



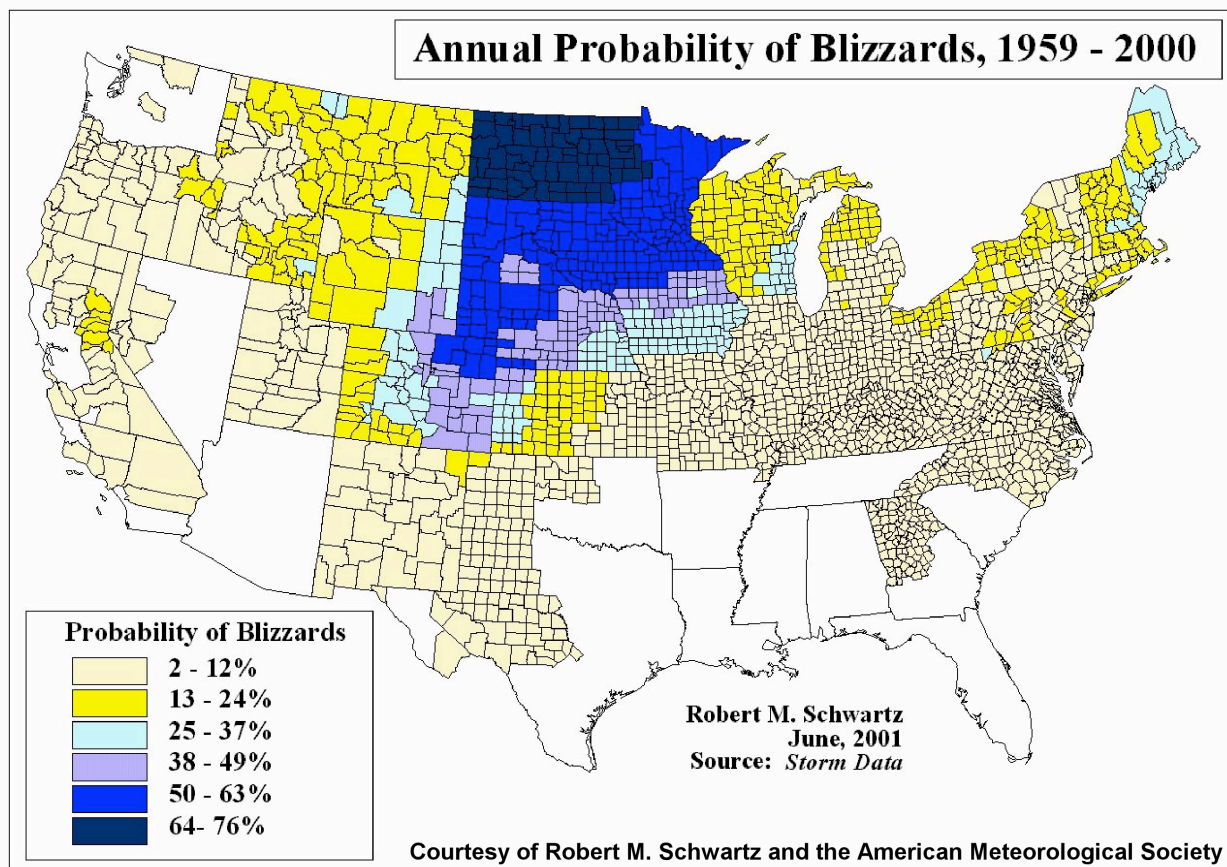
Photo: Bill Koch, Collection of Dr. Herbert Kroehl, NGDC

## Chapter 15 Great Plains Blizzards

What is a blizzard?

**Blizzard** – wind speed exceeds 30 kts (35 mph) and falling or blowing snow reduce visibility to less than 1/4 mile for at least 3 hours

Where are blizzards most common?

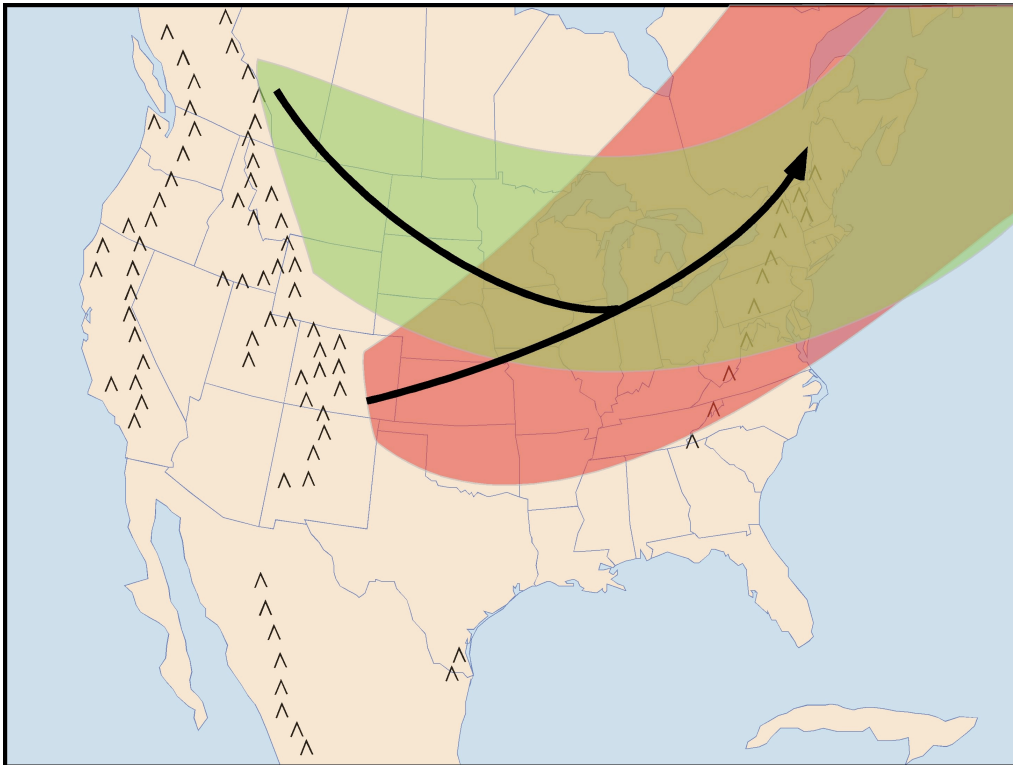


## Why are blizzards most common in these locations?

The Rocky Mountains block mild Pacific air masses

The Canadian Arctic is the source region for bitterly cold air  
“the only thing between North Dakota and the North Pole are  
barbed wire fences”

Cyclones form on the east side of the Rocky Mountains



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The Gulf of Mexico is the source of moisture

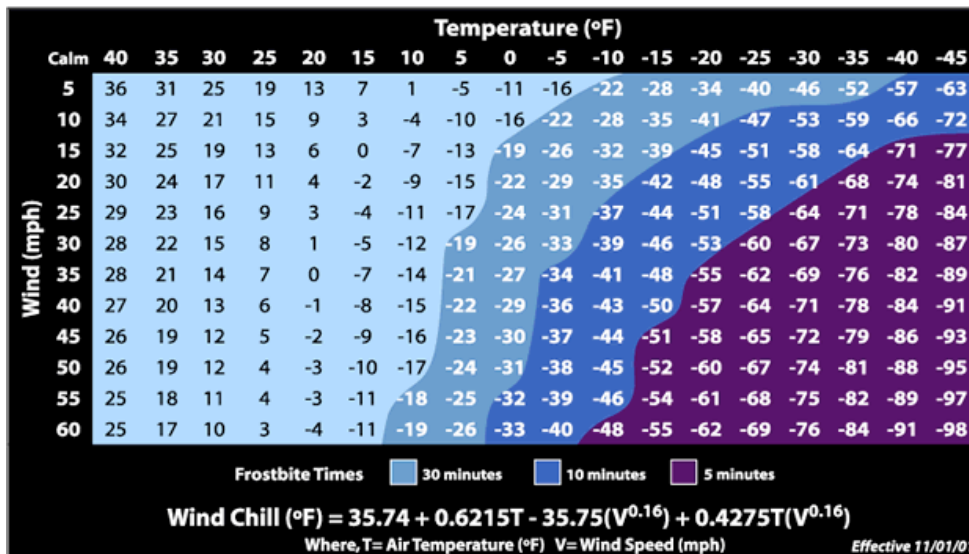
## Humans and Blizzards

**Hypothermia** – a decrease in the body’s core temperature to a level at which normal muscular and cerebral functions become impaired

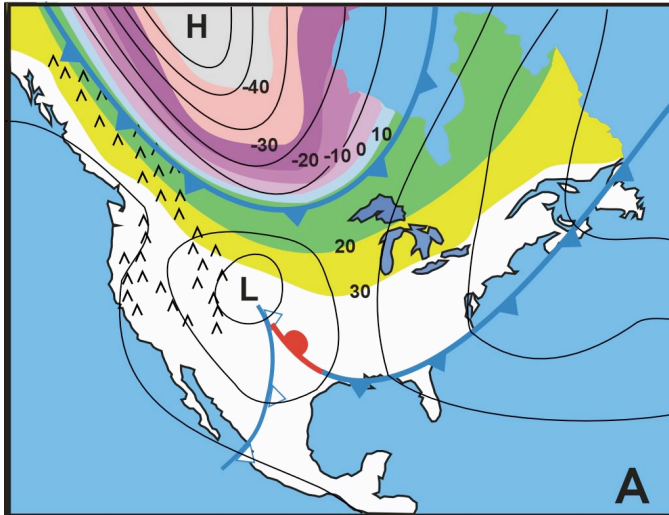
What are the symptoms of mild, moderate, and severe hypothermia?

**Frostbite** – flesh of the body freezes

**Wind chill temperature** – provides a measure of the equivalent temperature a body experiences due to the combined effects of cold temperature and wind



## Cold, Wind, and Snow



What weather conditions occur on the plains prior to the formation of a blizzard?

Cold airmass  
Cyclone formation

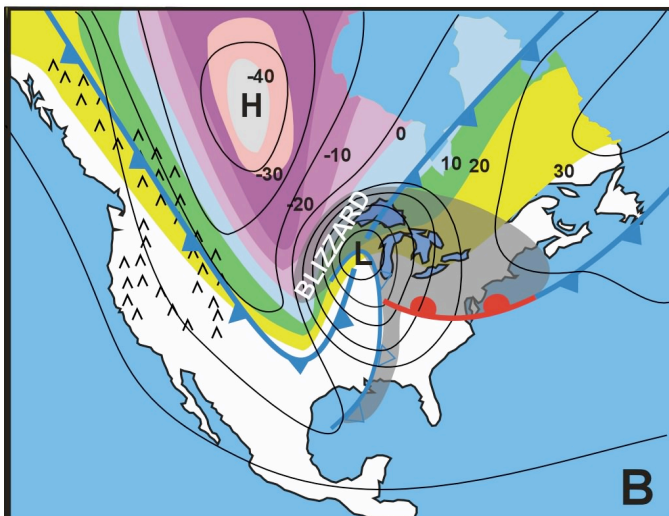
Where is the source region for the cold air associated with blizzards?

What factors favor the formation of very cold air?

High sea level pressure is often associated with very cold air.

What role does the high pressure center play in the formation of blizzard conditions?

What type of front marks the leading edge of the very cold airmass?



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## Colorado Cyclones and Blizzards

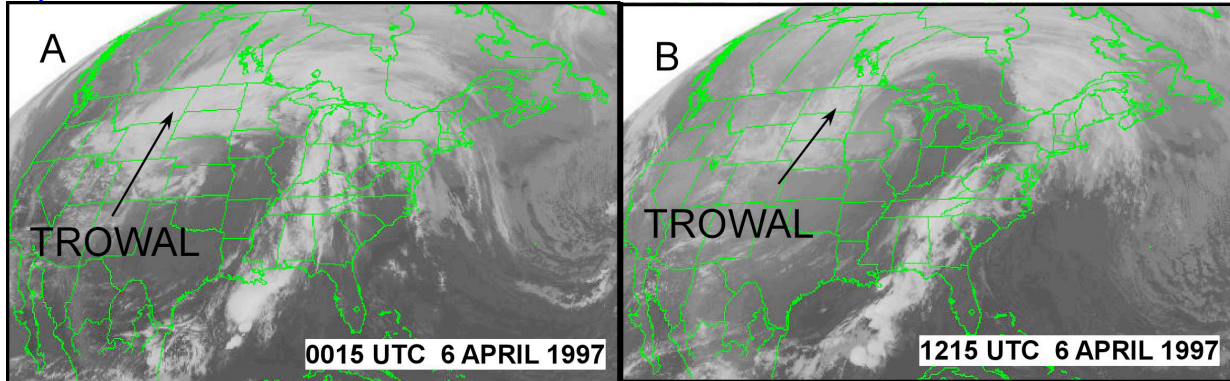
What factors lead to the formation of a cyclone on the east side of the Colorado Rocky Mountains?

For a blizzard to form cold air must be in place over Canada when the cyclone forms in eastern Colorado.

This cold air is pulled south by the circulation around the cyclone.

Strong winds form on the northwest side of the cyclone, where the pressure gradient is largest (between the low and high pressure centers).

What feature of the cyclone is typically associated with snowfall that can be a part of the blizzard?



What is the typical width of the band of snowfall associated with the trowal?

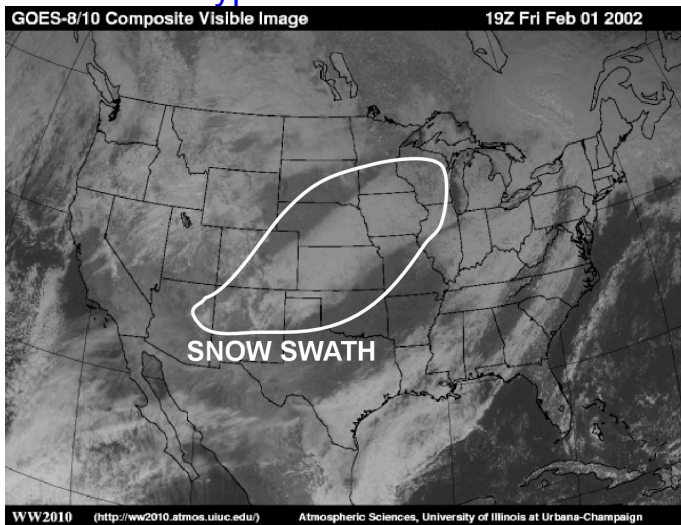


Image courtesy of the Department of Atmospheric Sciences  
University of Illinois at Urbana-Champaign

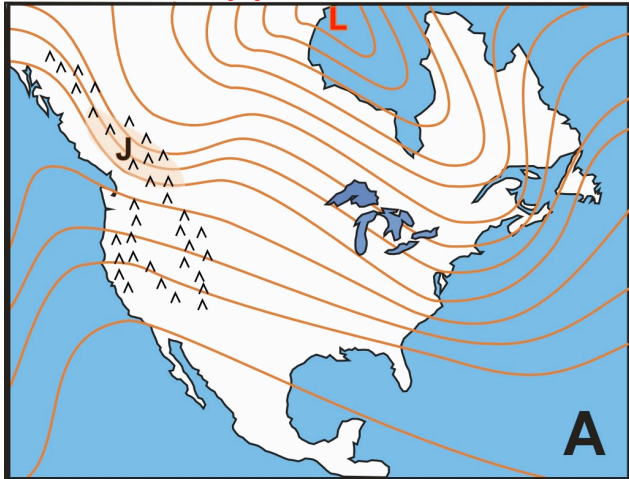
What factors can make the snow that does fall susceptible to blowing and drifting?

How can the presence of the Rocky Mountains enhance the amount of snow that falls?

**Upslope flow** – air is forced to rise as it flows from lower elevations to higher elevations (such as from the Great Plains towards the Rocky Mountains)

In what part of the cyclone are you most likely to find upslope flow?

## Alberta Clippers and Blizzards

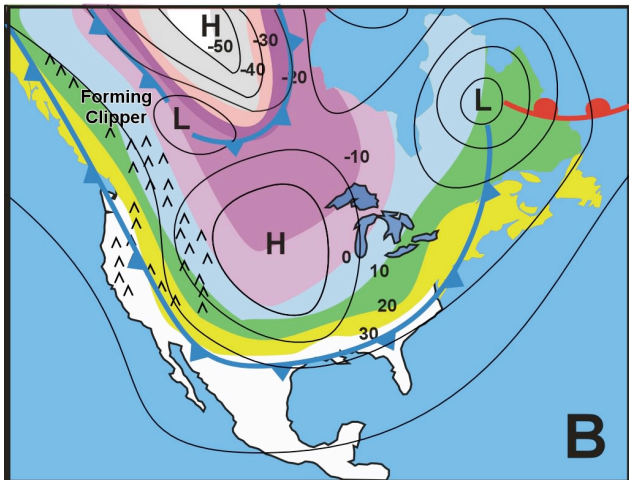


What conditions are commonly present when an Alberta clipper forms?

### Upper air conditions

Jetstream oriented NW to SE over Canadian Rockies

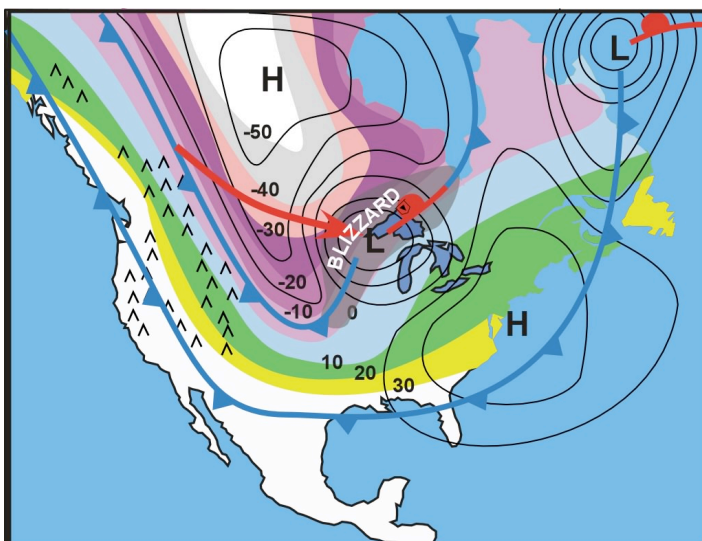
Wave in jetstream over the Canadian Rockies



### Surface conditions

Cold air in place over the United States

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What types of weather occurs with Alberta clipper blizzards?

Fronts  
Cold temperatures  
Winds  
Wind chill temperatures  
Snowfall

How does the snow that falls from an Alberta clipper blizzard form?

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How do Alberta clipper blizzards differ from Colorado cyclone blizzards?

## Ground Blizzards

**Ground blizzard** – a blizzard that is caused solely by blowing snow (no new snow is falling during a ground blizzard)

Under what conditions can a ground blizzard occur?

How deep is a ground blizzard?

What are the impacts of a ground blizzard?

## Blizzard Safety

What are the most common causes of fatalities in blizzards?

What can you do to protect yourself from winter weather hazards when driving?

### Carry a winter storm survival kit in your car

- Blankets and sleeping bags
- Flashlights and batteries
- First aid kit
- Knife
- High calorie non-perishable food
- Extra set of clothes
- Drinking water
- Large can with a lid
- Small can for melting snow
- Waterproof matches or a lighter
- Large candles

### Carry a winter automobile safety kit in your car

- Sand or cat litter for tire traction
- Shovel
- Windshield scraper and brush
- Tool kit
- Tow rope
- Jumper cables
- Accident flares

## Stay in your car if you get stranded

You can quickly become disoriented in whiteout conditions if you leave your car

A car provides shelter from the cold, windy, wet conditions

Rescuers are more likely to find a car than a person

## Carry a cell phone to call for help