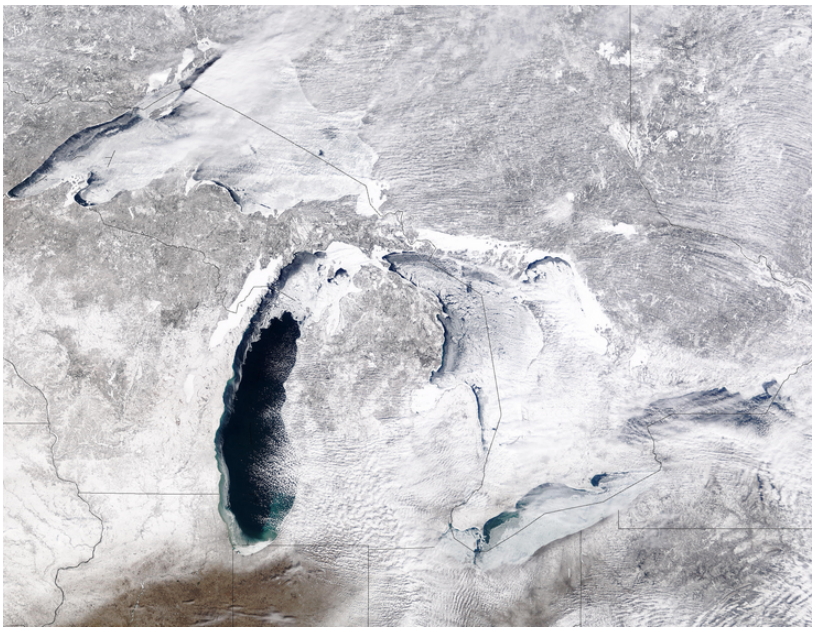
GREAT LAKES ICE COVER - ONTARIO
1973 – 2021



INTRODUCTION / BACKGROUND

One way of looking locally at climate change over time is to examine the percentage of the surface area of the Great Lakes that is frozen. The National Oceanic and Atmospheric Administration (NOAA) announced in early December of 2017 its prediction that ice cover would be less than average for the third year in a row.

The degree of frozen surface is important to us because it is a predictor of increased lake effect snow, which affects our area, although not quite as severely as the Michigan counties that border the lake. Since our weather typically comes from west to east, if prevailing winds travel over water they are more likely to pick up moisture than if they travel over a snow-covered surface. This more humid air then is primed to drop it's moisture as snow once it passes over the water and onto land. And just where is that land? In our case, its western Michigan, but the same scenario applies to cities like Buffalo, Cleveland and Erie, which rank among the snowiest in the nation.

It would be easy to blame climate change for ice cover trends, but it's really not that simple. To a significant degree, our winters are more strongly tied to trends that correspond to El Nino Southern Oscillation (ENSO) which is a shift in the warming pattern of the southern Pacific Ocean. There is much speculation about the effect of climate change on ENSO, but that is still under study and beyond our purposes here.

You and your group will be looking at historical data that details the yearly maximum ice cover for one of the Great Lakes. You will then compare it to the maximum average of all the Great Lakes as well as Lake St. Clair, which connects Lake Huron to Lake Erie.

DIRECTIONS

Open the data files and use Excel or Google Sheets to format and analyze the data. You will want to evaluate the information to see how percentage of ice cover on Lake Ontario has changed over many years and compare it to the ice cover of the entire Great Lakes basin. You should graph the data, generate a trendline (exponential, linear, other) by determining with your data partners which is most appropriate. Be sure to justify your choice. Include the equation for the trendline and its r^2 value. Establish a growth rate (positive or negative) using rolling data approximations. You may choose to add error bars to the data representation if it lends more confidence to your findings.

Be sure to keep track of any "noticings." What do you notice as you examine the data? What is significant to you? Is the trendline predictive of the future? Why or why not? Are you confident that the data represents what is really happening? Are there data that you would like to see?

Prepare a poster that includes an appropriate title for your data analysis, a representation of your data with its trendline, a claim about the trend that you discover, based in evidence and your group should be able to justify the insights from your analysis. You may be asked to share your ideas with the larger KAMSC student group, so do your best!

REFERENCES:

Email communication from Jia Wang, climatologist for Great Lakes Environmental Research Laboratory (GLERL), National Oceanic and Atmospheric Administration, 1/3/18.

http://www.cleveland.com/weather/blog/index.ssf/2017/12/ice_cover_on_great_lakes_forec.html

https://www.forbes.com/sites/marshallshepherd/2017/12/26/record-shattering-lake-effect-snow-in-the-great-lakes-region-how-does-it-form/?sh=6967ee7a1326

https://www.glerl.noaa.gov/data/ice/#historical