Summary of the ABoVE L-band and P-band Airborne SAR Surveys, 2012-2022

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Documentation Revision Date: 2023-06-13

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Summary

This dataset contains tables containing Airborne flight metadata from synthetic aperture radar (SAR) surveys from 2012 to 2022 in Alaska and Canada as part of NASA's Arctic Boreal Vulnerability Experiment (ABoVE). ABoVE conducted airborne SAR surveys of over 120,000 km2 in Alaska and northwestern Canada during 2017, 2018, 2019, and 2022. The data files and companion file contain L-band and P-band airborne SAR metadata acquired during the ABoVE airborne campaigns. Included are detailed descriptions of ~80 SAR flight lines and how each fits into the ABoVE experimental design. Extensive maps, tables, and hyperlinks give direct access to every flight plan as well as individual flight lines. This entry is a guide to enable interested readers to fully explore the ABoVE L- and P-band SAR data.

This dataset includes 37 data files in comma-separated values (*.csv) format and one file in Portable Document Format (*.pdf) format.

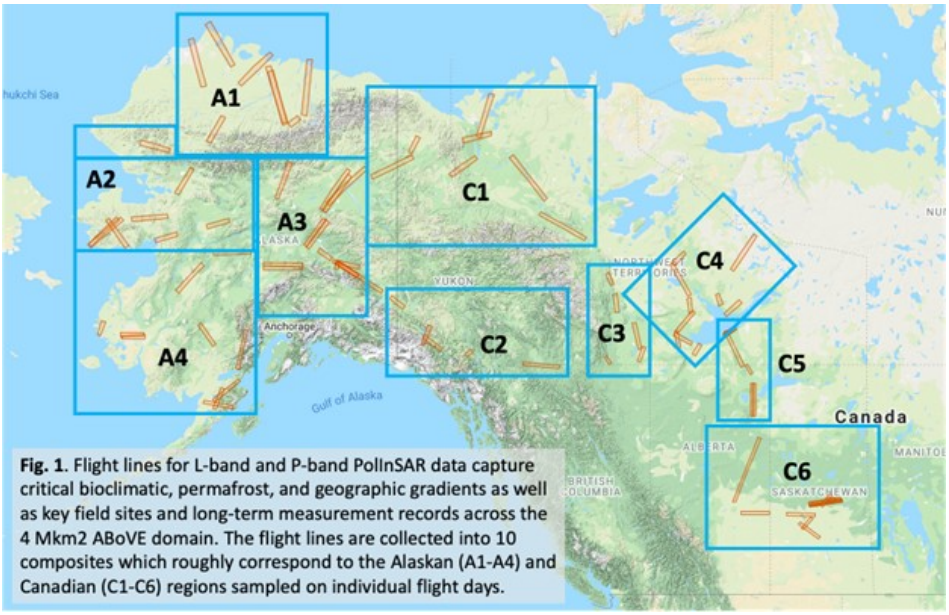

Figure 1. Flight lines for L-band and P-band PolInSAR measurements capture critical bioclimatic, permafrost, and geographic gradients as well as key field sites and long-term measurement records across the ABoVE domain. The flight lines are collected into 10 composites which roughly correspond to the Alaskan (A1-A4) and Canadian (C1-C6) regions sampled on individual flight days. Basemap source: Google Maps.

Citation

Miller, C.E., P. Griffith, E.E. Hoy, N. Pinto, Y. Lou, S. Hensley, B. Chapman, J.L. Baltzer, K. Bakian-Dogaheh, W.R. Bolton, L.L. Bourgeau-Chavez, R.H. Chen, B-H. Choe, L.K. Clayton, T.A. Douglas, N.H.F. French, J.E. Holloway, G. Hong, L. Huang, G. Iwahana, L.K. Jenkins, J.S. Kimball, T.V. Loboda, M.C. Mack, P. Marsh, R.J. Michaelides, M. Moghaddam, A.D. Parsekian, K. Schaefer, P. Siqueira, D. Singh, A. Tabatabaeenejad, M.R. Turetsky, R. Touzi, E. Wig, P. Wilson, C.J. Wilson, S.D. Wullschleger, Y. Yi, H.A. Zebker, Y. Zhang, Y. Zhao, and S.J. Goetz. 2023. Summary of the ABoVE L-band and P-band Airborne SAR Surveys, 2012-2022. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2150

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1. Dataset Overview

This dataset contains tables containing Airborne flight metadata from synthetic aperture radar (SAR) surveys from 2012 to 2022 in Alaska and Canada as part of NASA's Arctic Boreal Vulnerability Experiment (ABoVE). ABoVE conducted airborne SAR surveys of over 120,000 km^2 in Alaska and northwestern Canada during 2017, 2018, 2019, and 2022. The data files and companion file contain L-band and P-band airborne SAR metadata acquired during the ABoVE airborne campaigns. Included are detailed descriptions of ~80 SAR flight lines and how each fits into the ABoVE experimental design. Extensive maps, tables, and hyperlinks give direct access to every flight plan as well as individual flight lines. This entry is a guide to enable interested readers to fully explore the ABoVE L- and P-band SAR data.

Project: ABoVE

The Arctic-Boreal Vulnerability Experiment (ABoVE) is a NASA Terrestrial Ecology Program field campaign being conducted in Alaska and western Canada, for 8 to 10 years, starting in 2015. Research for ABoVE links field-based, process-level studies with geospatial data products derived from airborne and satellite sensors, providing a foundation for improving the analysis, and modeling capabilities needed to understand and predict ecosystem responses to, and societal implications of, climate change in the Arctic and Boreal regions.

Related Datasets:

Related data are available on the ABoVE Project page.

Acknowledgements:

The L- and P-band SAR data acquisitions would not have been possible without the indefatigable support of our NASA pilots and flight crews. We thank John McGrath and the NASA AFRC C-20 (N30502) team as well as Derek Rutovic and the NASA JSC G-III (N995NA) team. We also thank the instrument scientists, operators, and data processing team from the JPL Suborbital Radar Science and Engineering Team (334F) who were essential to the successful execution of these experiments and rapid processing of the resulting data products. The field work supporting the SAR campaigns was made possible by the excellent support from Dan Hodkinson, Sarah Sackett, and the ABoVE Logistics Office. Finally, we thank the data curation team at the Oak Ridge National Laboratory Distributed Active Archive Center for their support and expert advice.

This work was supported by the NASA Terrestrial Ecology Program's Arctic-Boreal Vulnerability Experiment (ABoVE). A portion of this work was performed at the Jet Propulsion Laboratory, California Institute of Technology, under contract with National Aeronautics and Space Administration (80NM0018D0004).

2. Data Characteristics

Spatial Coverage: Alaska, USA and Canada

Spatial Resolution: Locations throughout the ABoVE study domain

Temporal Coverage: 2012-01-01 to 2022-12-31

Temporal Resolution: Irregular flights throughout temporal coverage window

Study Areas: Latitude and longitude are given in decimal degrees.

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Alaska and Canada	-169	-102	72	50

Data File Information

This dataset includes 37 files in comma-separated values (*.csv) format and one file in Portable Document Format (*.pdf).

The file *Summary_of_the_ABoVE_L-band_and_P-band_Airborne_SAR_Surveys.pdf* contains L-band and P-band airborne SAR metadata acquired during the ABoVE airborne campaigns. Included are detailed descriptions of ~80 SAR flight lines and how each fits into the ABoVE experimental design. Extensive maps, tables, and hyperlinks give direct access to every flight plan as well as individual flight lines.

Each *.csv (e.g. *Table_1_ABoVE_L-band_PolInSAR_Campaign_1.csv*) coincides with a table in the PDF document. These files contain details regarding airborne SAR flights, including the flight plan number and a URL to flight plan summary at uavsar.jpl.nasa.gov.

Table 1. Data dictionary for CSV data files (Table_*.csv). Each file contains a subset of these fields.

Variable	Units	Description
Flight_plan		Airborne flight plan number
Flight_plan_url		URL to flight plan summary at uavsar.jpl.nasa.gov
Sortie_date	YYYY-MM-DD	Flight date
Region_sampled		Region sampled
Region_sampled_url		URL to flight plan map at uavsar.jpl.nasa.gov
PolInSAR_band		SAR band; L or P-band
Campaign		Name of airborne campaign
Line_ID		Flight line ID

Short_name		Flight line name
Flight		Airborne flight plan number. Synonymous to ‘Flight_plan’
Flight_url		URL to flight plan summary at uavsar.jpl.nasa.gov. Synonymous to ‘Flight_plan_url’.
Band		SAR band; L or P-band
Date	YYYY-MM-DD	Flight date. Synonymous to ‘Sortie_date’.
Region		Region sampled. Synonymous to ‘Region_sampled’
Comments		Contains additional details about the flight line

3. Application and Derivation

These files enable interested readers to fully explore the ABoVE L- and P-band synthetic aperture radar (SAR) data. See Miller et al. (2019) for an overview of the ABoVE airborne campaign and discussion of the L-band and P-band SAR within the context of the ABoVE project.

4. Quality Assessment

None provided.

5. Data Acquisition, Materials, and Methods

Please refer to the documentation file, *Summary_of_the_ABoVE_L-band_and_P-band_Airborne_SAR_Surveys.pdf*, for methodology details.

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

Summary of the ABoVE L-band and P-band Airborne SAR Surveys, 2012-2022

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov
- Telephone: +1 (865) 241-3952

7. References

Miller, C.E., P.C. Griffith, S.J. Goetz, E.E. Hoy, N. Pinto, I.B. McCubbin, A.K. Thorpe, M. Hofton, D. Hodkinson, C. Hansen, J. Woods, E. Larson, E.S. Kasischke, and H.A. Margolis. 2019. An overview of ABoVE airborne campaign data acquisitions and science opportunities. Environmental Research Letters 14:080201. https://doi.org/10.1088/1748-9326/ab0d44