Title of the symposium:

Forest disturbances as drivers of tree species range shifts under global change

Detail of organizer(s):

Responsible

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Co-organizer

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Symposium abstract

In order to survive in the changing climate, tree species need to either adapt to the new conditions or shift their distribution range. At the same time, the effects of abiotic (e.g. fire, wind, drought) and biotic (e.g. insects, pathogens) disturbance agents are increasing throughout many parts of the globe. Disturbance regimes influence forest dynamics and distributions in complex ways – the process of mortality and regeneration is likely to interact with those of migration or persistence processes. Together the new climate conditions and disturbances will result in latitudinal, longitudinal and elevational shifts in tree species distributions, strongly shaping the distribution and composition of future forested landscapes.

Traditionally, the literature has focused on species range shifts driven most directly by climate. However, that is no longer the case as recognition of the importance of disturbance regimes in influencing species distributions grows. Disturbances can provide the opportunity for range shifts (contraction or expansion) by opening up new resources or removing seed sources. For example, broad scale, stand replacing disturbances such as wildfires can trigger range expansion opportunities for pioneering species whereas massive insect outbreaks can cause substantial range contraction. Compounding effects from disturbance interactions may lead to regeneration failures and even result in long-term changes to substrate conditions. In addition to the natural disturbances, global trade has increased the number of non-native biotic disturbance agents causing a novel threat for the health of forests. Agents such as emerald ash borer, sudden oak death or ash dieback may have unpredicted effects on tree species distribution and range shifts. The shifting and potentially intensifying role of disturbances in determining tree species range shift rates and directions is therefore a significant and important question for modern ecologists.

The proposed symposium will bring together experts from different continents working with the interaction of natural disturbances and tree species range shifts. The goal of the symposium is to discuss the current state-of-the art on the topic as well as to identify future research needs. The survival of tree species is crucial for how we will see the future forested landscapes and thus follows the Congress theme “Nature and society facing the Anthropocene: challenges and perspectives for landscape ecology”.

How your symposia will improve landscape ecology science?

1. Our symposium will improve landscape ecology science by discussing the topic of studying species range shifts by including the effect of disturbances.

Natural disturbances play a significant role in shaping the dynamics of forested landscapes and their effects are increasing under global change. In landscape ecology, species range shifts have been traditionally studied with field inventories and climate niche models. However, increasing natural disturbances are another climate sensitive variable to this equation and a potential catalyst for change. Current projections for climate change suggest increases in natural disturbance frequencies in many areas, such as in vulnerable areas with only few tree species like boreal coniferous forests. Novel regimes are also emerging as the number of non-native biotic disturbance agents increases with global trade. In this context, it is important to understand how and when disturbances catalyze range expansion, shifts, or contraction in forested systems.

2. Our symposium will improve landscape ecology science by synthesising the above-mentioned problems in a review and analysing the global patterns of the interaction between natural disturbances and tree species range shifts.

The symposium will gather together researchers working with natural disturbances and tree species range shifts to discuss various examples on the topic from different parts of the world. We will look for generalities across systems and areas of research needs, especially as they relate to future disturbance regimes and interactions between disturbances and/or non-native species. Our aim is to write a synthesis paper on the topic with the symposium contributors to i) identify common patterns on interactions between natural disturbances and tree species range shifts and ii) detect future research needs and caveats.

Broad thematic areas

Broad thematic areas 1st choice: Disturbances in landscapes
Broad thematic areas 2st choice: Vegetation science and landscape ecology

Free Keywords

disturbances, range shifts, species distribution changes, climate change

Notes

If the symposium is accepted, we will pursue for a synthesis article on the topic together with interested symposium contributors.