Lake Effect Snow @ IWX

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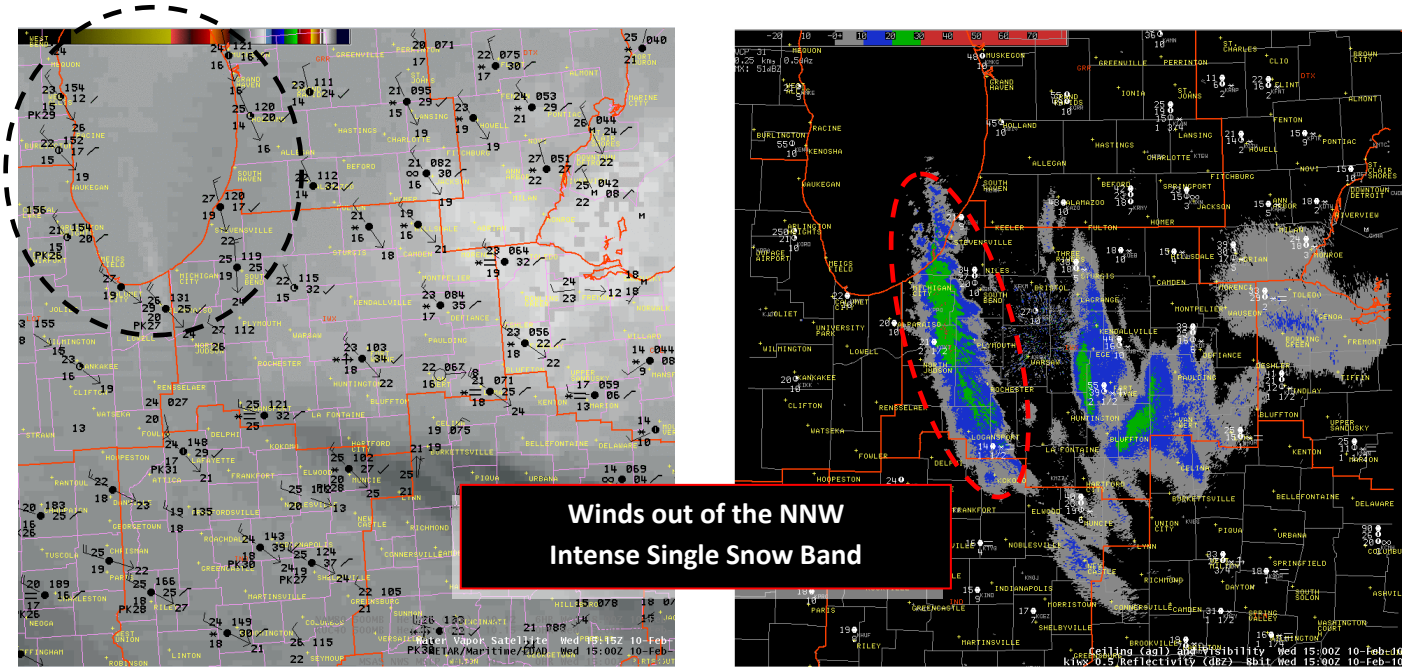
IWX – Northern Indiana

Lake effect snow (LES) is typically a winter weather event that affects areas downwind of Lake Michigan and usually occurs from late fall through the winter months. LES develops when cold, arctic air moves across the relatively warm waters of Lake Michigan. This air becomes warmer and moister than the air aloft, rises and in turn clouds and snowfall will be produced.

LES can take on several different types or forms with each type having a different set of parameters that need to exist in order for it to occur. Below are only a few examples of the different types and how they affect the IWX forecast area.

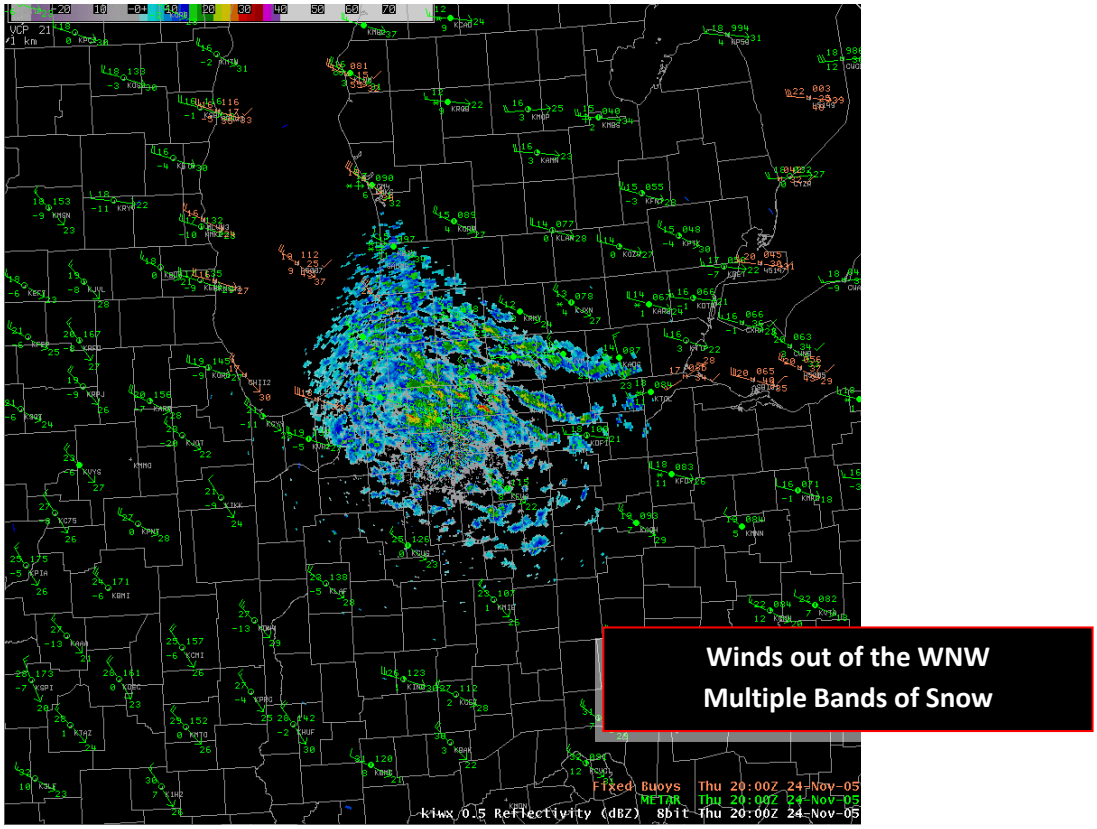
Example: Feb 10, 2010 – Single Band

This type is formed parallel to the major axis of the lake in the channel of maximum thermal convergence. The convergence is formed from the land breezes from both sides, which is in response to forced ascent over the lake. This is typically the most intense type of snow band that affects IWX and occurs when there is a northerly wind.



Example: November 24, 2005 – Multiple Bands

This type is formed perpendicular to the major lake axis. Winds are out of the west-northwest for this type of lake effect event and will also affect areas of IWX. With the multiple bands, they are usually narrow with a few bands becoming more intense than the others.



Scenarios:

There are a few scenarios that may lead to LES developing across the Northern Indiana forecast area. LES can begin after a cold front passes across the lake, turning the winds northwesterly. Another situation would occur when a deep low pressure system located along the New England coastline can bring in northerly flow over lake. The general idea, however, is that cold, arctic air moves across the warmer waters of Lake Michigan and results in LES.

Rules of Thumb:

- > -13C Lake/850mb delta T
- fetch must be at least 30-40 miles
- low vertical wind shear
- adequate inversion height
- ample synoptic scale moisture
- favorable dendritic crystal growth (-12 to -18C cloud layer)
- some synoptic scale forcing

Other things to consider are the upstream observations and upstream lakes. Lake effect snow typically comes to an end when the 850mb ridge axis passes, significant low level drying occurs, inversion heights lower, and warm air advection ensues.

Impacts on IWX FA:

LES events affect areas closer to and downwind of Lake Michigan. These areas can see anywhere from a few inches of snowfall to several feet if the conditions are supportive and be hazardous to life and property. Driving conditions are also made worse as (major) roads become snow-covered and visibilities are reduced to near zero at times do to the intense snowfall rates.