



Figure S1. Examples of the relationship between pH and temperature in 1982 and 1983.

Since WPLC dataset only contains yearly minimum and maximum pH, we are not able to plot seasonal variations between pH and water temperature at a station. Instead of that, we plot possible relationship between available pH and temperature among the stations in each year as partly shown in Fig. A above. The relationship between pH maximum and T minimum (red points) basically tends to show negative correlation, while the relationship between pH minimum and T maximum (blue points) show no clear correlation. The pH maximum supposed to be observed in the surface water in winter was more affected by temperature than by the other processes including biological ones. In contrast, pH minimum data includes the data measured in both surface and subsurface waters, and could result in more complicated relations.

Note that the published data resolution of ± 0.1 in pH is not much sufficient for well resolving the pH fluctuation ranges of the pH maximum and pH minimum subcategories. However, the differences between pH maximum and pH minimum are resolved by this resolution and ranges of T maximum and T minimum groups are well different from each other. These features are not inconsistent with our assumption.