January 2026

2024-2025 GIS Retrospective

Oct 1, 2024 - Sep 30, 2025 Report
Randy Fulweber & Rachel de Sobrino
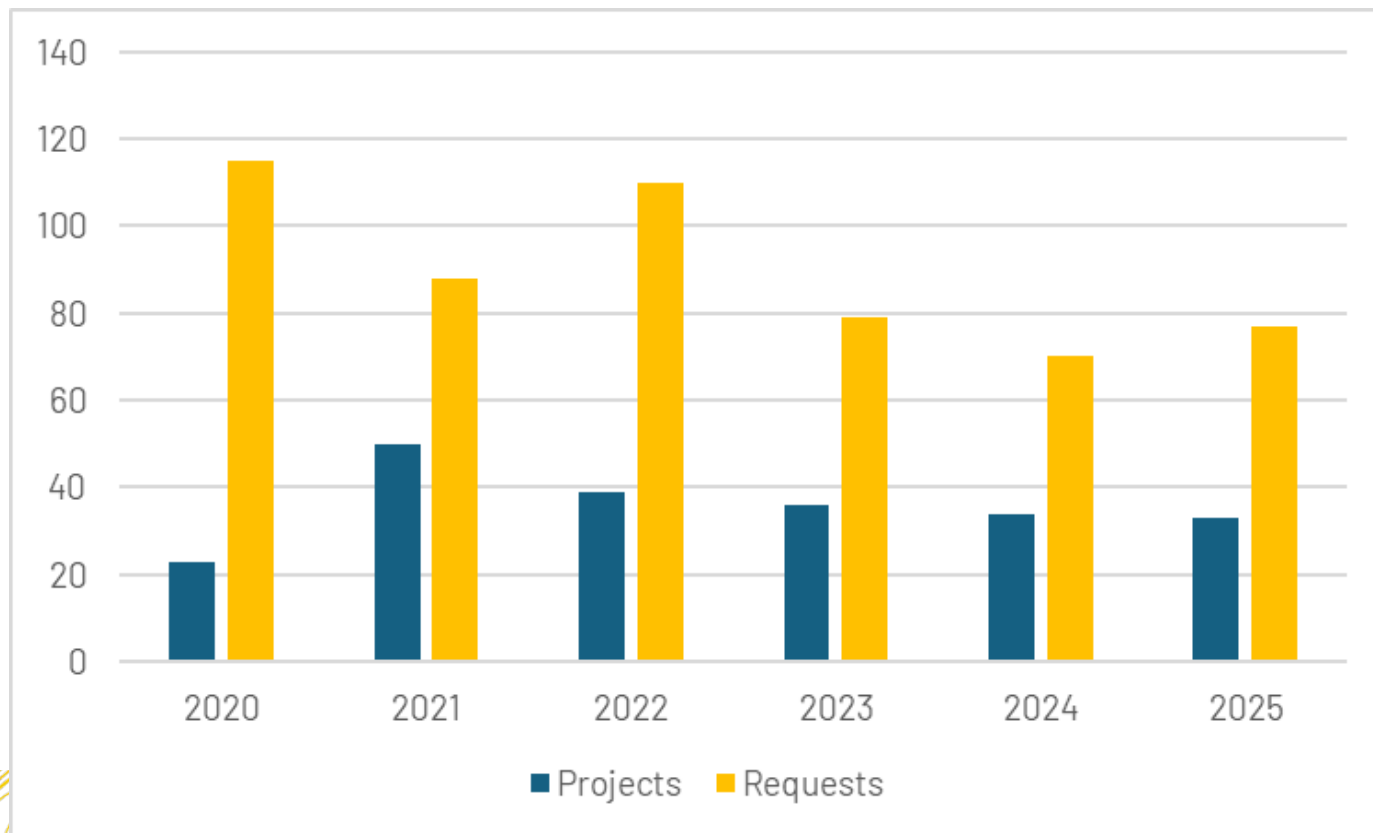
UNIVERSITY OF ALASKA FAIRBANKS

Science Support

- **78 requests for 34 projects**
  - 9 site selections
  - 10 custom maps
  - 9 remote sensing analyses
  - 57 drone flights for 10 projects
  - 12 GNSS surveys for 6 projects
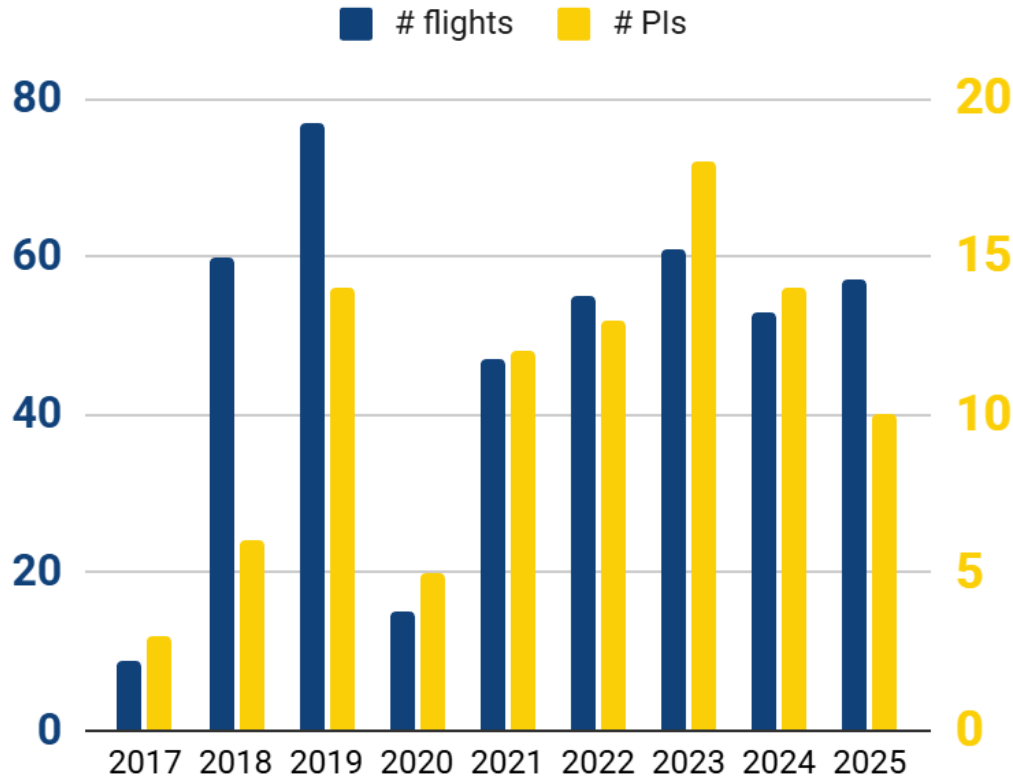 - GPS training and equipment for 21 PIs

Requests Fulfilled

Consistent level of support delivered in last three years.

Staffing

- Field season went by smoothly with experienced technicians
  - Adam Chavez – 2nd and final summer at TFS, University of Alaska Southeast undergraduate
  - Jorge Noguera – 17th and final season at TFS. Jorge's depth of experience with the program will be sorely missed!
- Manager Randy Fulweber departed at the end of 2025 closing out 15 good years with TFS.
  - Hiring beginning January 2026 for manager replacement
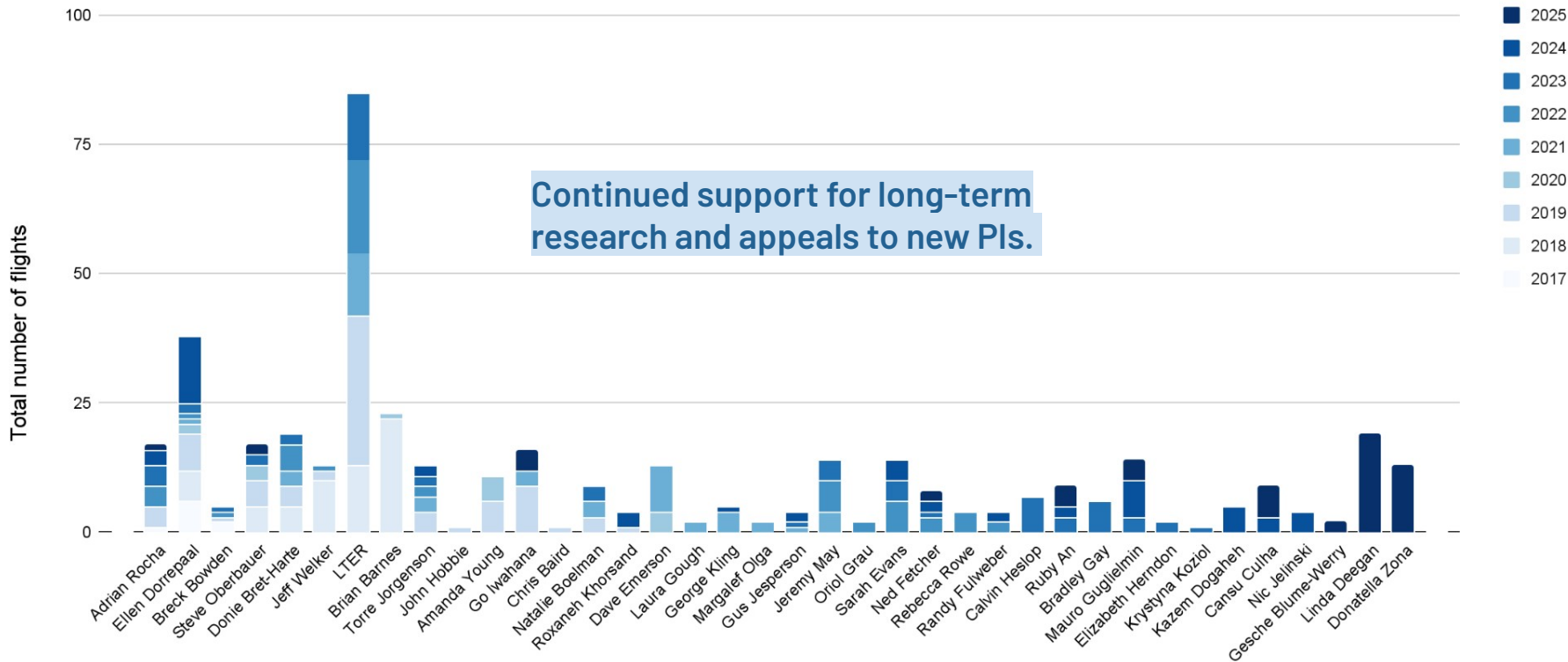- Rachel de Sobrino holding down the fort in 2nd year of analyst role

Total flights and projects supported by the TFS UAV program since 2017.

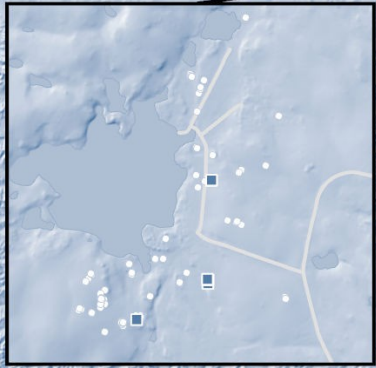**Relatively steady UAV support in last four years.**

Small decline may be influenced by some projects bringing own drones, as well as general user-day trends

UAV support since program inception

Continued support for long-term research and appeals to new PIs.

UAV flights throughout program history
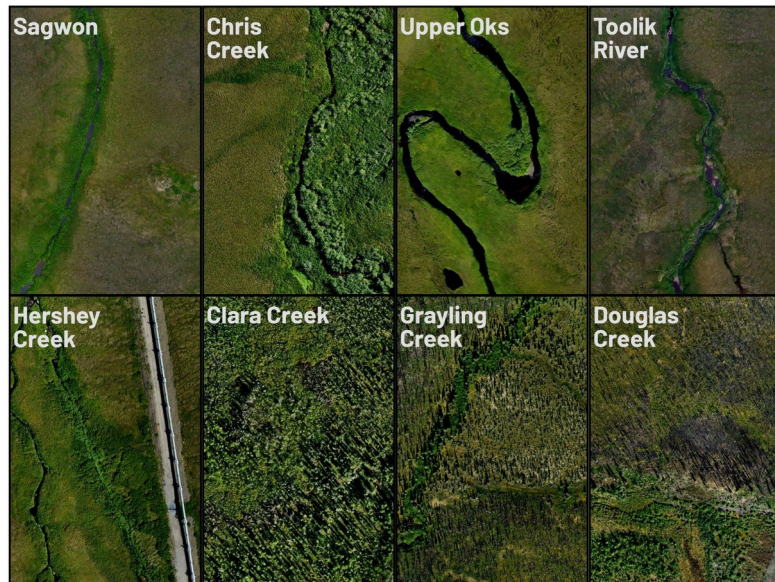
Project Support: Evome

ToolikGIS flew 13 of EvoME's 14 sites stretching from south of Coldfoot up to Sagwon.

- The first time we've flown south of the Brooks, or over trees! One site couldn't be flown safely due to limited line of site with tree cover and topography.
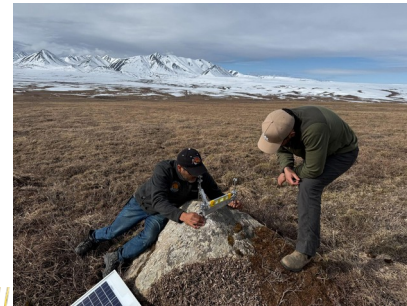- RGB and multispectral imagery for each study section

GNSS Surveys

Multi-day base station occupations are the backbone of the data accuracy we provide in drone and GNSS surveys.
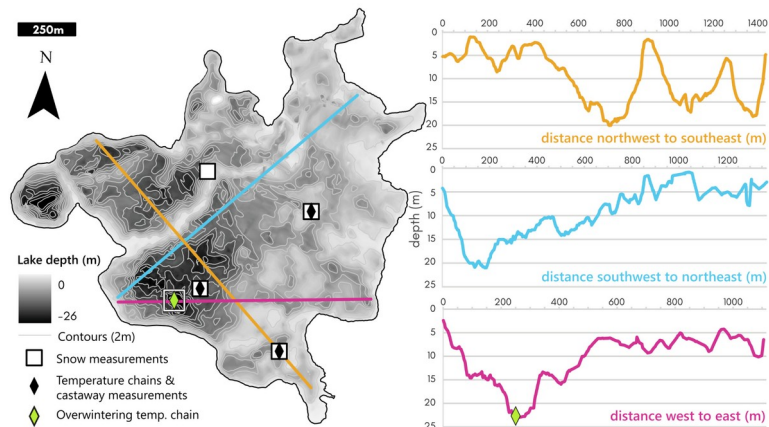
- Recurring equipment loans from Earthscope are key to making this possible.
- MEF made us additional spike mounts, tripling the number of concurrent occupations we can run.
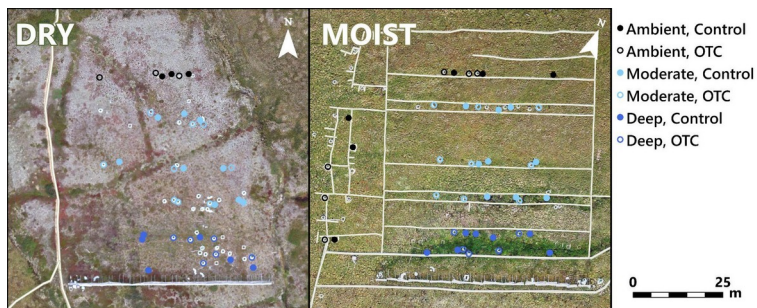
Isn't the weather at Toolik beautiful?

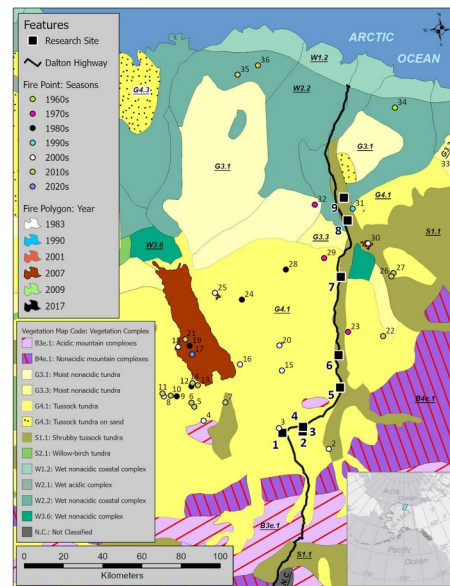Spike mount made by MEF's Joe Franich. →
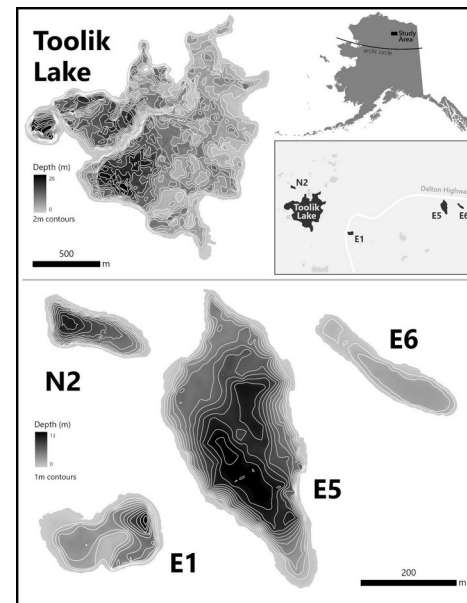
Publication Figures

Bathymetry map of Toolik Lake for Sally MacIntyre. R. de Sobrino

AON ITEX snow fence sites for Katelyn May. R. de Sobrino

Fire history and vegetation complexes for Angelica Feurdean. R. Fulweber, *Biogeosciences* 2025

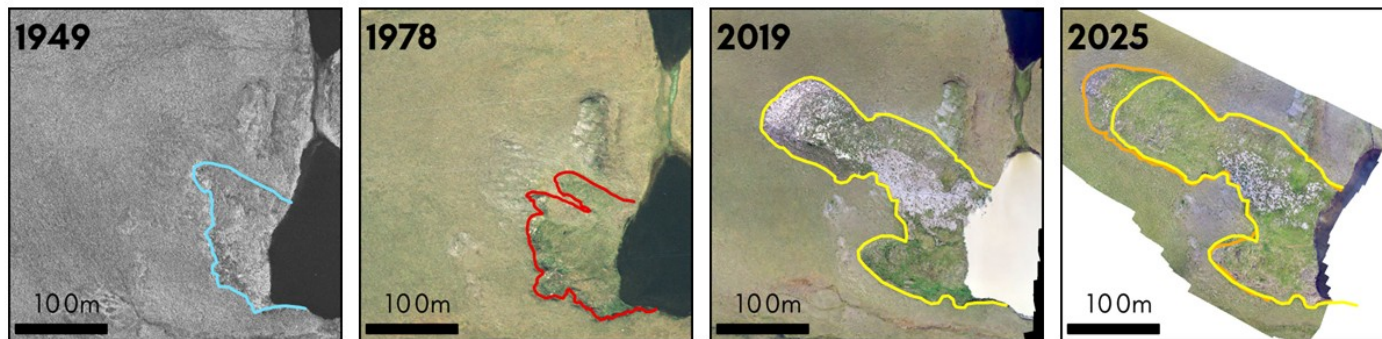Lake bathymetry for Robert Schwefel and Sally MacIntyre. R de Sobrino
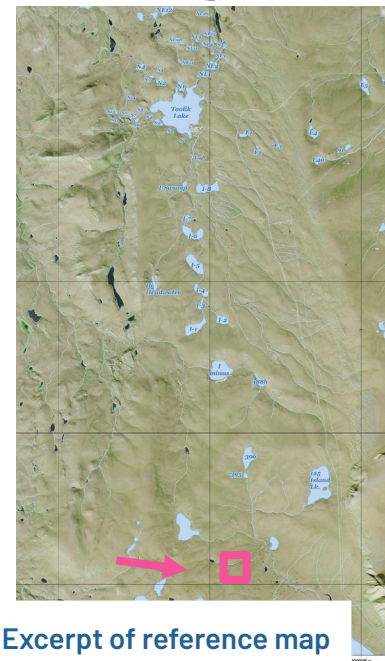
Area of Focus: GTH89/Lake 395 thermokarst

UAV flights for PIs Donatella Zona and Cansu Culha

Time series figures and analysis produced from historic aerial imagery and requested by multiple research projects.

Request submitted to NEON to fly this site each year - elevation data collected in 2025. NEON data products are heavily used by TFS GIS in mapping and analysis.
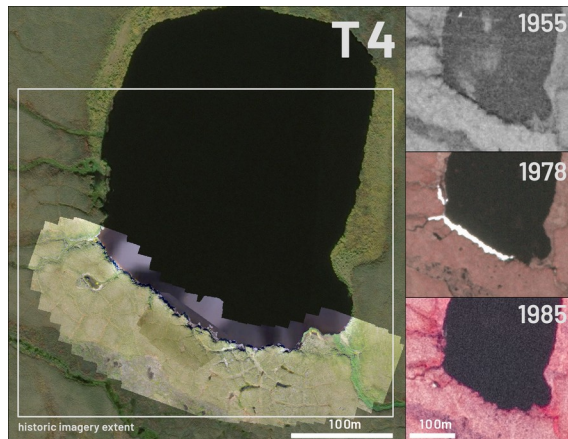

Time series of retrogressive thaw slump at GTH89/Lake 395 thermokarst. ToolikGIS undergraduate Adam Chavez downloaded and georeferenced historical aerial imagery in support of Donatella Zona's project on N2O emissions. R de Sobrino
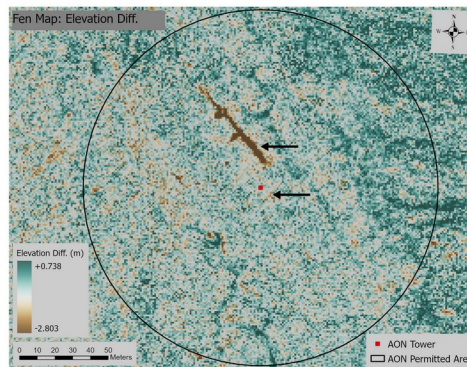

Excerpt of reference map of research lakes in Toolik vicinity for Phaedra Budy & LTER. R de Sobrino
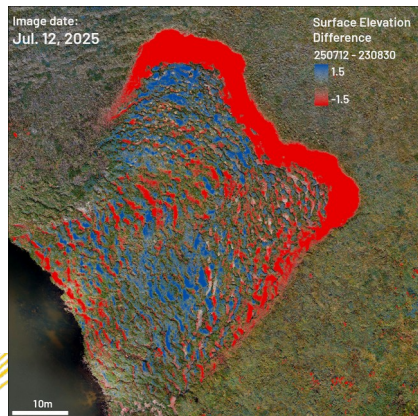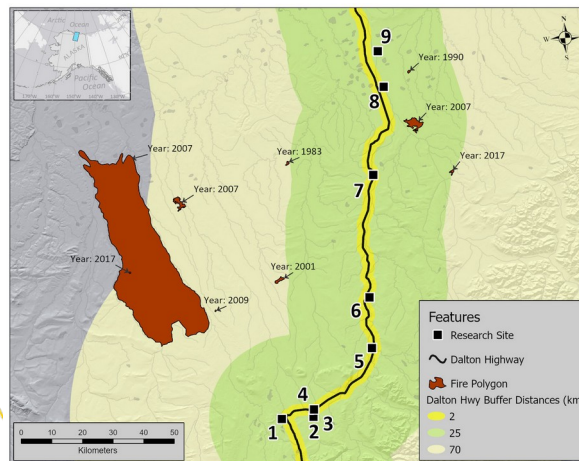
Remote Sensing and GIS Analysis

Time series of permafrost degradation on lakeshore. Adam Chavez downloaded and georeferenced historical aerial imagery in support of Donatella Zona's project on N2O emissions. R de Sobrino

Ground subsidence map at AON fen tower for Colin Edgar. R Fulweber

Surface elevation change at an active layer detachment in support of Rachel Harris. R de Sobrino

Fulweber calculated distances between soil cores and the nearest fires from the Alaska Interagency Coordination Center database. Fulweber is a coathour on the publication by Angelica Feurdean.

Drone Retirement

In compliance with federal regulations, Toolik's DJI drones are grounded and being auctioned off to buy a new drone.

- In process of acquiring VisionAerial Switchblade, and Micasense and PPK units to maintain same quality of data as in past years.