

High Chlorophyll Concentrations & Phytoplankton Composition Under Lake Ice

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Background

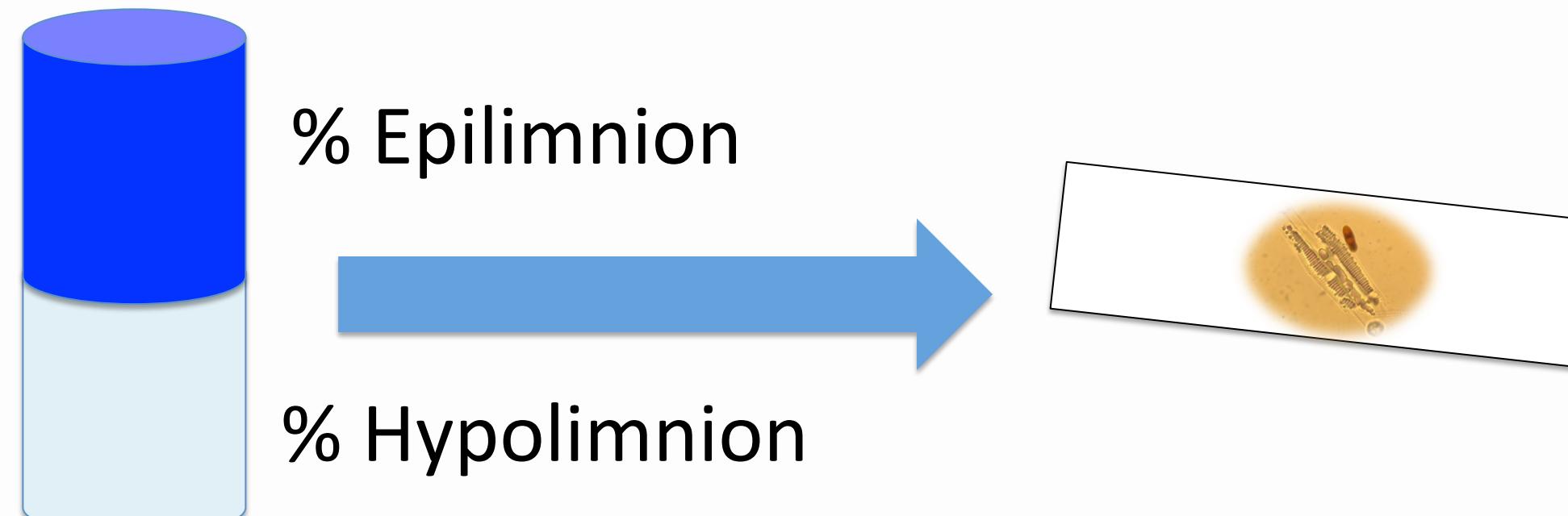
- > Sparkling Lake is a 63 ha, oligotrophic seepage lake in north-temperate Wisconsin.
- > Sparkling Lake has high chlorophyll concentrations under-ice compared to other lakes in the region.
- > Chlorophyll can be an indicator of productivity and lake health. In this study, we investigate how chlorophyll concentrations correlate with phytoplankton composition.



Sparkling Lake, Vilas County, WI

Methods

- > Starting in 1983, phytoplankton samples have been collected four times a year. Chlorophyll samples are collected biweekly to monthly by the NTL-LTER.
- > Previously unexamined slides were analyzed for community composition using microscopy. Indicator phytoplankton genus were identified.



Phytoplankton samples are hypsometrically pooled and preserved in Lugol's solution. Water samples are then sent to PhycoTech Labs to be placed on slides.

Results

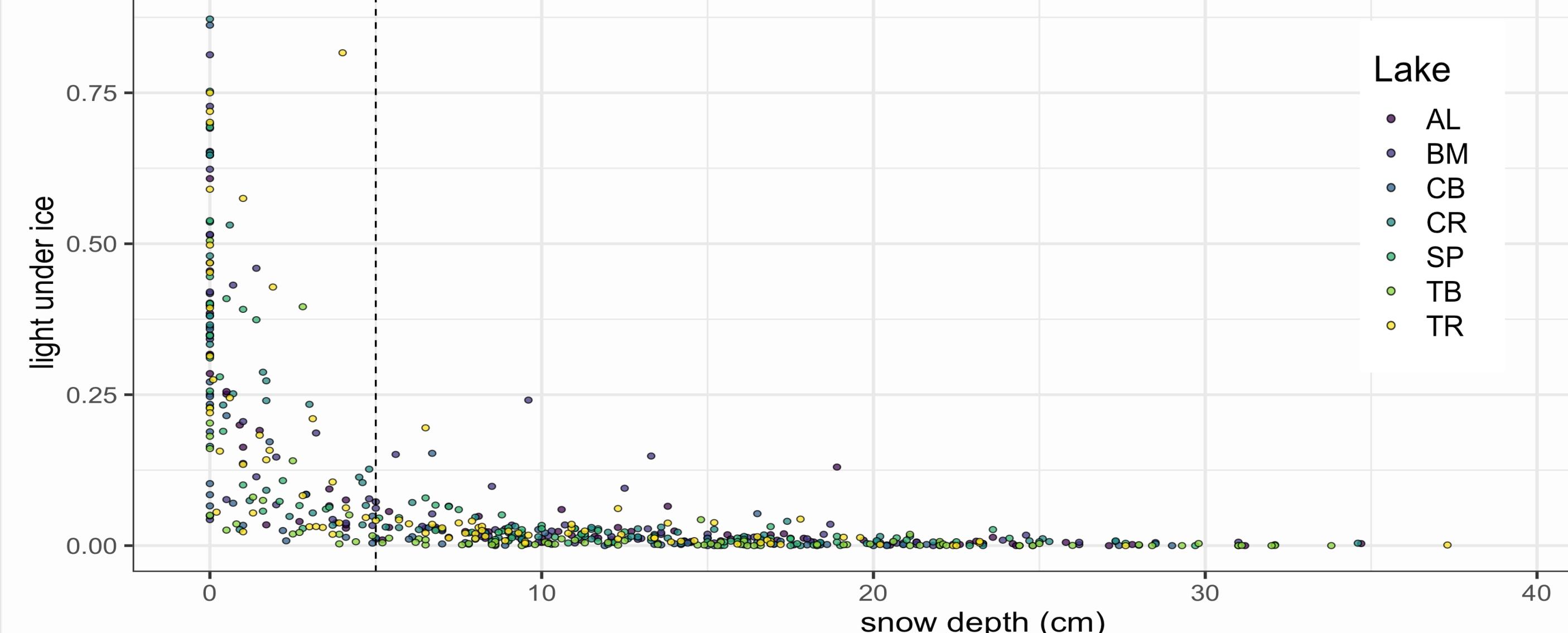


Figure 1: Light extinction relationship with snow depth for North-Temperate Lakes. Dotted line at 5cm of snow where light dramatically starts to decrease.

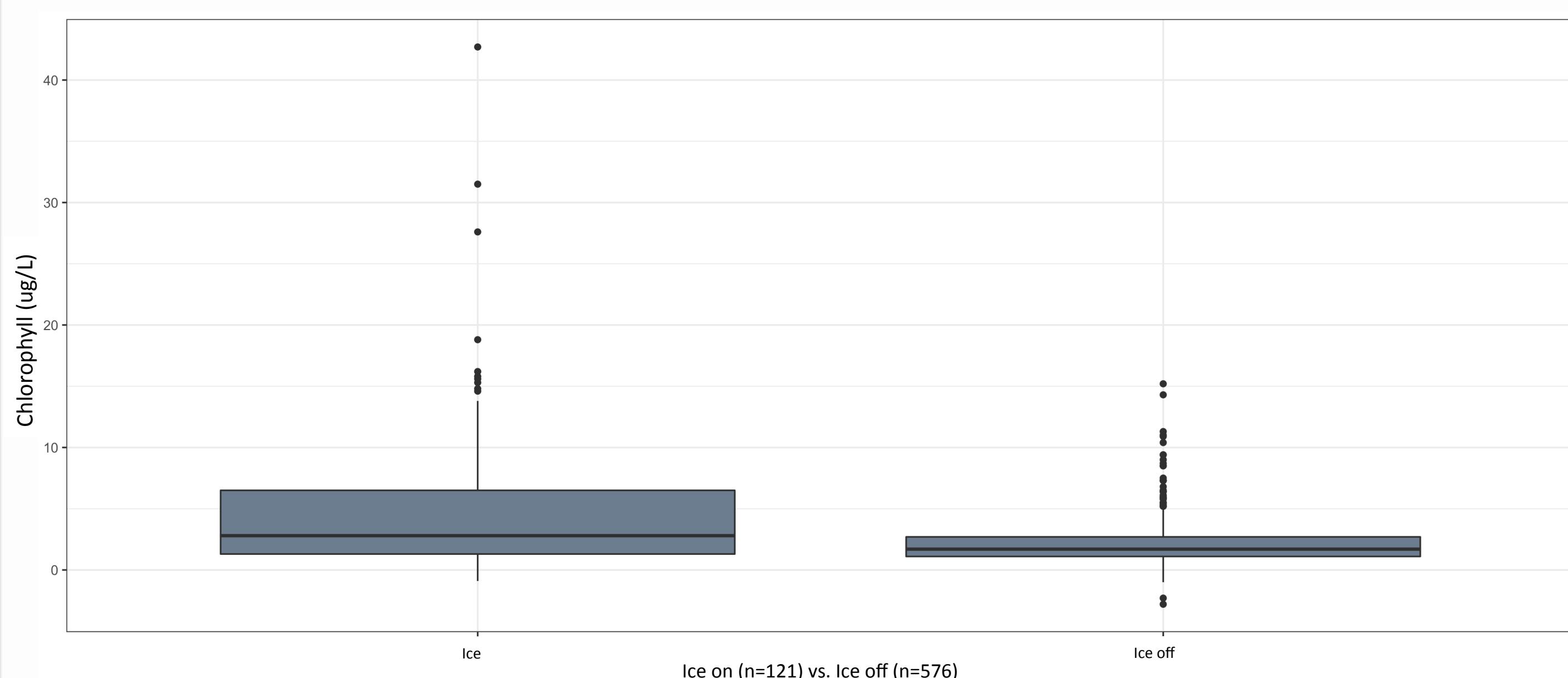


Figure 2: Surface chlorophyll during ice on compared to ice off. Note more data has been collected during ice off than ice on (576 points vs. 121).

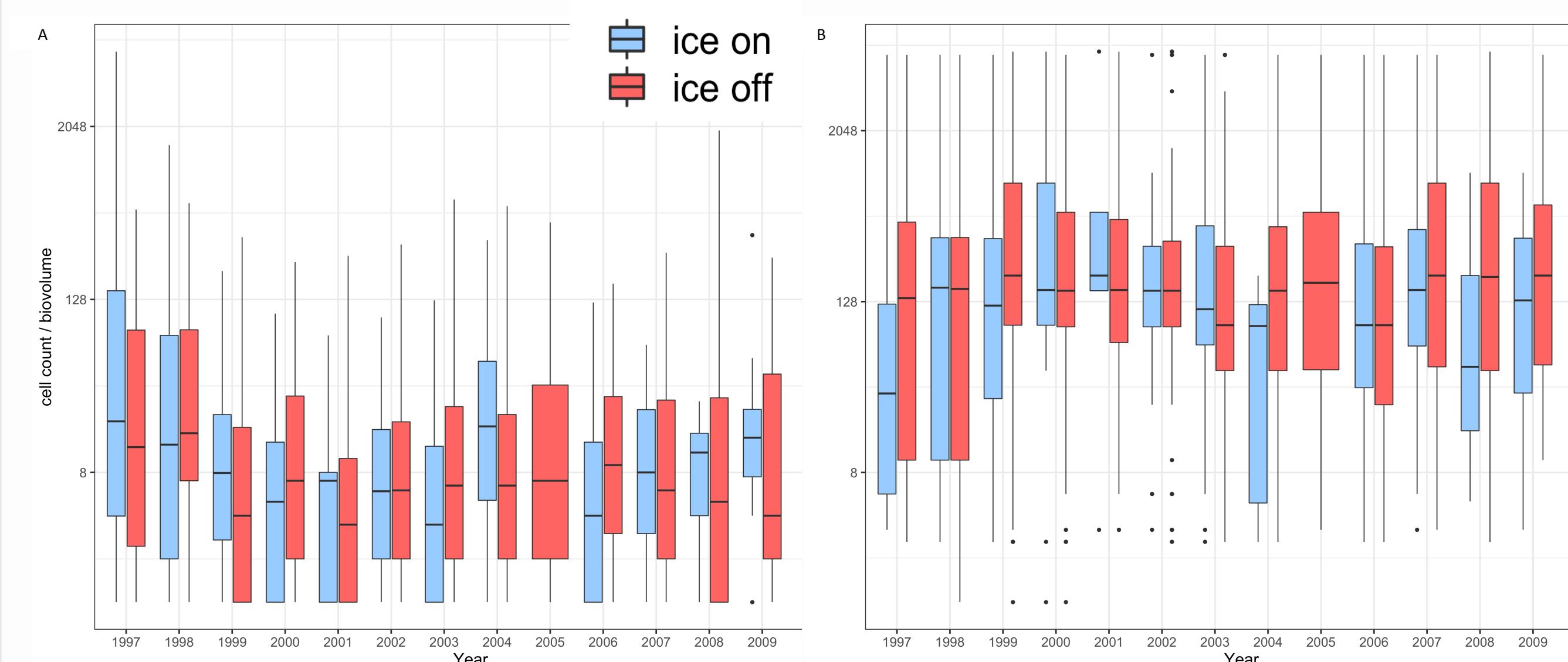
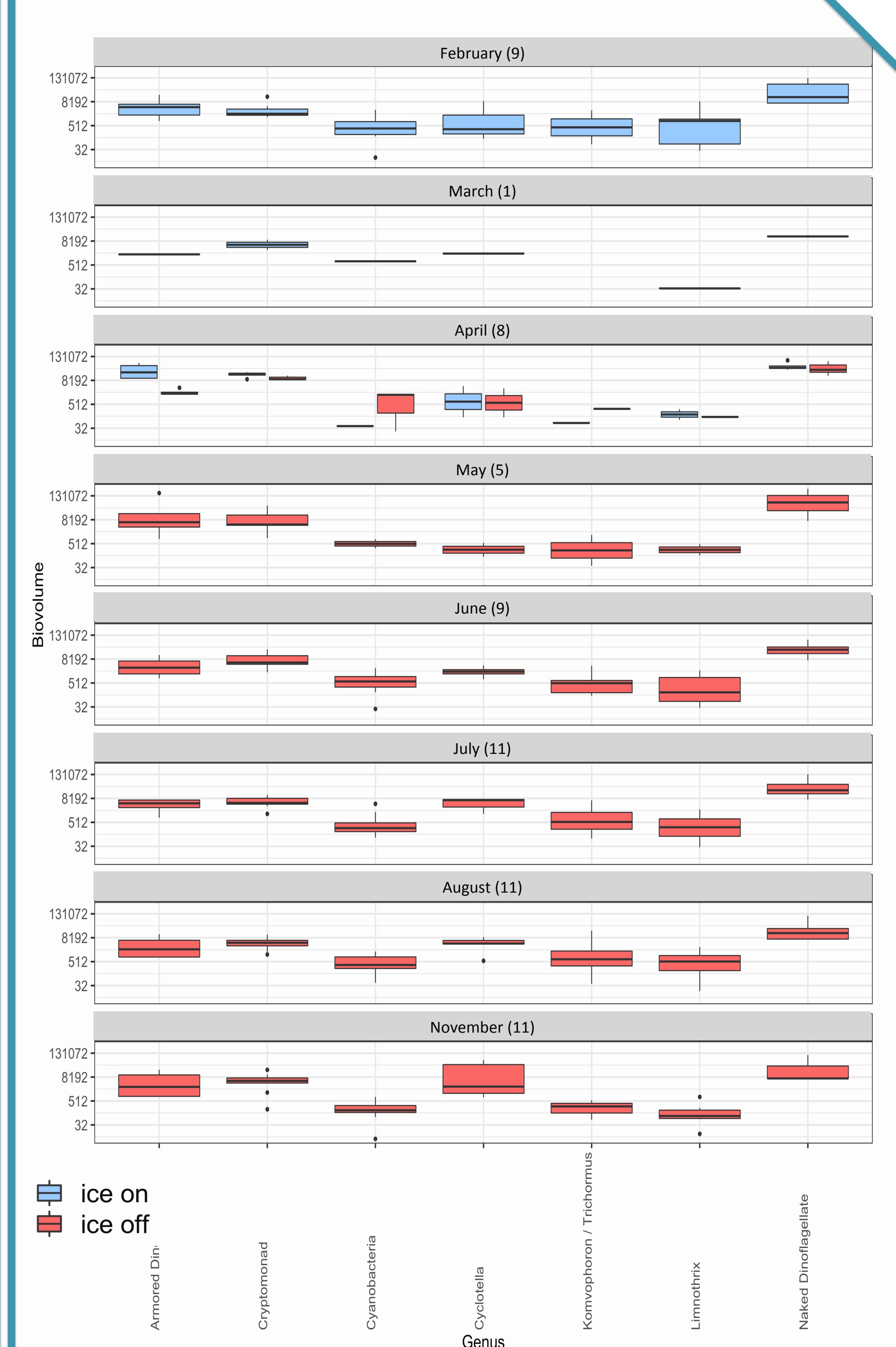


Figure 3: Cell counts of phytoplankton in our time series (A) in comparison to biovolume calculations (B). Cell counts gave rough estimates of what was occurring in both seasons and biovolume keyed into finite changes and showed "missing" genera.



- > *Cryptomonad*: common indicator species
- > *Cyclotella*: grow in sustained periods of darkness
- > *Fragilaria*: indicators of early spring bloom
- > *Planktothrix*: free floating species
- > *Naked /Armored Dinoflagellates*: frequent across time series, looking to parse differences
- > *Limnothrix*: contain enzymes in the cyanobacterial carbon metabolism
- > *Cyanobacteria*: Watching for blooms & busts

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