Identifying thaw-refreeze events in Alaska by remote sensing

Image?

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Winter Icing Events

• Have potential for catastrophic effects on wildlife populations

 Icing has been implicated in large-scale die-offs



Winter Icing Events

Temperature often used as a proxy
Lack of data across regions
Thus we have limited understanding of:

Trends ,timing, distribution, severity of icing
Biological implications





Remote Sensing Technique

Method by Bartsch et al. (2010):
Allows for detection across large areas
Detection based on changes in snow characteristics

Accurately detected known events





• Detail Method of Detection • Results: • Frequency, timing and size of events • Validation: • Comparison to weather station data • Aerial observation O Discussion • Limitations of Model Implications for Alaska





Detecting Icing Events

text or

image(s)











Detecting Icing Events











Detecting Icing Events





Analysis





- Avg. no. events/winter
- Avg. no. events/month in winter
- Interannual variation in frequency/distribution
- Spatial extent of icing events





Average Number of Events Winter



Average Number Events Each Month



Number Events Each Winter





Comparison to Observed Events

- Dec 2005: Kotzebue to Unalakleet and onto Seward Peninsula
- Jan 2007: Kotzebue south to Shaktoolik; 4 days of rain





Conclusions

- Performed well compared to weather station data and "observed" events
- Interesting patterns:
 - Highest frequency in southwest
 - Larger events in the interior, higher elevation
 - Similar rates throughout winter

• Limitations:

- Too few years for trends
- Unable to estimate severity of events
- Similar platform not currently available









Uses for Data



• Link data to wildlife movement and demographic data

• Even with limited # years, may be enough data across populations

- Guide placement of weather stations, snow monitoring
 - Networks across islands, areas isolated geographically

• Elevation and latitudinal gradients

• Build mechanistic understanding of factors that lead to icing

• Link detections to synoptic conditions

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