

Graphing in Excel

- (1) Using Excel, make a scatterplot of ice duration for the entire duration of 150 years. Do you see a trend in the duration of lake ice cover for the whole data set of 150 years?

Looking at the data collected, there seems to be a slight trend of the total duration of ice to decrease over the last 150 years. Figure one shows that there were more years that were ice-covered for over 100 days before 1940 then there were after that, and there were more extreme lows more recently than there were in the early 1900's.

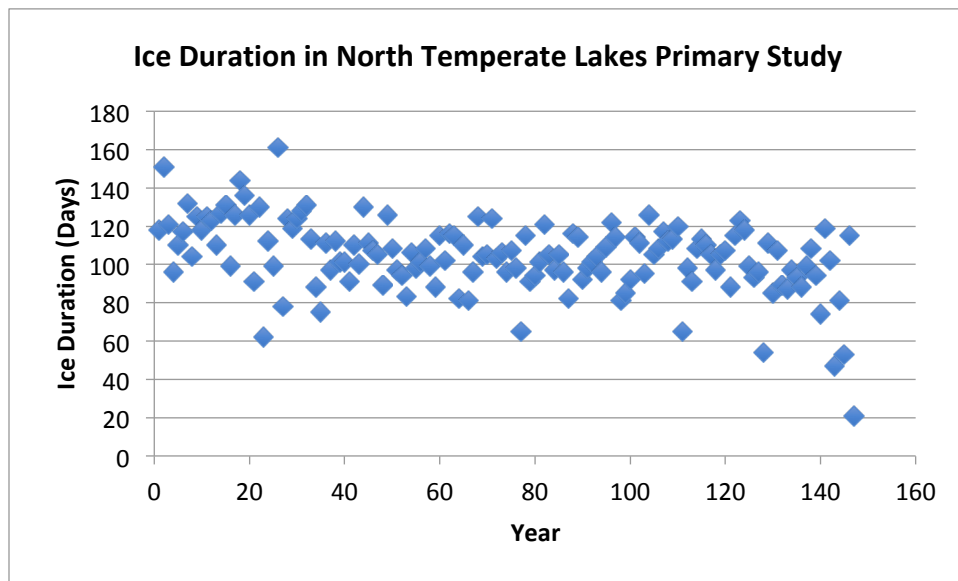


Figure 1. Ice formation on Lake Mendota, a site monitored by Long-Term Ecological Research (LTER), was measured by taking note of the day ice covers the lake, and the day the ice broke up. Sampling was started in 1855, and was checked every year until 2001.

- (2) What is the average duration of lake ice cover during the years 1940-1960 and 1980-2000? What's the standard error of ice duration over these two time periods?

Years	Mean	Standard Error
1940-1960	102.9 days	2.84
1980-2000	90.095 days	4.403

- (3) Make a graph that compares the average duration of ice cover from 1940-1960 to that of 1980-2000, and include error bars that show either standard error or standard deviation. In all graphs, make sure your axes are labelled and you have an informative figure legend.

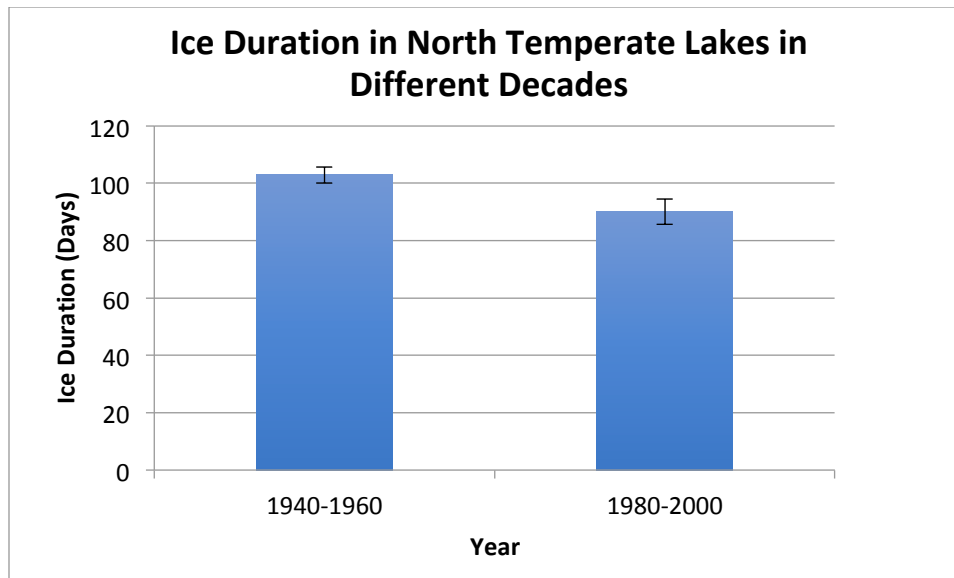


Figure 2. The Average ice duration was compared between two time periods, 1940-1960, and 1980-2000. The standard error is shown in the error bars.

*(4) Does the average ice cover duration vary significantly between these two time periods?
How will you test it.*

The significance of this data as it relates to the hypothesis that the duration of ice cover on the lake can be quantified theoretically by running a t-test. In the two-sided t test performed comparing '40-'60 and '80-'00, the p value is .0164, meaning that there is a 1.6% chance of getting this data if the null hypothesis (that the duration of lake ice is not decreasing) is true.