



Characterization of carbon fluxes of drained lake basin chronosequence on the Alaskan Arctic Coastal Plain.

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Thaw lakes and drained lakes are a major component of the landscape of the Barrow Peninsula, an area of 1600 km² in the northeast part of Arctic Coastal Plain, Alaska accounting together for about 50–70% of the landscape. Greenhouse gas fluxes from lakes and vegetated drained lake basins have been largely understudied with most research in tundra regions being done in drier and more accessible areas.

To assess with confidence the current and future sink/source activity of the Arctic tundra, it is necessary to characterize these vegetated, drained lakes with respect to gross primary production (GPP), net ecosystem exchange (NEE), and ecosystem respiration (ER) and investigate their responses to environmental parameters. To evaluate these processes we measured CO₂ fluxes and environmental variables in twelve vegetated, drained lakes of three ages classes across the Arctic Coastal Plain (Young age basins drained about 50 years ago, Medium age basins drained between 50-300 years ago, and Old the ones drained between 300-2000 years ago, according to Hinkel et al., 2003).

Comparison of the seasonal CO₂ uptake (or release) in different drained lake ages allowed testing of the validity of the traditional view that old-growth ecosystems are carbon neutral. We showed how even ecosystems thousands of years old (i.e. Old drained lakes) are still accumulating biomass, and are still a sink of carbon.