

Data Policy
Arctic Boreal Vulnerability Experiment
February 14, 2018

The Arctic Boreal Vulnerability Experiment (ABoVE) is a NASA [Terrestrial Ecology Program](#) field campaign conducted in Alaska and Western Canada. ABoVE is a large-scale study of environmental change and its implications for social-ecological systems.

Successful execution of ABoVE will require a high level of coordination among observational, experimental, and modeling efforts of the science team and its collaborators and partners.

At the heart of the ABoVE research strategy is a commitment to data management and sharing that will enable researchers to access, understand, use, visualize, and analyze large volumes of diverse data at multiple thematic, temporal, and spatial scales. Managing and integrating data for ABoVE requires an overarching data policy to ensure that participants have full, open, and timely access to data, to promote the exchange of quality controlled / quality assured data, to protect intellectual property rights, and to ensure that proper credit is given to data originators through authorship, citation, or acknowledgement.

This policy pertains to the life-cycle of data during ABoVE – from data collection, through quality checking and analysis, to distribution to ABoVE science team members and stakeholders, and to depositing finalized products in a long-term archive.

NASA Data Policy

This policy states that there can be no period of exclusive access to the data or data products generated during the project by either an individual scientist or a science team. A short period of time for calibration, correction, and quality assessment prior to public release is permissible. Some exceptions regarding full public access may need to be established for data obtained from sources that bind users to more restrictive data policies or that are inherently sensitive in nature (e.g., commercial satellite data or confidential human-subjects data). See more on the [NASA Earth Science Data and Information Policy](#).

ABoVE Data Policy

1. ABoVE Data

For the purposes of this Policy, the term "ABoVE data" shall mean the primary observations, monitoring data, site characterization information, model output, remotely sensed products, and ancillary data specifically supported by NASA and its partner agencies to meet the goals outlined in the ABoVE Concise Experiment Plan ([link](#)). All data must be accompanied by quantified estimates of uncertainty.

ABoVE data includes metadata, which are defined as the descriptive information such as content, quality, and conditions that characterize a set of measurements.

Data sets from other sources (e.g., forest inventory data, satellite products, global meteorological analysis, etc.) may be needed to meet the goals of ABoVE, but were not funded specifically for ABoVE. There may also be data from other programs (e.g. DOE NGEA-Arctic, Polar Knowledge Canada) that are partners with ABoVE, but fall under other management. The [ABoVE Leadership Team](#) will help broker agreements with officials and institutions in order to obtain such data sets for use by ABoVE science team members.

2. Sharing Data

Full, open, and timely sharing of the full suite of data sets for all ABoVE science team members is a fundamental objective. All data and associated metadata produced by NASA-funded projects should be made available to every ABoVE investigator as soon as feasible but no later than 12 months after acquisition.

The leaders of Partner Projects and Affiliated Projects should identify data that they intend to share when they join the ABoVE Science Team. They should provide data and metadata as soon as feasible following data collection. The agency sponsoring their data collection should define the duration of any exclusive use period.

In the case of Indigenous Knowledge (IK, section 6) obtained from community stakeholders, IK data will be shared pending review and approval by the local community, tribal council, or group who participated in ABoVE research and outreach activities.

Certain data products provisioned for the Science Team in the ABoVE Science Cloud (ASC) have conditions for use and/or restrictions on redistribution. Users of the ASC must acknowledge and follow these conditions and restrictions.

Data will be analyzed cooperatively by all scientists involved in obtaining them, with the caveat that if IK is involved, knowledge holders must be involved in the analysis and must first provide consent before IK data are disseminated to other ABoVE investigators. In addition, ABoVE data will be made available in preliminary form to ABoVE investigators to enable quality assurance through preliminary analysis and intercomparison with other data sets. Corrections and refinements to data products will be made as the analysis proceeds. Revisions will be noted, and investigators and the ABoVE Science Cloud data system will maintain version control.

The ABoVE Science Cloud is provided as a resource for data processing and sharing among the ABoVE Science team during the course of the campaign. Long-term archival and stewardship, including issuing of citations and DOIs, will be accomplished as described in section 7.

3. Data management based on standard metadata and data product formats

International [metadata standards](#) (e.g., ISO19115) should be used to facilitate discovery, sharing, and understanding data products among the diverse investigators within ABoVE. In addition, [standard file format](#), parameter names, and units are encouraged. Community-of-practice standards should be used when these exist (e.g. AmeriFlux, GTN-P, CF Conventions). Geospatial data products should at a minimum be produced using the ABoVE Standard Projection (vector and raster) and Reference Grid (raster).

4. Credit to Data Collectors

When data are used by others in publications or in modeling or integrating studies during the course of ABoVE, the scientist collecting the data will be credited appropriately, either by co-authorship, citation, or acknowledgement. If Indigenous or Local Knowledge holders are involved, they should also be credited (see section 6). For data that have not been published, the data originators must be informed of analysis and publication plans well in advance of submission of a paper, given an opportunity to read the manuscript, and, if appropriate, be offered co-authorship. In cases where unpublished data from other investigators are a minor contribution to a paper, the data are to be referenced by a citation or acknowledgement. Users of the data must state the primary source of the data

as well as the version number.

Citations for ABoVE data products will be developed by the permanent data archive and will include all individuals contributing to the data product, the title of the data product, the year of data release, the archive, and a digital object identifier (DOI) locator.

5. Protecting the rights of students

Universities require that key data collected by graduate students should not be published prior to submitting a thesis or dissertation because to do so can jeopardize the student's academic interests. As a result, data collected specifically for a student's thesis or dissertation are not subject to the data sharing obligations of this policy until after the student has completed their degree. This special consideration will be limited to 2 years after data collection for a Masters student and 3 years after collection for a Doctoral candidate.

6. Fundamental Principles for the Use of Indigenous or Local Knowledge

The [Inuit Circumpolar Council](#) has defined Indigenous Knowledge (IK) as “a systematic way of thinking applied to phenomena across biological, physical, cultural and spiritual systems. It includes insights based on evidence acquired through direct and long-term experiences and extensive and multigenerational observations, lessons and skills. It has developed over millennia and is still developing in a living process, including knowledge acquired today and in the future, and it is passed on from generation to generation. Under this definition, IK goes beyond observations and ecological knowledge, offering a unique ‘way of knowing’ to identify and apply to research needs which will ultimately inform decision makers”.

The ABoVE Science Team should follow the Guiding Principles of the Arctic Council for use of Indigenous Knowledge. The Arctic Council has recognized the central role of the Indigenous Peoples of the Arctic in all aspects of the Arctic Council mandate and has formally endorsed the importance of including the Indigenous residents of the Arctic in its deliberations. [Guiding Principle #1](#): “Recognize the value of... [Indigenous Knowledge] ...as a systematic way of thinking which will enhance and illuminate our understanding of the Arctic environment and promote a more complete knowledge base”.

Proper credit should be given to holders for Indigenous Knowledge.

7. Archive

ABoVE metadata and data products, including value-added products and model input and output generated by the program, need to be archived when the data sets are finalized for publication or at the completion of the investigator's funding. The process and timeline for archiving ABoVE data will be based on each project's data management plan, modified collaboratively by the investigators, the NASA HQ program manager, the CCE Office and the appropriate archive. Most data products generated during ABoVE with NASA funding will be archived at the ORNL DAAC, and cross-referenced with the archive centers of Partner Programs (DOE NGEE-Arctic, Polar Knowledge Canada) where appropriate.

8. Sharing Models

Model source code, when made publicly available, can be used to understand the uncertainty of model results relative to results from other models or observations, enable

others to see how models treat individual processes, and ultimately serve to improve models.

ABoVE investigators will make numerical models and key algorithms used in publications available to program participants and the broader user community no later than upon publication. As a model evolves during ABoVE, newer model versions associated with publications will also be made available to the research community upon publication. Each model submitted should include model source code along with version number, documentation in terms of a technical note or carefully documented code, example input and output, and a history of changes. Model archiving will follow the best-practice requirements and recommendations proposed in Thornton et al. (2005).

Credit will be given to model developers through citation when information from archived models is used in publications.

Certain model codes may be subject to copyright or international agreements that are more restrictive. The CCE Office will be responsible for brokering agreements with officials and institutions in order to obtain specific models required for use by ABoVE scientists.

9. Acknowledgements

Each publication or presentation arising from participation in ABoVE should acknowledge all organizations that provided funding, data, and/or logistical support. Funding agencies appreciate the inclusion of award numbers.

ABoVE investigators should also include an acknowledgement in each publication or presentation arising from participation in ABoVE. **The wording shall be similar to the following: “This study was part of the Arctic-Boreal Vulnerability Experiment.”**

Note that you may request a DOI for data accompanying your paper from the ORNL DAAC prior to publication of your manuscript. This provides a mechanism to acknowledge data providers and promotes wider usage of ABoVE data. In cases where other archive centers are more appropriate for your data, contact them to see if they offer similar services (they probably do, as this has become recognized good practice).

If you made use of the ABoVE Science Cloud computing resources, please include the following acknowledgement:

“Resources supporting this work were provided by the NASA High-End Computing Program through the NASA Center for Climate Simulation at Goddard Space Flight Center.”

10. Resolving conflicts over data and the data policy.

Conflicts over the interpretation of this Data Policy, or its implementation, will be resolved at the lowest level possible within the science team, who should refer to the American Geophysical Union [Policy for Scientific Integrity and Professional Ethics](#). Direct resolution of issues between investigators is preferred; the CCE Office and or sponsoring agencies may become involved if resolution cannot be reached.