**PAESTA Podcast Series  --  You Asked, We Answered!**

**Episode 23  --  What is lake effect snow?**

Steve Slikas, undergraduate student, Penn State Brandywine

Lake effect snow, in some areas, can be the cause to why we get so much snow. These storms mainly take place during the months of November to February. [1] When lake effect snow happens, such as the areas closer to the Great Lakes such as Lake Erie, if the conditions are right, snow will form. For lake effect snow to occur, colder air has to pass over the hot waters of the lake and when this happens, it causes evaporation to occur which brings up the now warmer wetter air which over time gets colder as it travels away from the lakes and becomes moisture. Depending on how cold the moisture gets, it can form into snow and cause a snowstorm at nearby areas such as happened in Buffalo, New York because of the neighboring Lake Erie. These storms can cause damages to power lines and close off streets. [1] Lake effect snow is most common with the Great Lakes here in the United States. At some point lake effect snow does not work because the water is frozen and therefore, lake effect snow cannot happen. Now let’s look at lake effect snow in a little more depth.

Lake effect snow is defined to be one of the most intense types of snowstorms in the world. The only two things that can stop this effect are if the lakes freeze or if they got cold enough to not have a difference with the air temperature. [2] One important factor to understand about this effect is that of the winds. The winds can either have a short fetch or long fetch depending on the lake’s orientation. A short fetch is when the wind is blowing through the width of the lake and a long fetch is the opposite of that being that the wind blows throughout the whole length of the lake. [2] Another important aspect you should know is that there are two snow band events that tie in with the short and long fetches. They are known as multi-band and single-band. Typically, multi-bands go with short fetches and single-bands go with long fetches. Lake Erie and Lake Ontario are associated with the single-band. When multi-band lake effect snow happens, it is due to the fact of horizontal convective rolls, also known by many as “cloud streets.” [2] The warm air that flows up forms cumulus clouds because as the air reaches its tendency to be able to float, it spills to the sides, thus creating the enormous cumulus clouds. At a certain point when, conditions get strong, snowfall will occur. Single-band lake effect is created in a similar fashion as multi-bands but instead of including only part of the lake, single-band form by taking up the whole lake to form the snowstorm beginning at the center of the lake, this storm creates its convection cell. [2] Now, let’s take a look at how the Great Lakes create sub-climates to further explain lake effect snow.

Lake effect snow creates subclimates, which in this case, means that the temperature of the lakes water is different from the temperature of the air during the year. We define the subclimates into two separate seasons and they are called the stable season and the unstable season. [3] When we define the stable season, we mean that the temperature of the lakes water is cooler than the temperature of the air, but when we define the unstable season, we mean that the lakes water is hotter than the airs mean temperature. This shows us that these two seasons are opposites of each other and affect the lake snow effect differently. The unstable season typically begins in August and lasts around till the middle of March. [3] This is when the water is hotter and because the air is colder, lake effect snow can reach the correct conditions to allow a snowstorm to happen. You tend to find that bigger snowstorms happen during the winter especially before it gets cold enough for the lakes to freeze over. When they freeze over, there is a reduced chance of lake effect snow to occur. [3] Once it hits at around mid-March that is when the stable season begins and goes up until the beginning of August.

*(This audio file was recorded by Steve Slikas, undergraduate student at Penn State Brandywine, on April 12, 2016.)*

**Works Cited**

[1] NOAA SciJinks. (2016, February 9). What is lake effect snow? Retrieved February 10, 2016, from <http://scijinks.jpl.nasa.gov/lake-snow/>

[2] Mersereau, D. (n.d.). Lake Effect Snow: How Nature’s Greatest Snow Machine Works. Retrieved February 3, 2016, from <http://thevane.gawker.com/the-mechanics-behind-lake-effect-snow-natures-greatest-1659711094>

[3] Niziol, T. A., Snyder, W. R., & Waldstreicher, J. S. (1995). Winter Weather Forecasting throughout the Eastern United States. Part IV: Lake Effect Snow. *Weather and Forecasting*, *10*(1), 61–77. [http://doi.org/10.1175/1520-0434(1995)010<0061:WWFTTE>2.0.CO;2](http://doi.org/10.1175/1520-0434(1995)010%3c0061:WWFTTE%3e2.0.CO;2)