Where does the snow on the Juneau Icefield come from?
Water Isotopes

Isotopes – atoms of the same element with different numbers of neutrons

Oxygen: \( ^{16}\text{O} \) \( ^{18}\text{O} \)

Hydrogen: \( \text{H} \) \( \text{D} \)
Isotopes Along a Storm Path

Decreasing $\delta^{18}$O and $\delta$D
Field Methods

Surface Samples

Vertical Samples
Surface Samples

Surface Transect Sampling
Vertical Samples

Pit Sampling

- 10 cm
- 50 cm
- 100 cm
- 150 cm
- 200 cm
- 250 cm
- 300 cm

Late Spring Snowfall

Ice Core Sampling

- 50 cm
- 100 cm
- 150 cm
- 600 cm
- 650 cm
- 700 cm
- 750 cm
- 800 cm
- 2400 cm
- 2450 cm
- 2500 cm

Snow

Firn

Ice
Modeling Approach

Isotope Ratios

Global Surface Temperature  Evaporation Temperature  Wind Trajectory

Location of Evaporation Source
Evaporation Source Temperatures for Juneau Icefield

- Frequency
- Evaporation (Source) Temperature (°C)
- 2017 Data
- Mean
Average Annual Temperature
Conclusion

• Evaporation source of the Juneau Icefield: North Central region of the Pacific Ocean

• Significance
  – Not previously studied
  – Understand relationship between climate and icefield
Thank you!