

Carbon Dynamics Following Fire and Harvest in North American Boreal and North Temperate Forests

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Outline: We are currently planning a synthesis of post-disturbance carbon dynamics among North American boreal and north-temperate forest flux-tower sites, including Fluxnet-Canada sites as well as other post-harvest and post-fire sites. Brian will take the lead on the post-fire synthesis while Andy and Alan will take the lead on the post-harvest synthesis and the fire-harvest comparison. Two post-doctoral fellows (Tianshan Zha and Manasah Mkhabela) will contribute to the analysis. The scientific questions will include:

- What are the temporal trajectories of NEP, GPP and TER following fire for boreal coniferous forests? What factors control these trajectories, including the stand age at which the stand reaches C neutrality, the stand age at maximum NEP, and the rate of NEP decline as the stand further matures?
- What about following harvesting?
- How do the carbon dynamics differ following fire and harvesting?
- How do boreal and north-temperate coniferous stands compare?
- How does the successional trajectory, and broad-leaved vs. needle-leaved succession (harvesting and fire), affect the carbon dynamics?

To date, our plans are focused on North American sites, under the umbrella of Fluxnet Canada. In particular, we are aware of only three boreal fire chronosequences (Alaska, Manitoba, Saskatchewan) and at least one temperate forest fire chronosequence (Oregon). However, there are a few more locations where fire has played a role, but perhaps only a single age has been measured. We will determine if these sites can also add valuable information. Harvesting sequences have been measured in British Columbia, Saskatchewan, Quebec, New Brunswick, as well as at a few sites in the United States. As part of the planned FLUXNET TCO synthesis, we will be glad to discuss international collaborations (a) to extend the scope and (b) to share and focus the activities. In particular, we will be searching for collaborators from northern Europe and from Siberia who may have chronosequence data that would be directly comparable to investigate processes. One challenge is that we are only aware of a single group of sites (Saskatchewan) where both fire and harvesting carbon dynamics have been measured in a close geographical area with similar soils and climate. Hence, the fire-harvest comparison may only be done at these sites, where the data have been provided by the lead authors.

Sites: North American boreal and north temperate coniferous post-harvest and post-fire chronosequences. An expansion of the study to include Europe and Siberia will be investigated.

Co-authorship: Offers of co-authorship will be extended to all who make significant contributions to the paper, of data, ideas, and analysis.