



# SNOW DRIFTS

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## Introduction

The Delta Junction High school was requested to join the snow view globe photos of snow in clouds, trees, and on land intensive observation. (IOP) globe training to learn globes protocols for land cover about observing snow on the ground which can be compared to NASA remote sensing technology records to see if they get the same reading.

Snow is part of the local and global water cycle that impacts agriculture and natural resources within the interior region of Alaska. The purpose was to see how much water equivalent is in the snow for agricultural and natural resources. Sharing of data with citizen scientists around the world about snow drift accumulation due to wind occurrences helps with the purpose of knowing potential water availability for resource management. Research found that as the intermittent wind increased the windward drift increased in height.

## Hypothesis

What wind speeds are required to create snow compaction in a windward snow drift?

## Methodology

- Globe and landcover snow measurements (snow collection sampling were utilized.)
- From November to February 2025, the windward snow drift at the Delta Junction High school was surveyed for snow ed monitoring.
- Protocol sites selected from toe of the drift to the peak of the drift
- High school students collected and measured snow and melt water samples at each incriminated site.
- Used measuring devices:
- Meter stick for snow or the lack of snow
- Rain gauge to measure liquid of total snow (Also known as snow water melt equipment in mm)
- Snowboard during snow event to measure depth, amount of water, and ph of new snow
- Weather station to collect wind data

## Data

- Later on in our research, a Chinook (warm tropical wind) occurred January 24th to February 9th, losing 2000 mm of snowpack.
- Was reported to be high 39 degrees and average 19 degree with wind clocked at 60mph.
- Height of snow drift was 2500 mm tall before Chinook, after it went down to 1524 mm.
- From monitoring before and after the Chinook, estimated a total of 680 mm of snow melt occurred.
- Was reported from Ft. Greely Garrison source.

## Images Of Ground Findings

### Delta High school Windward Drift



Showing of snow drift/loss of snow pack

### Ice layers on Drift



Showing of Ice creation/Ice layers

## Images Of Ground Findings

### Weathered down ice layer



Showing of Melt Clusters

### First site on Drift



Discovered it was completely ice at the bottom!

## Data Images



Temperature and Windspeed Data

## Results

After a few weeks of measuring, we had discovered it was a complete ice layers at the bottom of the snow drift and we were no longer able to measure physically along the snow drift entirely because of the ice lens layer. During this, we had found melt clusters as well when looking around the drift after the Chinook, we discovered ice ribs (snow layer that when heated due to rain, warm weather, etc. melts down). It is uncommon to see a Chinook during this time.

When heat rose, and our melt water started to spread through the snow ribs/boundary layers (percolate), it would then further compact once the atmosphere's heat lowered, made a new layer, as well as fortified the snow ribs.

## Conclusion

We had discovered that the wind, specifically lower wind speeds (such as 6-8 mph) can help with snow compaction when it came to our windward snow drift. The wind typically blows it in a leapfrog manner called saltation, helping create a new outer layer. However, it doesn't just do this to the drift. Since wind helps with temper control, the harsher the winds (60-90 mph), the further pressure and compaction is created when it eventually freezes over. The data in the graphs reflect evidence for the ice lenses and layers directly correlating with the chinook winds. The graphs demonstrate a big drop from 2200 mm of snow depth before the chinook, to 1500 mm. We see the crest of the drift building, having an upward trend before the chinook happens, the warm winds causing a drop, then saltation of the drift resumes shortly after. The melt water becoming trapped infiltrating within the drift creating ice layers. The hydrofracturing within the drift forms melt cluster crystal formations.

\*Continuing research will continue through 2025 until snow has dissipated and water findings can be fully calculated\*



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