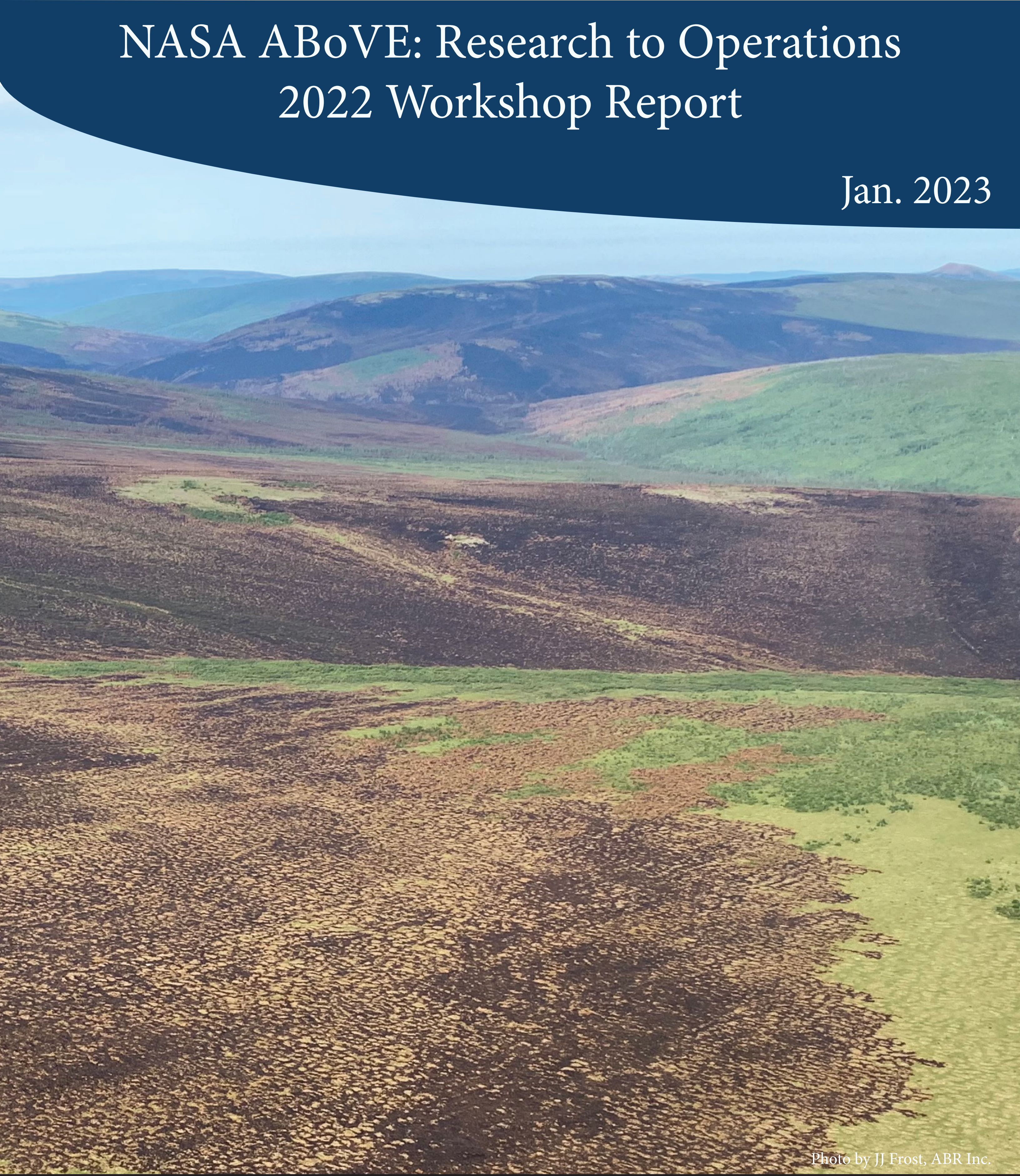
NASA ABoVE: Research to Operations 2022 Workshop Report

Jan. 2023



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ALASKA FIRE SCIENCE CONSORTIUM

ABoVE ARCTIC - BOREAL VULNERABILITY EXPERIMENT

International Arctic Research Center

UNIVERSITY OF ALASKA FAIRBANKS

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Photo by JJ Frost, ABR Inc.

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Introduction

The 2nd Alaska Fire Science Consortium (AFSC) Research-to-Operations (R2O) workshop convened May 12-13 at the University of Alaska Murie Building. The 1.5-day workshop was held following NASA ABoVE's 8th Annual Science Team Meeting as an opportunity for researchers and managers to engage directly and explore the use of research products in operational and decision-making settings. The aim was also to build upon the foundation laid in 2017 with AFSC's first NASA-sponsored R2O workshop and identify progress in the intervening five years. Recordings from the presentations at this workshop, links to materials from the 2017 R2O workshop, and additional resources are available online at frames.gov/event/557648.

2017 NASA ABoVE Workshop Report from AFSC

The 2022 workshop opened with leadership perspectives from Alaskan leaders of the Bureau of Land Management (Tom Heinlein) and the State of Alaska Division of Forestry and Fire Management (Helge Eng). These agencies, along with the US Forest Service, are the primary ones charged with fire suppression and protection in Alaska. The jobs of public agencies are immense, with the services they provide to residents and visitors of Alaska across millions of acres (150 million acres under State of Alaska fire protection alone) from urban areas to rural settlements, wilderness, parks and refuges. Federal agencies are also responsible for suppressing fire and supporting fire management planning for Alaska Native peoples, corporations and trust lands held by the Bureau of Indian Affairs.

Agency leaders highlighted the issues they face and the types of management decisions they are making daily. Examples of agency decisions include pre-season fire management planning as well as allocation of resources on single and multiple incidents, and across the state—before, during and after the Alaska fire season. Below are a few ideas and insights from land managers:

For near-real time decision-making (such as on active fires) at least two daily products are needed to make data useful--often by the time remotely sensed data can be obtained, it has been outpaced by progression of the incident. Still, remote sensing data is fast replacing the use of a human "field observer" to map progression which can take hours, or an entire work shift. Several federal agencies have rich datasets of plot-based vegetation and fire effects which would be invaluable for ground-truthing data in large remote sensing studies and syntheses. One suggestion was to embed research staff into agencies and vice versa to build stronger translational pathways.


Tom Heinlein, acting BLM Alaska State Director, gives opening remarks at the R2O workshop.

There has been a perception by land managers that NASA's mandate is more about supporting basic science and research, than application-directed missions. Can more emphasis be placed toward translating research into new insights for decision-making? Managers perceive that there is so much information, so many opportunities, that it is difficult to make sense of the inputs. What is useful, and what is actionable?

Overview

The process to translate new research insights and deliver new tools is not entirely clear. A few barriers to the implementation of new tools and use of new research were discussed. Agency staff tend to have narrowly focused (and funded) missions, with little capacity to access and process new data. Resistance to change can be high in agencies, for several reasons. Opportunities, however, lie in translating those insights for use in permitted activities, and understanding impacts of human and "natural" processes like climate change.

> **2017 & 2022 Management Priorities**
>
> Protect communities
> Increase efficiency of lean operations
> Improve science inputs for decision making
> Expand use of remote sensing data sources

Leadership perspectives were offered as well as by Scott Goetz, the ABoVE Science Team Lead. Scott explained that NASA now has an "Open Data" policy which is helping tremendously with objectives to make data available to agencies and for public purpose. There has been a lot of input from the field, from management agencies, and from communities in project planning for the first six years of the ABoVE experiment. NASA scientists have met face-to-face with stakeholders and communities in Alaska and Canada and have attended workshops and provided webinars in Alaska, Yukon, and the Northwest Territories for fire practitioners and local stakeholders. They have also solicited input to mission planning and included Alaska agency staff in new proposal development. Nancy French (Michigan Tech Research Institute) highlighted ongoing and completed ABoVE fire research projects. She highlighted the extensive field work in identifying post-fire effects and what has been learned about resiliency. Hydrology (soil moisture and water table) is a large driver of fire spread as well as depth of consumption.

Next we reviewed of some examples of the outcomes from the 2017 R2O workshop. Some data products presented then are now being used in decision making and other projects and products are still in progress. Randi Jandt (AFSC) gave examples of progress and accomplishments since 2017, including use of remote sensing for fuels inventories, fuel moisture detection, fire weather prediction, precipitation estimates, understanding forest response to disturbance through time, post-fire effects, and assessing fire risk.


R2O Poster Session

Alison York, AFSC coordinator, laid out the workshop goals, including a discussion of the barriers for operationalizing research. Priorities for the fire and land manager agencies and non-governmental organizations that partner with AFSC have not changed that much from 2017 (top right). Broadly, many of the "success stories" of applied research we reviewed centered on the three themes of potential fire risk, NRT fire behavior and post-fire effects. Participants were surveyed about topics for the workshop and three clear choices emerged:
1) soil moisture 2) vegetation 3) emissions/combustion

Work by scientists and ORNL-DACC to make datasets searchable and available, as well as the many webinars, meetings, and proposal planning sessions with direct involvement of stakeholder agencies and NASA or other participating scientists were also keys to successes since 2017. Jay Cable, from the Geographic Information Network of Alaska (GINA), described a successful effort to operationalize satellite remotely sensed hotspot data with a very short turnaround (latency) at the interagency fire coordination center. This took considerable effort from both the management and academic side, and the product is now being maintained with a combination of NOAA, University, and agency funding.

Soil Moisture: Management

From a management perspective, soil moisture is used for situational awareness (fire danger rating, resource allocation, resistance to control), fire behavior prediction (spread rates, flame length, spread probability) and some planned activities like prescribed fire.

Boreal forest duff plug: photo by Leif Van Cise, UAF

Eric Miller's presentation included a deep dive into properties of the soil organic (duff) layer that strongly influence wildfire and how these relate to the Canadian Fire Weather Indices that are used by Alaska fire managers for potential fire risk across the landscape.

Alaska uses the Canadian Fire Weather Index (FWI) system because indicator values like build-up index (BUI) appear to reflect observations better than comparable indicators from the U.S. national system, like energy release component. The U.S. national fire danger rating system was built for roundwood dead fuels (twigs to logs) while the Canadian system reflects empirically derived moisture contents in moss/forest floor. Latitudinal day length and foliar moisture content are not considered, however. In the Canadian system, the fine fuel moisture code indicates dryness in the top 2-4 cm of moss, and is about 16 hours (time lag) behind ambient atmospheric moisture content. Duff moisture has a 12 day time lag, and the indicator for deep drought, including litter moss, and upper duff to mineral soil (drought code) has a 50 to 200 day time lag. The drought code is therefore indicative of seasonal to annual moisture condition. Drought code is more useful in upland and mixed forest and upland areas than in lowland black spruce with shallow permafrost that keeps the layer saturated.

Precipitation has greater influence on seasonal soil water balance than evaporation, so perhaps more influence on fire season. However, vegetative drought stress may also occur in upland or better drained areas due to continued uptake of water by trees (esp. deciduous) but these processes are not captured by the algorithm. Because the Canadian indices are "initiated" on the third day after snowmelt each spring, it is desirable to have good spatial information for snow-off dates around the state. Unlike forests of the continental U.S., snowpack has little influence on the Alaska fire season. Managers would like to have near-real time soil organic layer moisture contents for seasonal startup, mid-season verification of fire danger and more localized information for projects like prescribed fires.

Accurate spatial precipitation data is a weak link in rating fire danger

Fire behavior prediction and modeling, unlike fire danger prediction, is based on outputs from the U.S. national fire behavior prediction system, based on Rothermel's fire spread model, and not including crown fire. An excellent overview on fire behavior analysis and the tools used in Alaska is available: see Fire Analysis in Alaska: Quick Reference (Ziel and Moore, 2021). Fuel moisture content and wind speed are the primary direct drivers of fire intensity and spread. Eric described how fuel moisture contents, live and dead, are routinely estimated--rather than measured--using other factors like temperature, relative humidity, and shading (canopy cover). Dead fire fuel moisture contents are atmospheric-forced, while live fuel moistures are physiologically maintained and non-vascular mosses and lichens are poikiolohydric. Other influences on fuel moisture content are less well known and not accounted for in drying models, including solar radiation, evaporation fraction, surface temp, planetary boundary layer, active layer depth, and vapor pressure deficit.

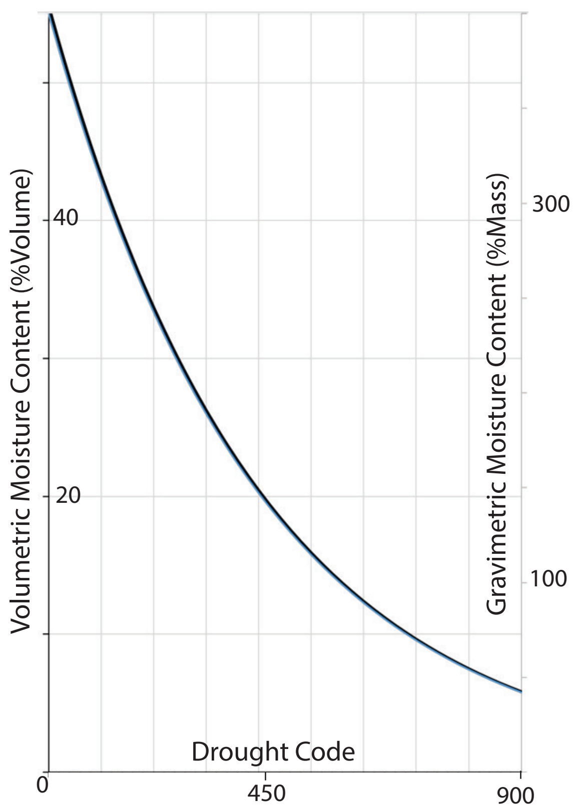
Soil Moisture: Research

Recent experiments have been conducted to validate and calibrate soil moisture detection using microwave remote sensing. Laura Bourgeau-Chavez's summary of the studies indicate three main C- and L- band satellite sensors are being used: Radarsat-2, Sentinel-1 and ALOS PALSAR.

A key challenge in current Soil Moisture Active Passive (SMAP) products is that filters for soil moisture and biomass often exclude boreal areas. Off-the-shelf SMAP moisture content are weakly to moderately correlated with field moisture contest measurements. However, a few corrections, like normalizing SMAP brightness and calibrating algorithms with regional fuel densities improved relationships substantially (R^2 up to 0.67). Thus, accurate retrievals are possible. Laura has observed the best correlations with remote sensing indices are found at 1.2 cm for the fine fuel moisture code and 10-18 cm for drought code in boreal forest. In the Arctic, the best correlation with SMAP moisture content was at 6 cm depth.

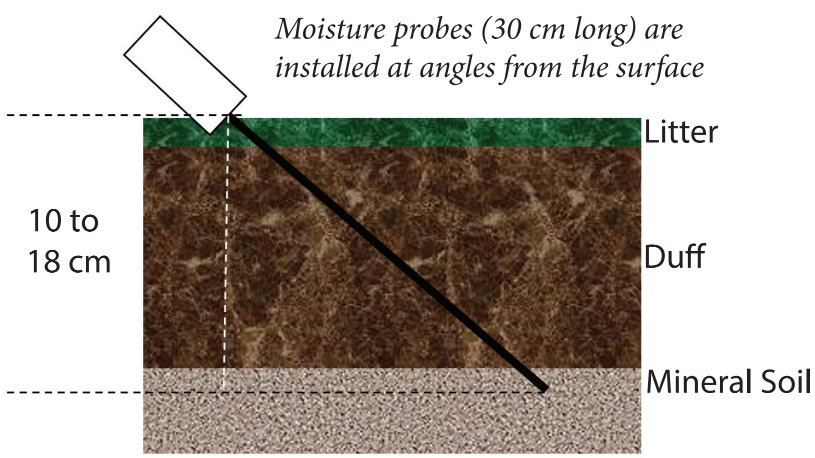
C- and L-Band radars can provide good correlation with near-real-time soil moisture in boreal and tundra duff!

Active radar soil moisture sub-canopy retrievals from polarimetric C-band SAR gave even better relationships and resolution to boreal volumetric soil moistures. For example, 12 cm moisture prediction in peatlands yielded R^2 of .76 when fuel type was considered (shrub biomass, etc.). Polarimetric L-band UAVSAR also accurately predicted organic soil moisture at 12 cm deep at the Ft. Providence field site. Once launched in 2024, NASA's NISAR will allow mapping every 6-12 days. It is important to develop algorithms for NISAR, as that platform will not be fully polarimetric. For the Alaskan fire community, Franz Meyer and Simon Zwieback at UAF are working on NISAR applications and could be helpful in connecting with the NISAR working group.



Maps of organic soil thickness and fuel load would be helpful to inform models for estimating fuel moisture (and fire danger). Such maps could also improve remotely sensed soil moisture estimates from land surface models incorporating fire (e.g. CaLDAS).

In Canada, there is an effort to re-vamp and modernize the FWI system, designed to represent near-term and seasonal drought. Typically, a 15-18 cm deep sample of compacted organic layer yields about 25 kg/m² of fuel and has a bulk density of 39 kg/m³ but there is considerable regional variability. Volumetric moisture content--which correlates even better with remotely sensed moisture content retrievals than gravimetric MC--is calculated as [VMC = GMC * bulk density]. Chelene's figure (left) shows how the two measures of moisture content relate to the drought code.



Chelene explained proper methodology when using hand-held TDR probes to measure duff moisture in experiments to validate remotely sensed soil moisture products. Figures Hanes 2022.

Soil Moisture: Takeaways

Investigators continue working toward accurate remotely-sensed soil moisture retrievals. The primary sensors useful for this work include Radarsat(but low-cost data has limited availability via data grants), Sentinel, SMAP, ALOS-PalSAR, and ultimately NISAR. NASA-ISRO Synthetic Aperture Radar (NISAR) mission is a joint project between US and Indian space agencies to launch a dual-frequency (S-band and L-band) synthetic aperture radar on an Earth observation satellite. Many projects are currently ramping up to support NISAR, which proposes to provide maps of surface soil moisture globally every 6 to 12 days at the spatial scale of individual farm fields. Important contacts for NASA's soil moisture retrieval project include Andreas Colliander at JPL, who has committed to continue working on correction factors for boreal moss duff moisture retrieval (quite different than agriculture application).

Research by the Canadian Forest Service as they update the fire danger rating system (CFFDRS, 2021) will aid efforts to understand and use remotely-sensed soil moisture in wildland fire application. The group at Michigan Tech Research Institute continues to work with their field data to develop corrections and better processing algorithms for boreal forest and tundra and subsequently has shared some of their findings at the December, 2022 AGU meeting (Bourgeau-Chavez *et al.,* 2022). It is important to continue to collect data on basic properties of boreal and arctic organic soils (impedance, bulk density, mineral content) to calibrate new sensors as they are available.

In the last decade, so much has been discovered about permafrost and hydrology and how it is impacted by both disturbance and climate: how can this science be made actionable for decision-makers and public?

Two ideas that were proposed are:

1) Permafrost maps for land management application are available via GIPL at gipl.alaska.edu, contacts are Nicolas Hasson and Dmitry Nicolsky. The site also hosts a TEM-based modeling tool to show the projected permafrost thaw curve for a user's area of choice.

2) Active layer maps could be used to determine impacts of proposed actions and for planning and permitting activities. New remote sensing methods can provide estimations of active layer (ex. Schafer, 2017) over large areas. In addition, more near real time data (weekly, for example) on thaw depth would be useful to fire managers making decisions on where to initiate fire danger indices in the spring. Data is just starting to trickle in on the magnitude of fire's influence on thaw depth at scale and through longer periods of time.

ABoVE Fire Disturbance Working Group

The group, led by Dong (Tony) Chen, has undertaken a review and synthesis of tundra/fire effects datasets from both researchers and agencies.

Check out the live spread sheet at tinyurl.com/229stbk

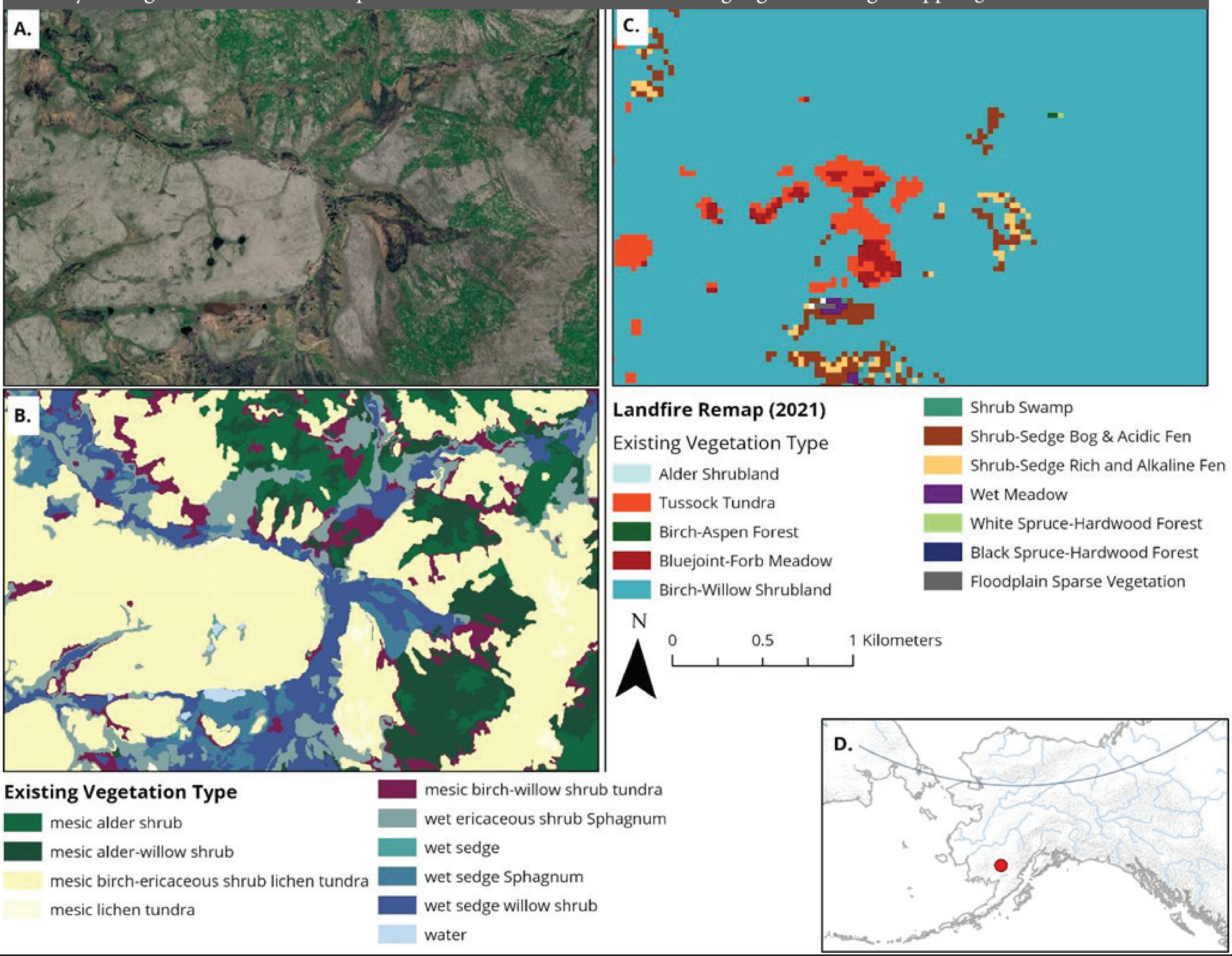
R2O researchers on the field trip visited the AK Division of Natural Resources: Department of Forestry Northern Region Facility and learned about agency work flows and research needs.

Matt Macander outlined recent ABoVE products and identified new sources of data as well as machine-learning algorithms for making important distinctions (e.g. high lichen cover refugia for caribou winter range, high continuity of black spruce tree cover, tundra shrub cover, etc.) to provide direct input to decision making. There has been significant progress in the mapping of vegetation cover types using hyperspectral remote sensing, from UAV's to satellites. Jonathan Wang's data set on Landsat MODIS-derived dominant vegetation cover from 1984-2014 is useful in providing perspective of regional trends and it would be desirable to extend the dataset to the current period (Wang *et al.,* 2019). Findings from research showing deciduous/coniferous fraction change (Massey *et al*., 2022) and plant functional type change (including where shrubs are increasing, and where forest types are changing, (Macander *et al.,* 2022)) could provide useful insights to regional land management. Products like continuous percent cover of foliar black spruce across the landscape (Nawrocki *et al.,* 2020) and products that provide canopy height and biomass at 10-30m resolution may be of interest to managers.

Useful geospatial products can be found at the State of Alaska Geoportal: gis.data.alaska.gov

A research project using IceSat 2 to estimate global biomass across the pan-arctic (Duncanson) has shown that the boreal zone has more biomass than previously thought, which can be factored into carbon and emissions models. Although some of the ABoVE geospatial maps are served in Canada Albers projection, there is a reasonable conversion for them to Alaska Albers projection used in the Alaska geospatial community.

Vegetation cover class and fuel maps derived from satellite data can be compared to LANDFIRE vegetation map products used by managers. Below is an example of the Mulchatna river from Matt's google earth engine app. Figure Macander, 2022.



Vegetation: Management

Lisa Saperstein demonstrated the workflows of an agency analyst when providing fire behavior and modeling for near-real-time decisions on incidents. She described some of the data gaps and needs faced by management and the challenges inherent in utilizing new data in mandated decision support systems. For example, fire modeling practitioners would like a gridded winds library (at a scale around 5°) for informing fire behavior runs. The product requires lots of computing power but might be within the purview of USGS-Climate Action Science Center.

Fuels considerations:

What will carry the fire? Grass, litter, shrubs?
How much fuel loading (biomass) is there?
Have RH, rainfall, or shade conditions changed?
What is the horizontal and vertical continuity of fuels?
Will this continuity change seasonally?
Will the height and density of fuels affect wind?

Fire practitioners think about vegetation as fire fuels and this involves characteristics that might not be important in other applications. Spatial fire behavior analyses of ongoing fire incidents are conducted using a web-hosted tool called WildFire Decision Support System (WFDSS) and includes fuels, topography, weather data used by analysts. Understanding how these analyses are used in decisions helps clarify the data needs for wildfire management.

Vegetation: Takeaways

Since the vegetation map product available to fire managers in WFDSS comes from LANDFIRE's team, it will be important to bridge other vegetation mapping efforts that potentially add much more accuracy and spatial resolution with LANDFIRE. Could Alaska vegetation map layers be hosted on a multi-agency platform, with the capability of annual updating (similar to the way CALFIRE sponsors vegetation maps in their region)? It would help researchers to have briefs describing best standard geospatial formats that can be used in management applications. Currently ArcGIS Online is the native platform for real-time fire management in Alaska. The Alaska Interagency Coordination Center hosts fire-related datasets that are easy to access and download.

Managers would like to be able to access moisture content for foliar or live herbaceous/woody vegetation based on earth observations (rather than algorithms computed from drying models). New hyperspectral data seems poised to deliver this: the GOES ABI instrument is being use to estimate live and dead fuel moisture contents over the continental U.S. VIIRS can potentially deliver an estimate for Alaska as well (Jimenez *et al.*, 2022).

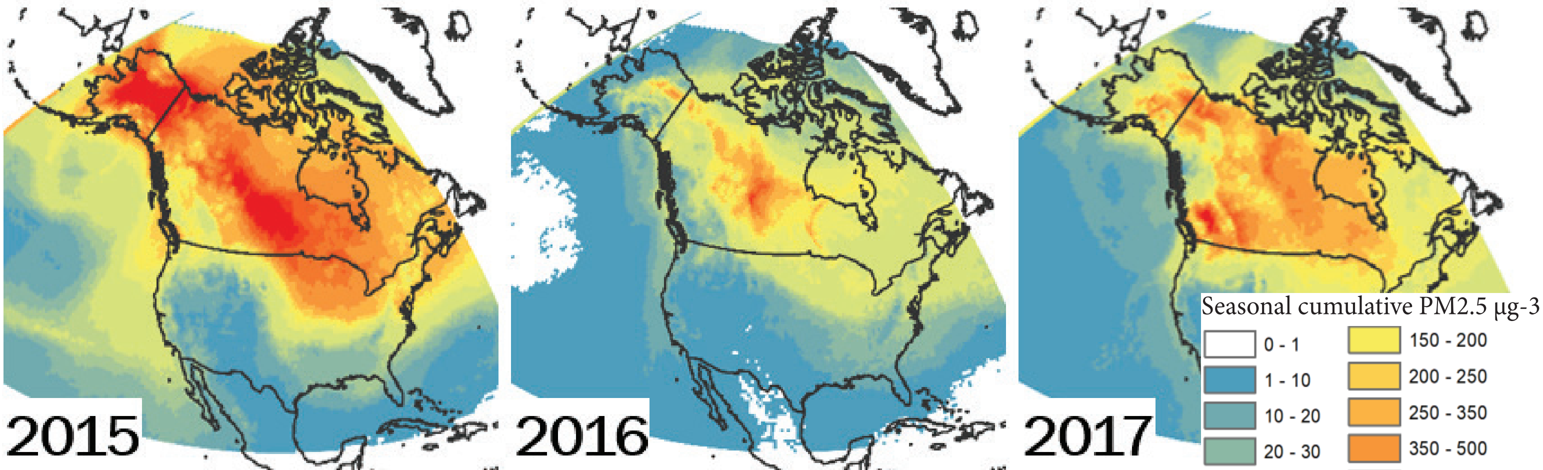
Unrestricted software can be useful for sharing and mining vegetation layers. For example, Adrianna Foster is developing a stand-based forest growth model, where users can choose different management practices modifying fuels (shear blading, thinning etc.) and see vegetation results at various future time-steps. Her team met with managers to develop desired management options for inputs. To bring this tool to application frequent meetings with end-users and some knowledge of the computer systems they use has been essential.

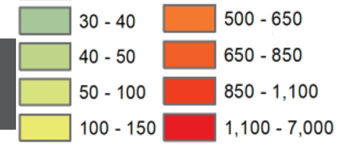
Break-out discussions identified valuable collaborations for both research and management with the State of Alaska's Vegetation Technical Working Group, who is setting standards to facilitate & coordinate vegetation mapping across Alaska: gc-vegetation-soa-dnr.hub.arcgis.com

Emissions: Research

The WildFire Emissions Inventory System (WFEIS) has new improvements making it an even more valuable tool, not only for research use, but for anyone to query carbon or emissions data and generate reports from their fire, management unit, region or state.

Dong (Tony) Chen suggested WFEIS could be used to estimate PM2.5 and model long term exposures to compare with health outcomes and provide mitigation recommendations. Air quality data is much sparser in rural Alaska, compared to the urban centers, in spite of recent efforts to expand the purple air monitor network. Several smoke modeling tools are available to Alaska Interagency Coordination Center (AICC) Predictive Services, and there is still uncertainty as to which of these has the best skill to use for planning and public advisory services. The Alaska Department of Environmental Conservation (ADEC) is the agency charged with issuing air quality forecasts and the fire agencies also need forecasts of smoke and visibility for their aircraft operations and logistics plans.





Large scale combustion data sets can be visualized and linked to administrative health dataset to assess health outcomes related to wildfire emissions. (Chen et al. unpublished findings)

Paul Goodfellow explained how ADEC completes an annual wildfire emission inventory using perimeter data from AICC combined with rather outdated algorithms for regulatory reports. They are planning to update their methods using whatever new scientific tools that could be applied for the task.

Emissions: Takeaways

What is the best way to apply the scientific findings on smoke and health to public needs? One suggestion was to promote more effective use of science tools using NASA's Earth to Sky program, presenting to science communicators at management units (for example, fire Public Information Officers or ADEC staff) who can effectively train the public.

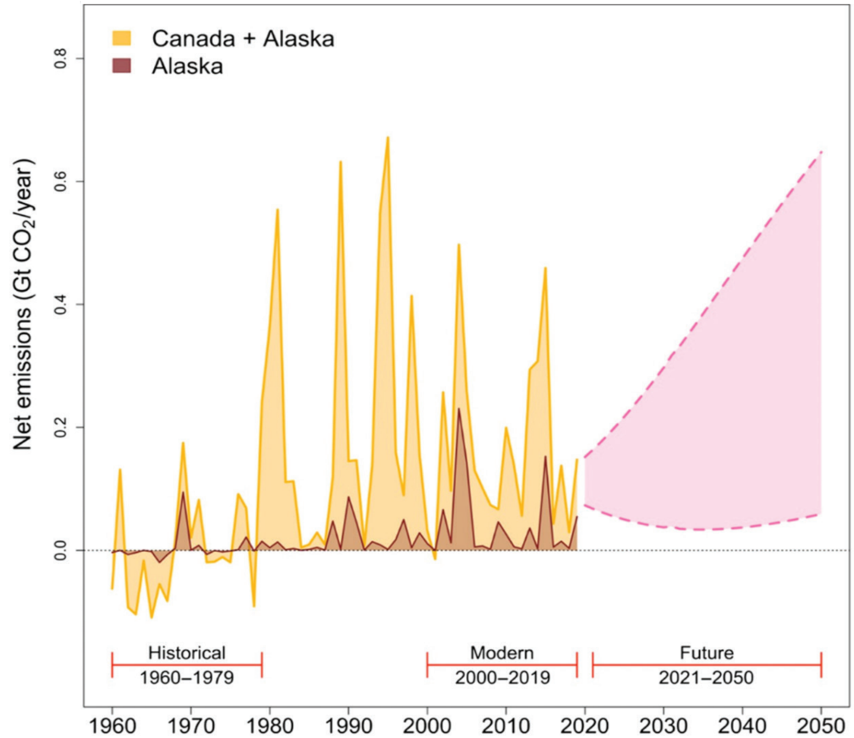
There is potential to utilize satellite-detected aerial optical density (which can be used to approximate surface PM2.5) for near-real-time decisions. A vibrant discussion centered around using NASA's new vertical smoke model for aircraft and fire information applications.

Recent scientific effort has focused on improving air quality modeling in Alaska but a comparison of the effectiveness of various tools for forecasting remains to be done. For example, HRRR has expanded instrumentation which has recently been used to improve smoke modeling as presented in a recent webinar (James, 2022).

Smoke impacts not only health but can ground firefighting and logistics aircraft during critical operations. Fire meteorologist Eric Stevens noted that expressions of smoke as ceilings and visibility are extremely important, as well as concentrations of particulate matter

Combustion: Research

Boreal areas of North America and Eurasia have the second highest rate of natural fuel consumption due to fire in the world. The emissions from these areas, which coincide with intensifying fire regimes, are globally significant (right-hand figure: Phillips *et al.,* 2022). Brendan Rogers (Woodwell Climate Research Center), demonstrated the large dataset on combustion across Alaska and Canada that has been assembled by the ABoVE project. The dataset includes measurements from over 1,000 ground-truthed burned field plots, and is now publicly available in the ORNL-DAAC.



Other ABoVE investigators (Potter *et al.*, 2022) have used the dataset to create useful auxiliary data products, such as a model of depth-of-combustion over boreal North America. One application of this dataset is to train advanced machine-learning spatial models (ex. convolutional neural network) to "grow" the fire on the landscape—with surprising accuracy. There is possibility that this type of modeling could someday replace the algorithm-driven fire models produced by analysts on active incidents.

Brendan gave an example of how depth-of-combustion modeling might be used in a management area like the Yukon Flats Wildlife Refuge and could be applied to predicting potential depth of combustion during active incidents.

Workshop Takeaways

Decision-makers under stress and time constraints will turn to familiar products.

Managers often have difficulty expressing their needs in "quantifiable" terms, yet sometimes, if the investigator knew certain data was useful, they could easily prepare it for management use.

Collaborators need to perceive there's something "in it" for them—a concrete need or objective.

Research entities like the National Science Foundation and NASA may not have capacity to prepare science derivative products for everyday use. However, data application brokers from these agencies and others (e.g. USGS, GINA, State of Alaska) are experienced with applications.

Integrating Science Into Workflows:

Involve collaborators during project planning.

Create pilot project or examples at small scale.

Link maps, models, and projects to public platforms or agency systems.

Distribute product to trusted person/entity for top-down delivery.

New scientific projects often don't come with long term funding. An example of this is the Wildfire Emissions Inventory System which developed a useful web-based tool end-users can operate but struggles to find funding for annual maintenance and permanent hosting.

"Language Matters"—if the project is not expressed in terms familiar to collaborators, they may not understand it's potential benefits. Example: it is tremendously helpful that investigators have learned about the fire weather indices and fire modeling tools that managers currently use to be able to relate findings to them using or comparing these tools.

Specific Outcomes

The goal of the 2022 R2O Workshop was to outline better strategies to move research products into an accessible format so they can be used for decisions at home, community, and governmental levels. Since the workshop, AFSC has noted a number of positive outcomes that we believe were inspired or augmented by the workshop.

Awareness and networking: The remote sensing workshops increased awareness of agency needs among support agencies like NOAA, GINA, NASA as well as among scientists in academia. We have noted increased contacts from these entities and requests for fire agency research needs and staff contact info, as well as data sharing between agencies and academia.

Fire danger and risk assessment: AICC Predictive Services used algorithmically produced snow cover maps from NASA Short-term Prediction Research and Transition Center (SPoRT) for the first time in 2022 to start up and shut down fire weather index tracking at Remote Automatic Weather Stations (RAWS). Algorithms start calculating wetting/drying beginning three days after an area is snow-free and indicate drought and fire danger throughout the season.

Vapor pressure deficit: Managers believe vapor pressure deficit may be a good index of fire ignition potential that's underutilized. There is emerging evidence of a strong correlation between vapor pressure deficit and fire spread, ignition, potential, fine fuel moisture code.

Soil moisture: In terms of validating fire danger indices during the fire season, soil moistures at two depths (0-10 cm and 5-10 cm) from NASA SPoRT were hosted on the AICC website for the first time during 2022 fire season. AICC comparisons from limited ground-truthing in 2022 suggest the SPoRT indices are tracking observed precipitation inputs. These soil moistures can be queried for specific fire locations, another capability that was sought by fire practitioners in 2017 & 2022.

Soil moisture: There is new evidence that soil moisture retrievals from polarimetric C- and L-band synthetic aperture radar (SAR) have skill and can be improved even more using site-specific algorithms based on fuel characteristics. This is great news, given that the longer L-Band wavelength is less affected by vegetation and NASA's NISAR sensor is due to launch in Jan 2024 (Bourgeau-Chavez *et al.*, 2022).

Smoke: AICC Predictive Services compared performance of the three most commonly used smoke models in Alaska during the active 2022 fire season. The recently improved HRRR smoke forecast seemed to be the most accurate. However its web interface is not very user-friendly and could be improved.

Fire detection and spread monitoring: NOAA's National Environmental Satellite Data and Information Service (NESDIS) is aware of the Alaska fire community's interest in more frequent satellite hotspot detection and is working directly with AWFCG in developing capabilities of the new GOES-17 and GOES-18 satellites. Mike Pavlonis (NESDIS manager) told managers at the interagency 2022 Fall Fire Review that they may be able to provide hotspot detection as often as every 10 minutes, and even under cloud cover. Managers were interested in the possibility of using this type of data for strategizing resource allocation to ongoing fires at the multi-agency coordinating group level.

Fire effects: Jen Schmidt presented findings at the Alaska Wildland Fire Coordinating Group Fall Fire Review demonstrating the effective use of Sentinel-2 data to assess burn severity after a devastating 2019 Alaska wildfire. She achieved high correlation ($R^2 = 0.66$) with field burn assessments (Composite Burn Index).

Emissions and C estimates: At the 2022 interagency Fall Fire Review U.S. Fish and Wildlife Refuge Manager Jimmy Fox described the use of the Wildland Fire Emissions Inventory System tool (presented at both R2O workshops) to inventory emissions produced during 2022 fires on the wildlife refuges he manages and how this data could inform fire management planning decisions in the future.

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Agenda

Research to Operations (R2O) workshop:
Using Remotely Sensed Data in Fire and Resource Management
May 12-13, 2022. Murie Building, UAF. In association with ABoVE 8th Science Team Meeting

Thursday, May 12: 1330-1600 PLENARY all afternoon with field trip and group dinner

1330-1400 Welcome and Introductions: AFSC staff and participants, goals and expected outcomes, focal areas, code of conduct, land acknowledgment, round robin brief intros.
1400-1415 A view from land management leadership | Tom Heinlein, Helge Eng
1415-1430 A view from science leadership | Scott Goetz, Nancy French
1430-1515 Progress report from AFSC 2017 workshop and goals/priorities for this workshop | Randi Jandt, Jenn Jenkins, Eric Stevens, Laura Bourgeau-Chavez
1515-1530 Geographic Information Network of Alaska (GINA) support of fire management| Jay Cable, Jen Delamere
1530-1600 Discussion, break and transition to field trip
1600-1800 Depart for field trip to Alaska Division of Forestry Northern Region facility
1800-2000 Group dinner

Friday, May 13: 0800-1700 PLENARY and Discussion

0800-0900 PLENARY: Synthetic presentation 1: Soil moisture | Laura Bourgeau-Chavez, Chelene Hanes, Eric Miller
0900-1030 Discussion on soil moisture topics
1030-1130 PLENARY: Synthetic Presentation 2 Vegetation | Matt Macander, Lisa Saperstein
1130-1300 LUNCH and poster session
1300-1345 Discussion on vegetation topics
1345-1430 Synthetic Presentation 3: Smoke/emissions/combustion | Brendan Rogers, Tony Chen, Allison Baer, Eric Stevens, Paul Goodfellow
1430-1630 Discussion on smoke/emissions/combustions topics
1630-1700 Wrap up and evaluation


Photo by Zav Grabinski, AFSC

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Jandt, R. & Z. Grabinski (2023). NASA ABoVE: Research to Operations 2022 Workshop Report. Alaska Fire Science Consortium, International Arctic Research Center, University of Alaska Fairbanks.

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