

This doctoral thesis examines the ecological role of fire in forests of the Czech Republic and attempts to make generalizations to the broader forest region of Central Europe. The thesis examines this general topic at several spatial and temporal scales and employs several different methodological approaches. The first chapter uses a contemporary record of spatially and temporally explicit forest fire data to quantify the anthropogenic versus environmental drivers of forest fire occurrence. The second chapter narrows its focus to a unique part of the Czech Republic that supports *Pinus sylvestris* dominated forests that may be partially maintained by fire. Similar to the first chapter, this section quantifies the driving influence of various environmental and anthropogenic variables on the fire regime, but also includes an impressive fire history record based on soil charcoal data that extends back several thousand years. The final chapter follows with a study on the role of fire on forest development in *Pinus sylvestris* dominated forests using a chronosequence approach based on known fire events during the past 200 years.

To very briefly summarize, one of the main overall findings of the thesis is that repeated fires have certainly occurred in some forest ecosystems in Central Europe throughout the past few thousand years. Regardless of how these fires were ignited (human versus lightning), they have likely prevented the successional replacement of some *Pinus* forests by more shade tolerant tree species. However, teasing apart the contribution of humans to the fire regime, as well as site (particularly soils and topography) factors, in terms of how they influence these pine systems remains unclear. There are likely multiple feedbacks among human activities, local fire regimes, site factors, and vegetation. Nevertheless, the findings are significant in the context of traditional views of forest dynamics in Central Europe, mainly because disturbance (especially wildfire) has traditionally been underemphasized in successional models of forest dynamics; traditional models assume compositional and structural stability over space and time, while this thesis suggests that fire (and variability in fire regime components) maintains certain vegetation types in a region where fire has thought to only be an anthropogenic process in areas with intense land use. This is a well-done doctoral thesis: several methodological approaches were used, the datasets are quite large, the analyses and interpretation are sound, and the thesis is well written. I believe the results will make an important contribution to the growing literature on the fire ecology of forest systems in the temperate region of Europe.


Questions:

1. The thesis devotes substantial text to discussing the fire regimes and drivers of these regimes in various fire prone forest regions worldwide (e.g. conifer forests of N. America, boreal forests, Mediterranean forests, etc). How would you summarize the fire regime (e.g. point return interval, severity, size) for the *Pinus sylvestris* dominated forest region you worked in (I don't think this was ever done in the thesis)? And, how and why is the regime unique compared to other pine dominated forest systems in the temperate zone?
2. Fire scar dendrochronology is a widely used approach to reconstruct fire regimes in many forest types, particularly in pine dominated forests. This approach could not be used in this thesis, presumably due to the lack of old

trees. However, I assume there were quite a few reasonably old trees in your stands, especially in some of the inaccessible areas. What are some other reasons that may explain the lack of fire scarred trees with regard to how fire scars are formed?

3. The last chapter of the thesis relied heavily on a chronosequence approach based on a space for time substitution. However, there is one very important assumption in this approach that was never discussed in the thesis, yet it represents an important caveat. What is this assumption and how might it have influenced your results?
4. My impression after reading the entire thesis is that overriding driver of pine forest occurrence was never resolved. In other words, are these stands a result of fire or site conditions? Clearly, they are correlated, as is clearly described in the thesis, but I think the relative contribution of these two drivers remains an important question for generalizing the results to the broader region of Central Europe. Can you elaborate on this with regard to your thesis? For example, if you removed fire from the *Pinus sylvestris* system you worked in, would they really be replaced by beech and fir? Similarly, can the fire regime you described really prevent successional replacement of *Pinus* on more productive sites with deeper soils?
5. Following from the last question, do you think your results can be generalized to the broader region of temperate forests in Central Europe? For example, if you hypothetically take humans out of the picture, and keep the forest composition, climate, and meteorology in mind, do you think wildfire would have played an important role in the dynamics of forests throughout the region during the Holocene?

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