balance conflicting goals in a changing forest: from timber production to carbon sequestration and biodiversity conservation

Detail of organizer(s):

Responsible

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Symposium abstract

Ongoing intensive forestry practises have significantly altered forest ecosystems, and continues to do so, which is amongst others illustrated by increasing landscape fragmentation and homogenization of forest stands, and by reduced species diversity. In addition to intensive forestry, climate change is able to alter forest dynamics and affect forest biodiversity as well as growth yield and disturbance cycles in forest ecosystems. Different climatic conditions will not only affect the distribution of tree species, it will likely also have an impact on disturbances such as the frequency and severity of forest fires, wind-throw and pest infestations, which will have strong economic and ecological implications. Consequently, there is a strong preoccupation to adapt forest management practices to mitigate negative effects of climate change, through for instance increasing uptake of carbon by vegetation and through attempts to minimize tree damages and losses by natural disturbances such as wind throw and pest outbreaks. However, such adaptations may have uncertain effects on other ecosystems services provided by forest ecosystems like timber production, carbon sequestration, and wildlife conservation. Thus, a good understanding of how forestry practices and climate change may affect forest dynamics is required if we want to safeguard ecosystem services forests provide and biodiversity they host. It is therefore essential to develop new decision support tools that are able to predict future scenarios in forest ecosystems.

Landscape simulation models can be used to assess the effects of future climate change, alterations in disturbances and management practices, and establishment of new species of flora and fauna on forest ecosystems. They can give valuable information on e.g. possibilities for increased carbon sequestration, and which restoration practices need to be used after forests sustained damage. There is a multitude of such models. Although they are

primarily used in forestry management, they may be highly valuable for other purposes as well, e.g. to increase the resilience of forest ecosystems and to aid biodiversity conservation planning.

In the proposed symposium, we outline the current work on using landscape simulation models to assess the effects of forestry practices and natural disturbances on ecosystem services provided by temperate and boreal forest ecosystems. The goal is to establish a platform for further advancement of how to balance the conflicting goals in forest landscapes that are facing climate change. We will cover various topics, targeting a multitude of ecosystem services, silvicultural practices and forest ecosystems, and discuss the challenges and benefits of current methodological approaches, research directions, practical sector implementation, and needs for future research.

How your symposia will improve landscape ecology science?

We believe that this symposium is of broad interest to landscape ecology given its focus on the implications of climate change for biodiversity conservation and forest management in one of the world's most important biomes: the forest. The universities of two of the organizers, Wageningen University and the Swedish University of Agricultural Sciences, have a long trajectory in this field, being the institutions with most publication papers in forest sciences (Scopus sources). Our intention is to provide an excellent coverage of forest landscape topics, especially relating to temperate and boreal forest ecosystems and increase the collaboration within landscape modelling between European and North American countries. We think that the IALE congress is an ideal forum to share, discuss and improve the research collaboration with landscape ecologists and the scientific community focussing their work on forest ecosystems.

Forest ecosystems provide natural resources and ecosystem services essential for humanity. The boreal forest is the second biggest biome in the planet supplying 60% of wood consumption in the planet. However, the effect of climate change will be strong in this ecosystem. Landscape modelling is considered as a powerful tool that is able to provide guidance in dealing with future challenges forest ecosystems are facing. This symposium will be a major contribution from a scientific point of view; in addition to an analysis of the current status, it will provide an improved understanding of the challenges forest landscapes face in future and how landscape simulation models may be used as helpful tools.

This symposium will be divided in three sections: forest management, biodiversity and impacts of climate change on forest landscapes. This structure allows for diverse research topics to be able to address a wide audience. Several invited speakers (see below) have already accepted our invitation to attend our symposium should it be approved. We further intend to advertise the symposium through our institutional web-sites and through social media, including Facebook and Twitter to gain as large a public for our symposium (and the whole conference) as possible. We will continue to find appropriate speakers for the

symposium after the decision of approval/rejection of the symposium to improve the quality, impact and scope of this symposium.

Broad thematic areas

Broad thematic areas 1st choice: Landscape modelling

Broad thematic areas 2st choice: Future: scenarios and new landscapes

Free Keywords

Climate Change, Ecosystem services, Forest ecology, Natural disturbances, Silviculture.

Outcomes of symposium

Special issue in a scientific journal (to be negotiated)

Notes

We intend to negotiate a special issue in *Frontiers in Plant Sciences*, discuss plans for future networking and scientific collaboration, as well as write a communication paper with all the speakers involved in this symposium.