



Airborne Mapping and Research at UAF: Hydrologic Applications

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Collaborators

Academic collaborators include Anupma Prakash, Christian Haselwimmer, Greg Walker, Keith Cunningham, Jessie Cable, Bob Busey, Bill Cable, Jeff Welker, Don Morton, Julie Malingowski, Chas Jones, Amy Jacobs, Don Atwood, Katey Walter Anthony, Guido Grosse, Greg Newby, Tom Heinrichs, John Worden, Melanie Engram, Dan White, Buck Sharpton, Bill Schnabel, 2d3, ImSAR and Aeryon.

Our service providers were Kirst Aviation, Arctic Aviation, Pat Harman, and the UAF/GI Machine Shop. Clients include the CARVE JPL team especially Chip Miller and Steve Dinardo, Olaf Vellinga and Walter Oechel.

Platforms: Conventional



Photo: Chas Jones



Photo: Pat Harman



Photo: Bob Busey



Photo: Jessica Cherry

Platforms: UAS & Balloons



Photo: Jessica Cherry



Photo: NASA



Photo: Pat Harman

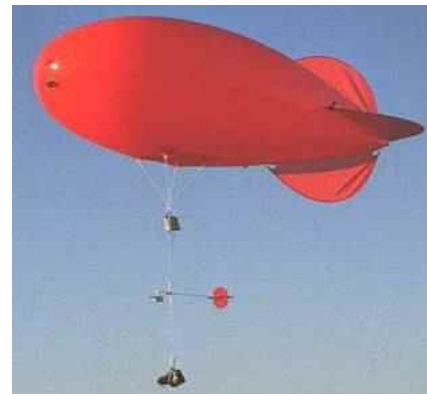


Photo: Vaisala

Payloads

Integrated Sensor System ('Tinman') developed by our group at UAF includes:

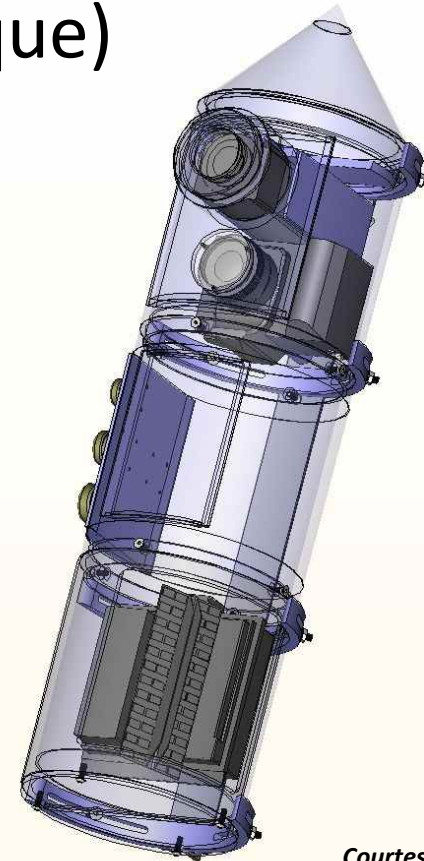
RGB cameras (Nadir and Oblique)

FLIR cameras

X-band SAR

Hyperspectral camera

Multispectral cameras



Payloads

A meteorological package (T, RH, P)

A cavity-ringdown laser spectrometer for water isotopes

SDSU Water Vapor, Carbon, Methane Flux



Photo: Vaisala



Photo: Phil Yoon



Photo: Picarro

Payloads

Acoustic Doppler Current Profiler

Sonar

(For Float Ops)



Photo: courtesy of Teledyne

GPS & IMUs & ETC

Garmin 430, 196, 495

Trimble R8-based RTK DGPS Rover & Basestation

Microbotic Midg, Crossbow 440, Honeywell

Riegl Laser Altimeter



Hydrologic Applications

- Surface Water
 - Ground Water
 - Water Vapor
 - Hydrology and Biogeochemistry
 - Snow and Ice Modeling
- 

Surface Waters: Wetlands

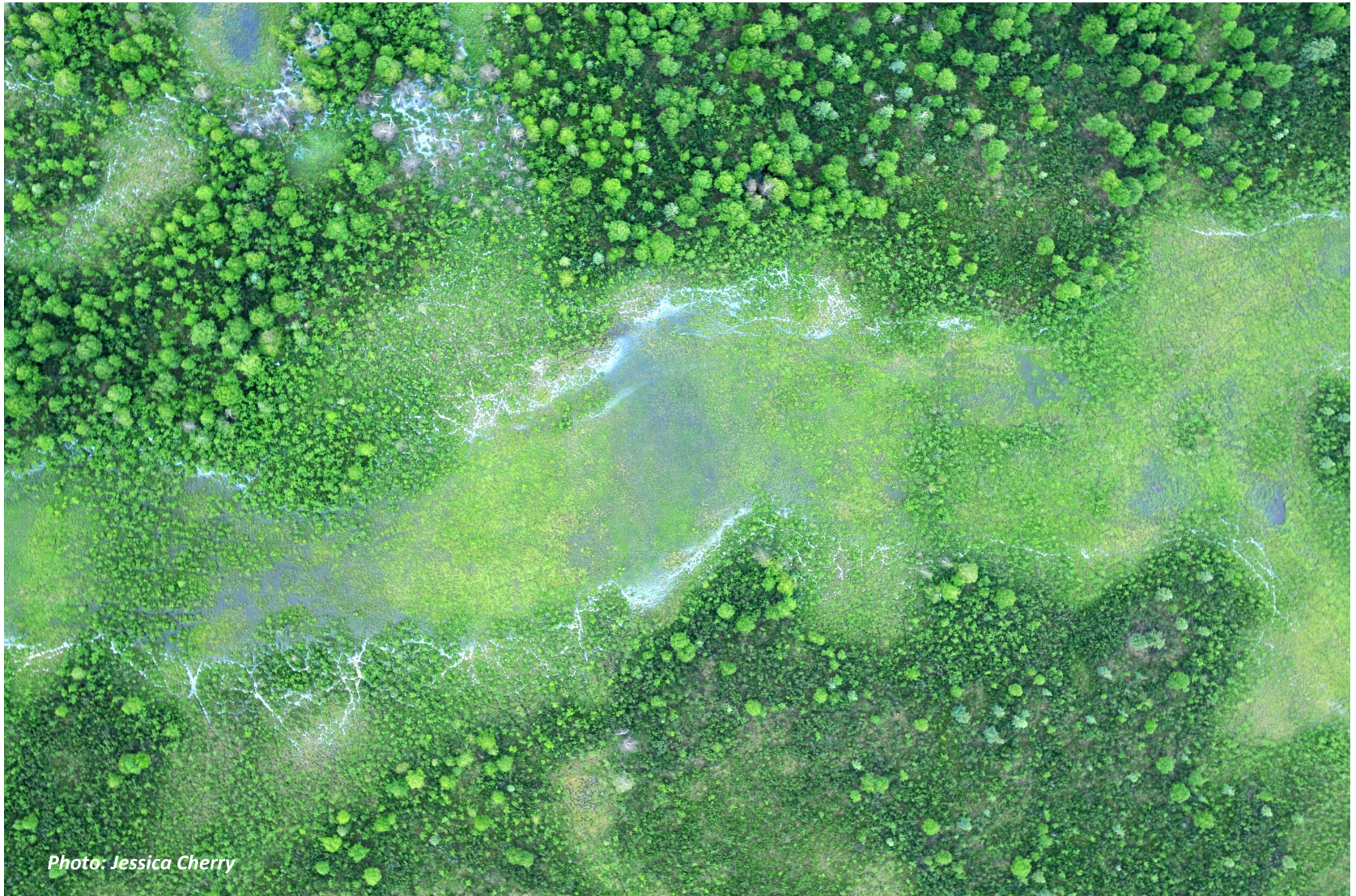


Photo: Jessica Cherry

Surface Waters: Disappearing Lakes

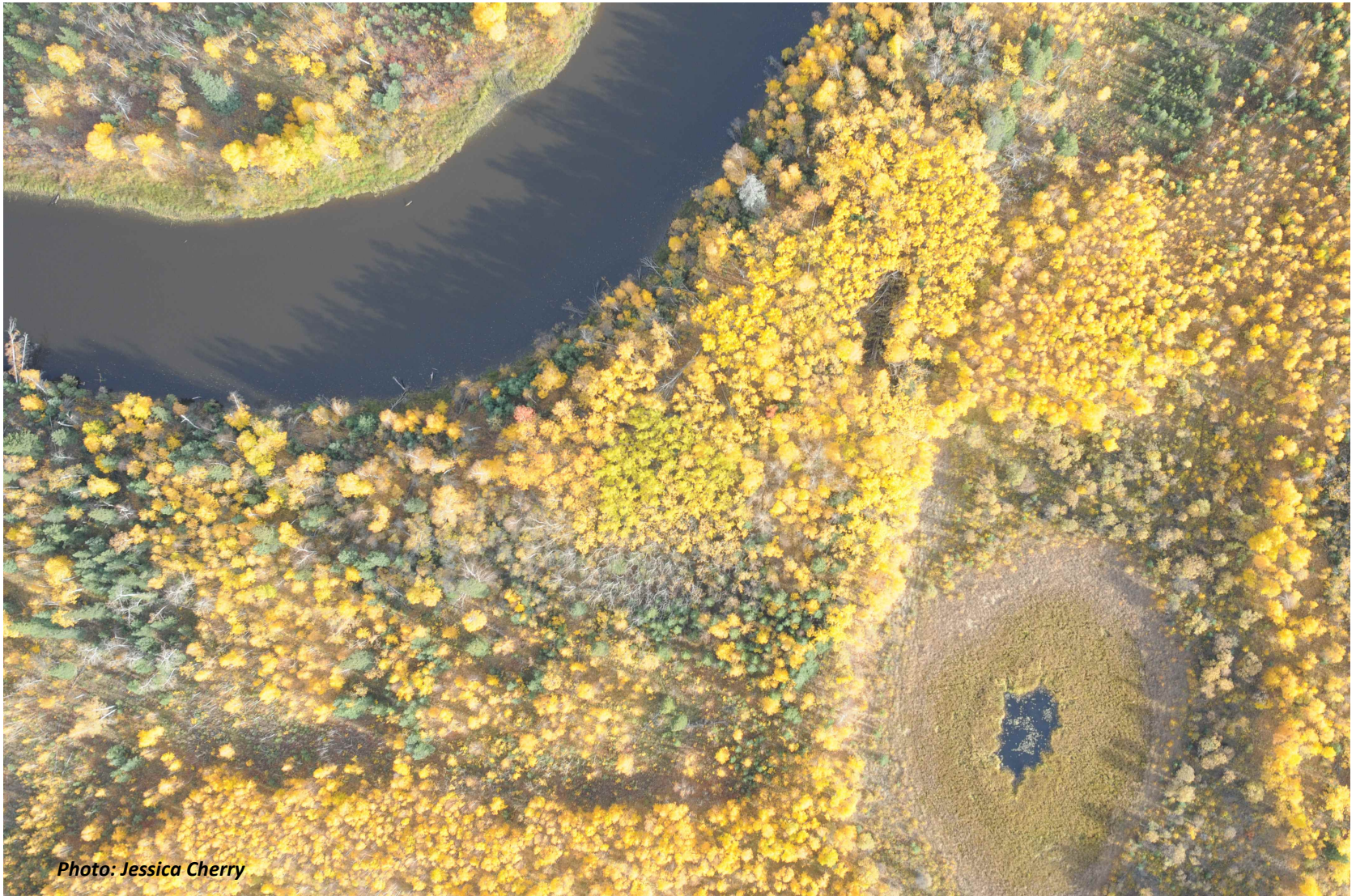


Photo: Jessica Cherry

Surface Waters: Lake Freeze Up

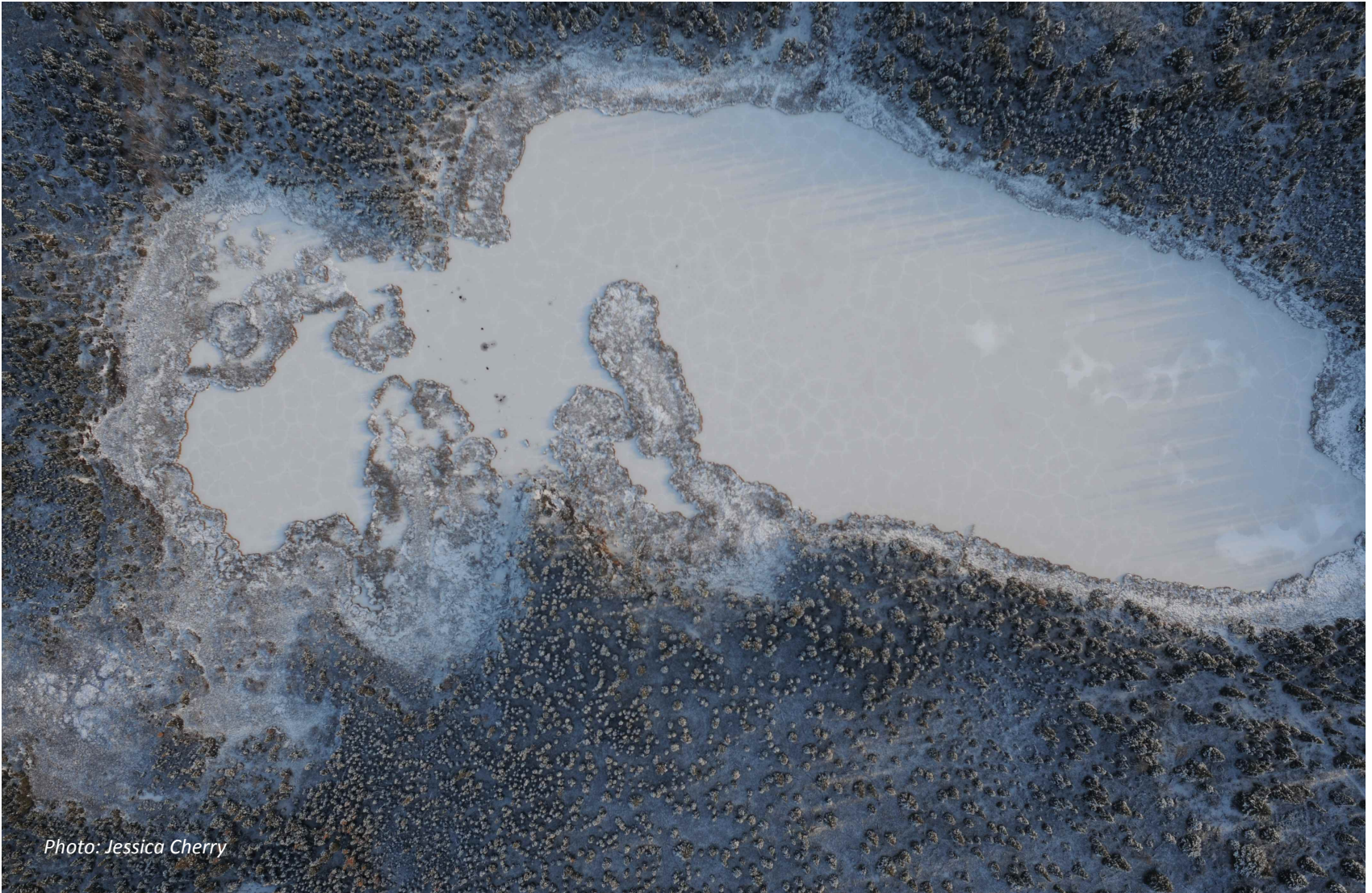
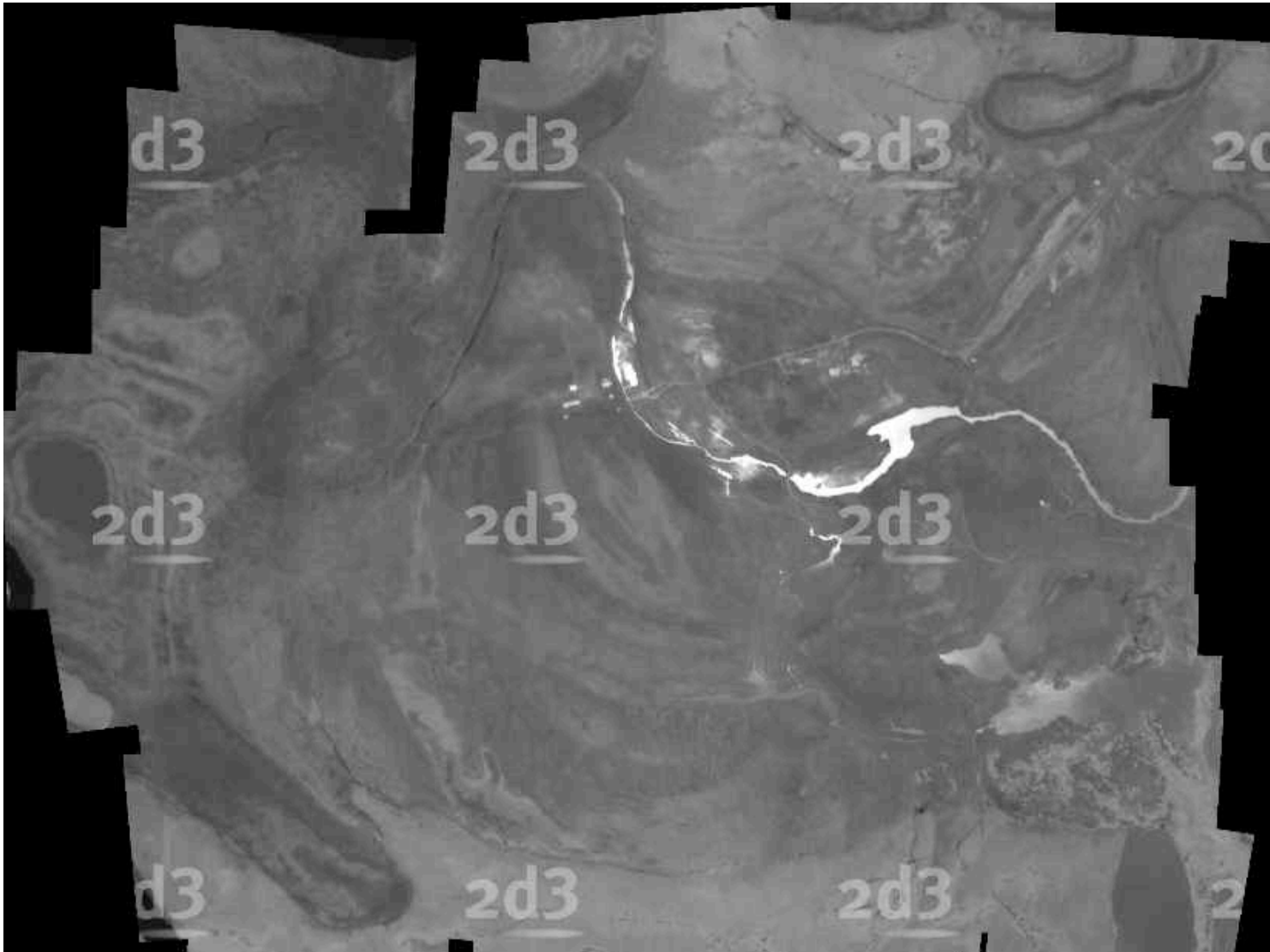


Photo: Jessica Cherry

Surface Waters: Lake Freeze Up



Ground Water: Hot Springs



Ground Water: Hot Springs



Photo: Jessica Cherry

Ground Water: Overflow



Photo: Jessica Cherry

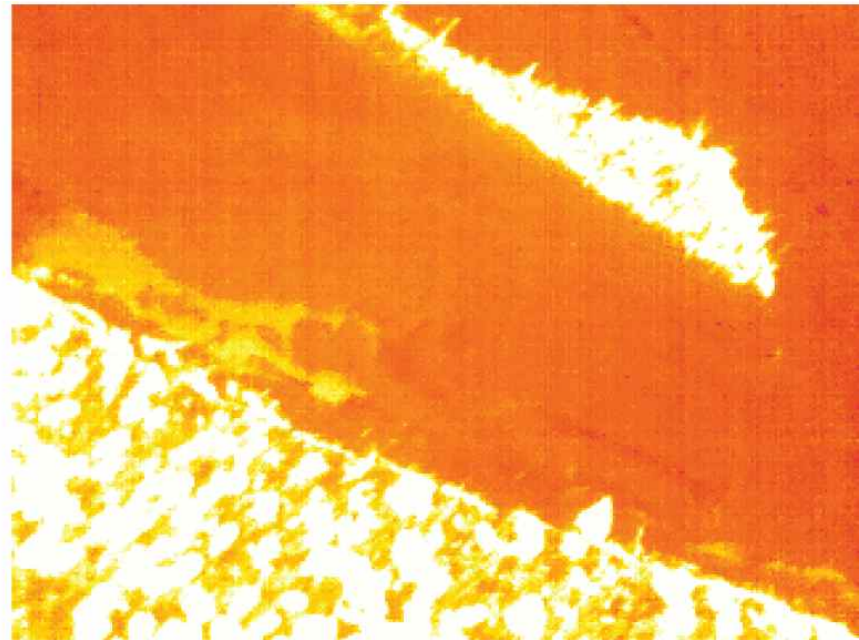


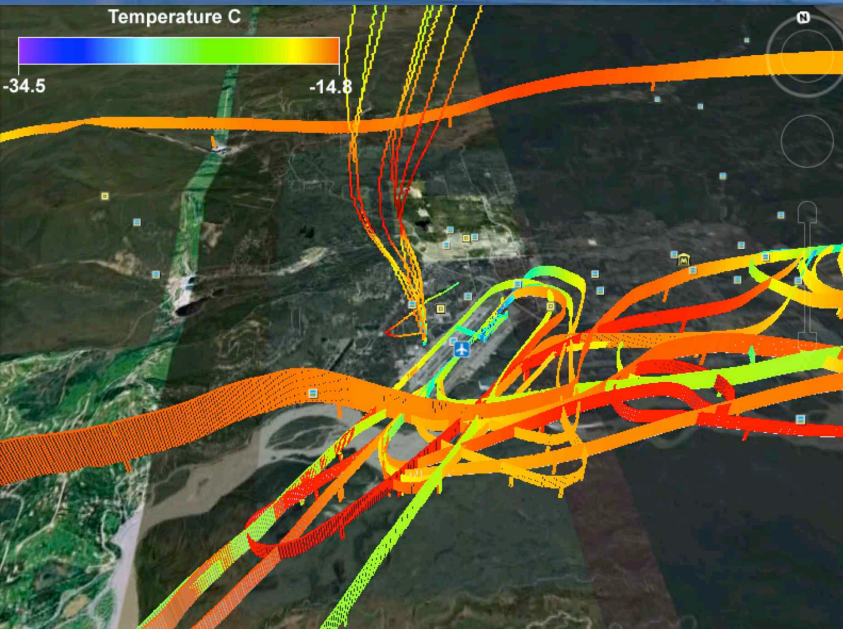
Photo: Jessica Cherry

Water Vapor: Ice Fog



Photo: Pat Harman

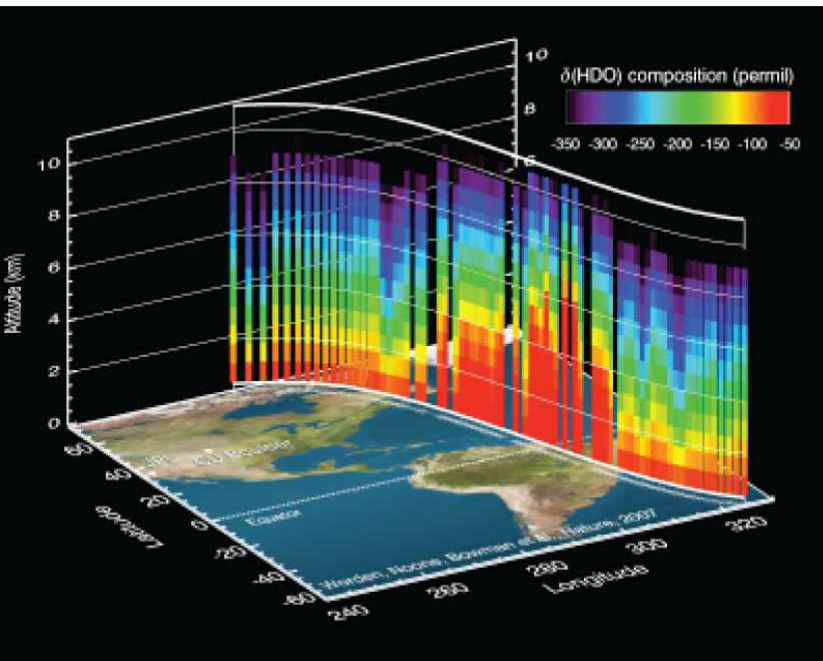
Photo: Pat Harman



‘Cessnasonde’ Film for Alaska
Weather Show:

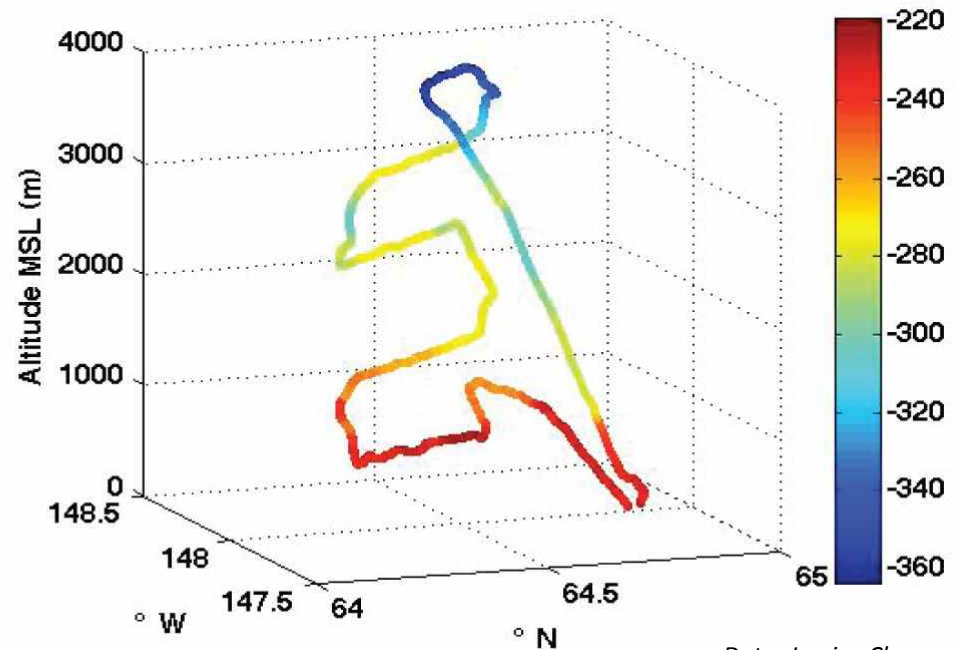
http://www.youtube.com/watch?v=_m9rpnL_dJg

Water Vapor: Isotopes



Courtesy David Noone

Deuterium from Aircraft: 27 Aug, 2011



Data: Jessica Cherry

Hydrology & Biogeochemistry: Methane

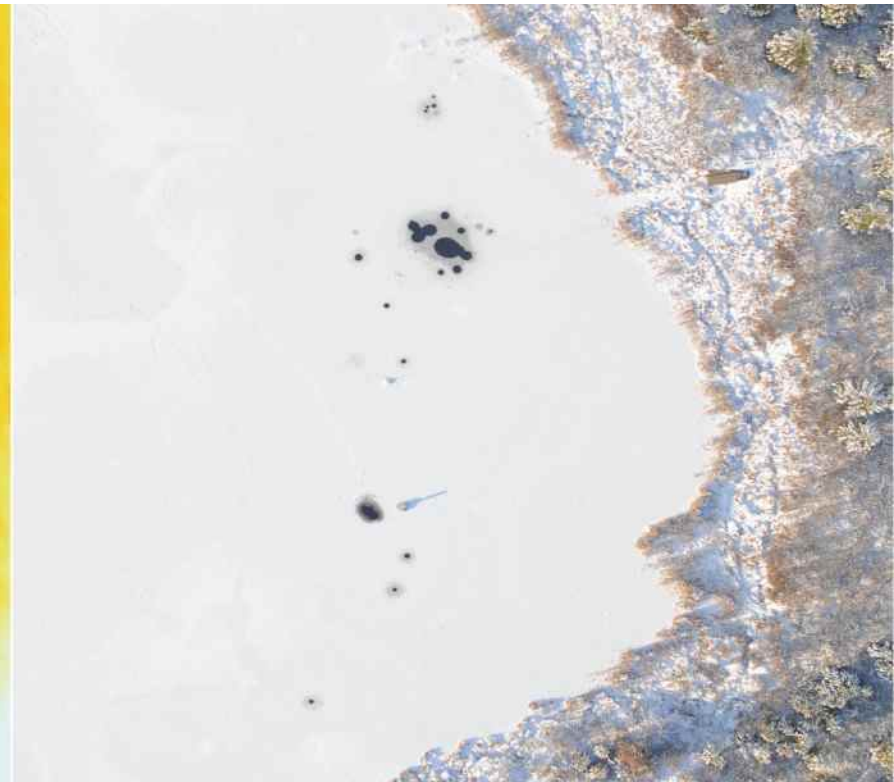
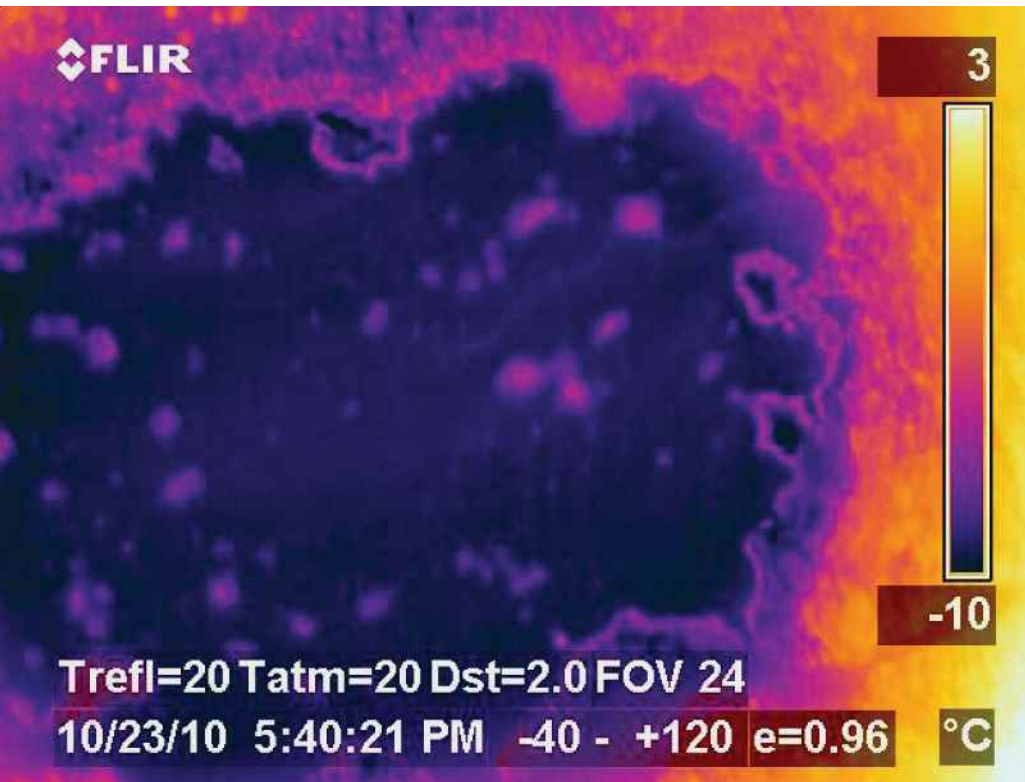


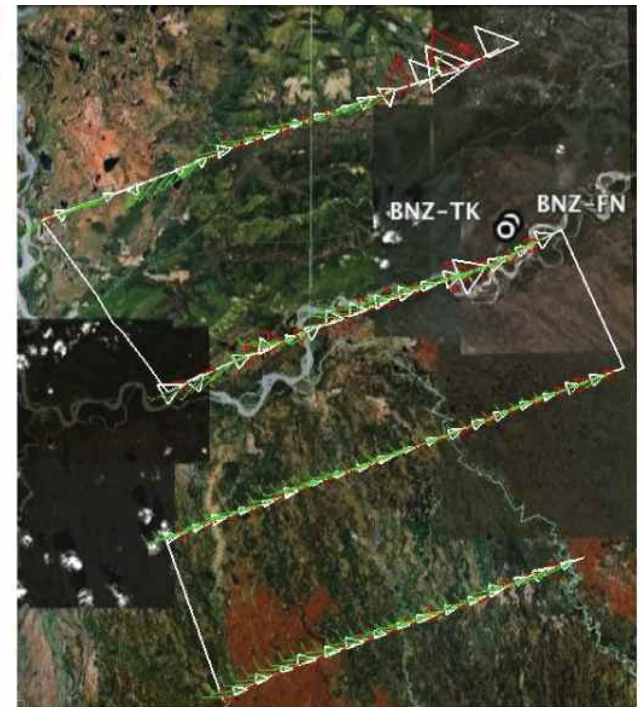
Photo: Jessica Cherry

Photo: Jessica Cherry

Hydrology & Biogeochemistry: Water Vapor, Carbon, and Methane



Photo: Jessica Cherry



Courtesy Olaf Vellinga

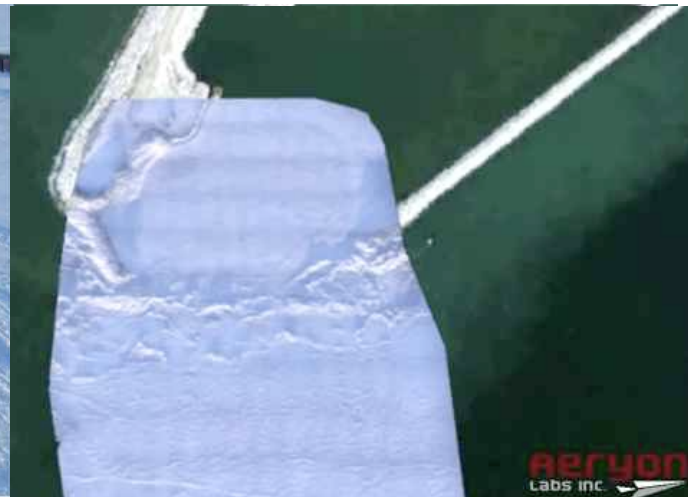
Hydrology: Snow & Ice Mapping



Photo: Chas Jones

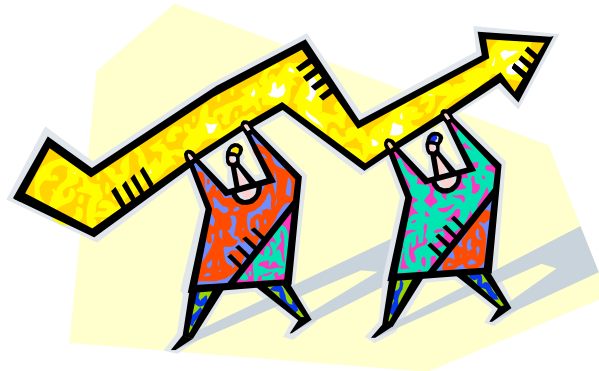


Photo: AKDEC



Future Directions

- Airborne Lidar and Laser Scanning
- Enhanced Mosaic and 3D Mapping Products
- Image and hydrology model integration
- Lake and river bathymetry, river velocity



Questions?



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