Quantification of Thermokarst and Carbon Release

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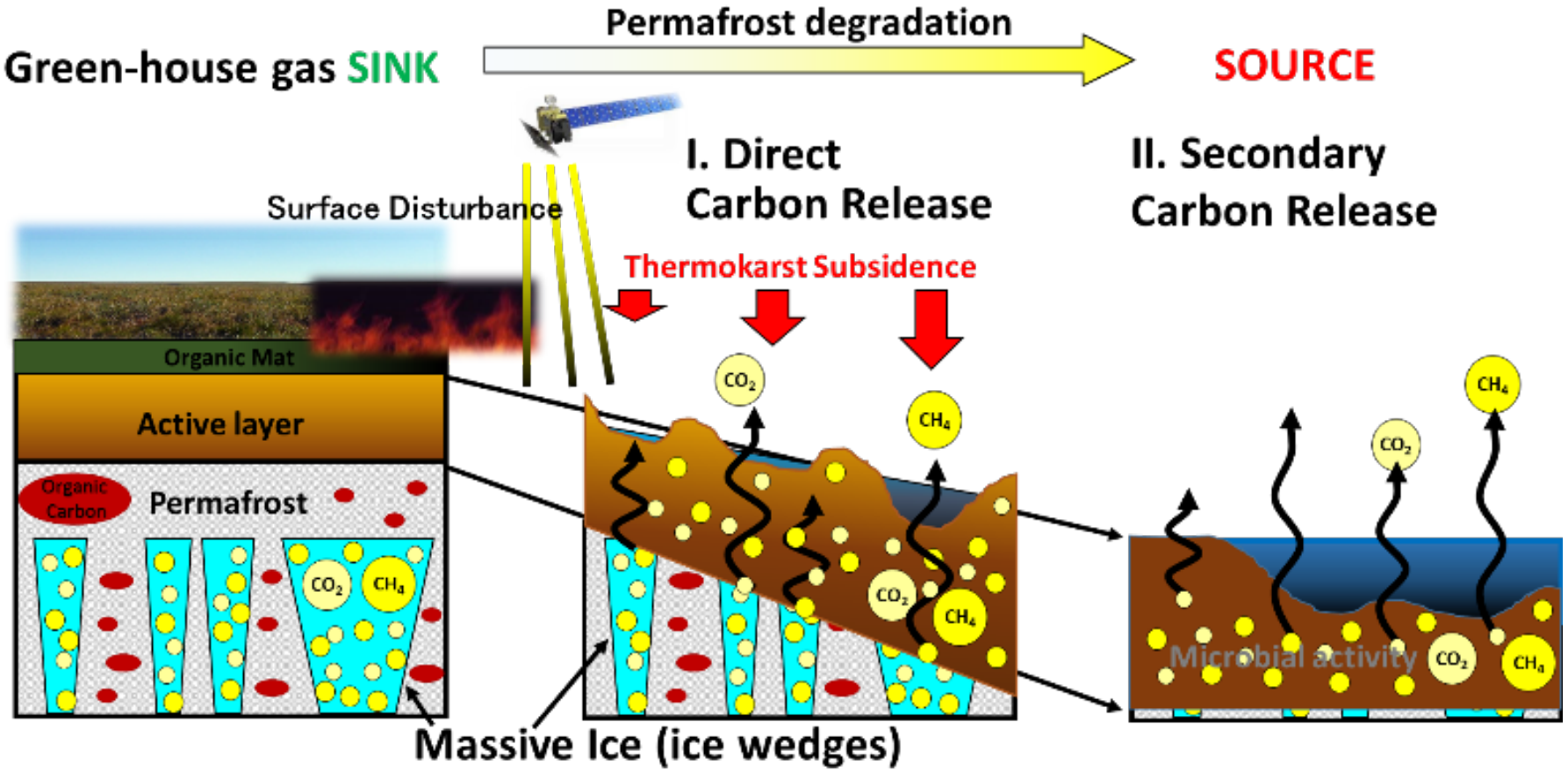
Science Objectives

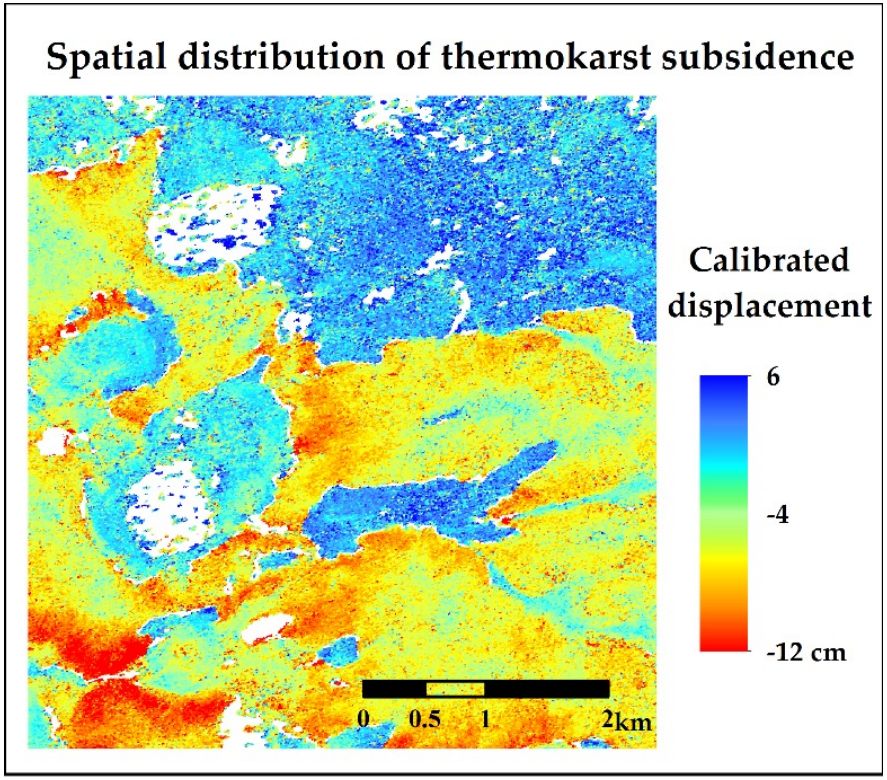
1. Measure the spatial variation of thermokarst subsidence
2. Reduce uncertainty in thermokarst quantification using remote sensing
3. Estimate GHG and organic matter contents in permafrost
4. Evaluate the rates of potential release of carbon upon thermokarst development (Release I)



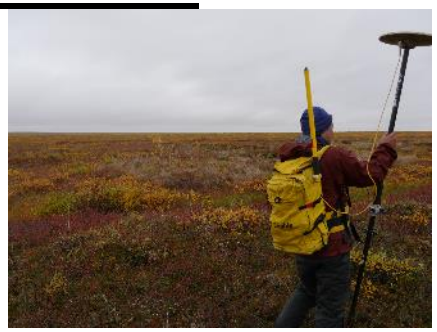
Sensor/Platform Summary

2-pass InSAR
(Airborne)
AirMOSS, UAVSAR
(Spaceborne)
ALOS-PALSAR1/2

LiDAR Differencing
Historical LiDAR DEM
and LVIS acquisition

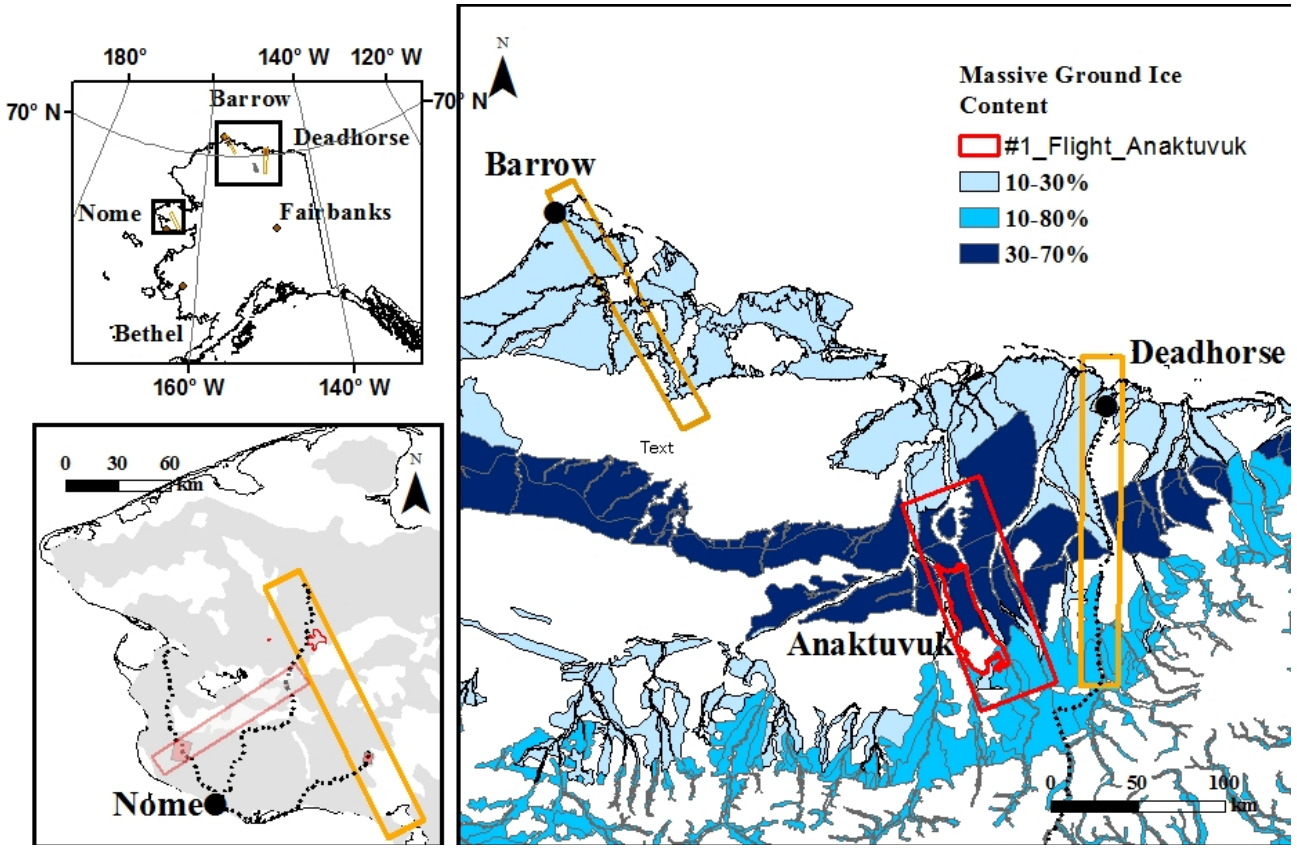


Fieldwork



Lab Analysis

Flight Line/Ground Site/Timing Priorities



Candidate Field Sites:

#1 Anaktuvuk River Fire

#2 Dalton HWY

#3 Barrow area

#4 Kougarok, Seward Pen.

#5 Fairbanks

NGEE-Arctic sites:

Barrow

Seward Pen.

Teller/Kougarok/Council

Timing: Early and late snow-free period

Impacts on ABoVE Science:

Tier 2 Science Questions addressed:

2. What processes are contributing to changes in **disturbance regimes** and what are the **impacts of these changes**?

3. What processes are controlling changes in the **distribution and properties of permafrost** and what are the impacts of these changes?

6. How are the magnitudes, fates, and **land-atmosphere exchanges of carbon pools** responding to environmental change?

Crosscutting themes:

The **thawing of the permafrost layer** will have consequences for human survival through gradual and extreme deformation leading to **damage of human habitats**, connective **infrastructures** and ways of life.