



Great Lakes Climate and Weather – Lesson 3: Lake Effect

Data sheet

Predict whether lake-effect snow conditions will occur in the situations described in the questions below. Use a ruler and the Snowstorm Forecaster map below to determine wind direction. Support your answer with evidence.

Determine wind direction by placing a ruler on the compass line on the figure parallel to the wind direction given in the question. Without changing its angle, slide the ruler over until its edge rests on the city in the question.

1. You are in Michigan City, Indiana (1). The lake temperature is 33 degrees Fahrenheit (F) (0.6 degrees Celsius). The air temperature is 2 degrees F (-17 degrees C). Winds are from the north at 12 miles per hour (mph) (19 kilometers per hour). A low pressure cell has moved east into New York State. The barometer is rising. Is a lake-effect snowstorm likely? (Circle one)

Yes

No

Why or why not?

High temperature difference, rising barometer, long fetch.

2. You are in Erie, Pennsylvania (2). The lake temperature is 33 degrees F (0.6 degrees C). The air temperature is 30 degrees F (-1 degrees C). Winds are from the south, light and variable. A high pressure cell has just moved east into New Jersey. Barometer is steady. Is a lake-effect snowstorm likely? (Circle one)

Yes

No

Why or why not?

Winds from the south would not cross a lake to reach Erie, Pennsylvania. The temperature range is too narrow.



3. You are in Kingston, Ontario (3). The lake temperature is 33 degrees F (0.6 degrees C). The air temperature is 20 degrees F (-7 degrees C). Winds are from the southwest, 9 mph (15 kph). The barometer is falling and a low pressure cell is located just west of you over Peterborough, Ontario. Is a lake-effect snowstorm likely? (Circle one)

Yes

 No

Why or why not?

Low pressure is west of Kingston. It must be east and followed by high pressure.

4. You are in Marquette, Michigan (4). The lake temperature is 33 degrees F (0.6 degrees C). The air temperature is -10 degrees F (-30 degrees C). Winds are out of the north, 20 mph (32 kph). The barometer is rising. Is a lake-effect snowstorm likely? (Circle one)

 Yes

No

Why or why not?

There is a very wide temperature difference and a long fetch. Expect heavy snow for the same reasons.

Would you expect light, moderate or heavy snowfall? (Circle one)

Light

Moderate

 Heavy

Why?

Expect heavy snow due to very wide temperature difference and long fetch.



5. You are in Holland, Michigan (5). The lake temperature is 32 degrees F (0 degrees C). The air temperature is 12 degrees F (-11 degrees C). Winds are out of the southwest. They carry arctic air due to the position of a large high pressure cell over central Michigan. The winds pass over Gary, Indiana. The barometer is rising. Is a lake-effect snowstorm likely? (Circle one)

 Yes

 No

Why or why not?

The fetch over the lake is not long but there is a fetch over the industrial area of Gary, Indiana. This adds heat and ice-forming nuclei to the air.

6. You are in Stevens Point, Wisconsin (6). The lake temperature is 32 degrees F (0 degrees C). The air temperature is 10 degrees F (-12 degrees C). Winds are out of the northwest at 8 mph (13 kph). The barometer is rising. Is a lake-effect snowstorm likely? (Circle one)

 Yes

 No

Why or why not?

Stevens Point, Wisconsin is not on a lake.

7. You are in Duluth, Minnesota (7). The lake temperature is 32 degrees F (0 degrees C). The air temperature is -8 degrees F (-31 degrees C). The winds are out of the northwest at 18 mph (29 kph). The barometer is steady. Is a lake-effect snowstorm likely? (Circle one)

 Yes

 No

Why or why not?

Winds do not pass over water to reach Duluth.



8. You are on Manitoulin Island (8). The lake temperature is 60 degrees F (16 degrees C). The air temperature is 75 degrees F (24 degrees C). Low pressure has just moved east over Quebec Province. High pressure is over Lake Michigan. Winds are from the west northwest at 5 mph (8 kph). Is a lake-effect snowstorm likely? (Circle one)

Yes

No

Why or why not?

It is summer.

9. Add a question using your own city or town.



Figure: Snowstorm Forecaster map See [ClimateWeath_L3_SnowstormForecasterMap.pdf](#)

Source: Greatest of the Great Lakes (GOGL): A Medley of Model Lessons. 2007. COSEE Great Lakes, Illinois-Indiana Sea Grant, University of Illinois, Champaign, IL 61820 Authors: Goettel, R, Hallesy, T, Murphy, J, White, S, Fortner, R, Stewart, S, Munson, B, Domske, H, Lubner, J, Danielski, A