

Changing Phenology and Productivity in North American Arctic and Boreal Ecosystems

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High latitude regions have been experiencing rapid temperature rises. These changes could increase GPP due to a longer growing season (“greening”), or decrease GPP due to increased frequency of drought and other disturbances (“browning”). The ability to accurately track phenological changes linked with increasing temperature is a key to understanding the controls on carbon fluxes and feedbacks to the climate system. This study investigated the relationships between NEE-derived phenology (start, end, and length of growing season) and annual carbon fluxes (observed NEE, partitioned GPP and RE) for 20 FLUXNET towers with 146 site-year of data in boreal Alaska and Canada. The results showed that for the boreal forest as a whole (combining evergreen, deciduous, and mixed stands), the longer growing season generally related to increased productivity. However, some individual sites showed declining productivity with longer growing seasons. The start of the growing season showed more impact than the end of the season on productivity. Our next steps will be to extend this analysis across the boreal and arctic biomes using the newly available MODIS MAIAC dataset across Alaska and Canada.