Initiatives to Increase Accessibility and Inclusion in Antarctic Research

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**Information Paper Submitted by the United States**

***Summary***

Antarctic fieldwork, conducted within the United State Antarctic Program, is carried out by researchers who can commit the time and resources and are physically qualified to deploy to Antarctica. Over decades, this strategy has created collections of samples, data, and knowledge, while inadvertently excluding many researchers from conducting Antarctic research. Recent initiatives in the United States take a more holistic approach and specifically encourages work in the less traditional (i.e., non-fieldwork) entry points into Antarctic research. The intention of these initiatives is to open new opportunities to include researchers that have historically been excluded from participating in Antarctic research and to approach Antarctic research in new ways. A beneficial consequence of these strategies is a reduction in the environmental human impact, including the carbon footprint inherent in Antarctic field research. These new initiatives, while nascent, are strategies that all Parties could consider for increasing inclusivity and accessibility in Antarctic research. The United States encourages all nations to share initiatives and successful practices aimed at increasing accessibility and inclusion in Antarctic research.

***Background***

Within the United States, the National Science Foundation is the manager of the United States Antarctic Program (USAP), which in turn sets the expectations for conducting research in Antarctica for U.S. researchers. Traditionally, the National Science Foundation has focused its field research program on research that can best be done in, on, or around Antarctica. Decades of investments in Antarctic field research have developed generations of Antarctic experts and created collections of information, data, samples, and results. From the data and samples, the U.S. Antarctic scientific community have developed foundational knowledge and understanding of Antarctica, our world, and the universe.

In compliance with the Antarctic Treaty, all the samples and data and results of the research efforts in Antarctica are required to be stored, curated, and shared openly so that they may be used again for secondary research. Physical sample collections reside in the NSF-supported [Oregon State University Marine and Geological Repository](https://osu-mgr.org/), the [National Science Foundation Ice Core Facility](https://icecores.org/about-ice-cores), the [Ohio State Polar Rock Repository](https://research.bpcrc.osu.edu/rr/), [Bigelow National Center for Marine Algae and Microbiota](https://ncma.bigelow.org/), and the Smithsonian Collections ([meteorites](https://curator.jsc.nasa.gov/antmet/index.cfm) and [invertebrates](https://naturalhistory.si.edu/research/invertebrate-zoology)) and with open access data primarily served through the [USAP Data Center](https://www.usap-dc.org/), [University of Minnesota Polar Geospatial Center](https://www.pgc.umn.edu/), and the [EarthScope Seismic and Geodetic Archives](https://www.earthscope.org/data/), as well as other discipline-specific repositories. Historical Antarctic data and samples archived in these repositories hold the opportunity to unlock new insights and discoveries about the Earth’s history.

*Figure 1 – National Science Foundation Ice Core Facility curator Curt La Bombard returns a core tube containing a section of the GISP2D ice core back to main storage after fulfilling a recent sample request. Photo Credit: Theo Carr*

A picture containing bottle, indoor

Description automatically generated

The time and resource burden required to collect samples and data in the field are also hurdles that exclude many researchers from accessing and participating in Antarctic research. This could be due to competing workloads, care-giving responsibilities, health, or various other priorities. The National Science Foundation has developed and continues to develop strategies to break-down barriers to accessibility and inclusivity. Over the past two years, five new initiatives have been implemented to increase the opportunities and accessibility for new researchers to engage with Antarctic research in both traditional ways as well as new pathways.

***New Initiatives***

The first of the five initiatives is intentional support for new Antarctic research not requiring fieldwork. The new research grants program for non-fieldwork proposals arose during the global COVID-19 pandemic, a time that forced everyone, everywhere to re-think strategies and priorities. This new research grants program ([NSF 23-508](https://www.nsf.gov/pubs/2023/nsf23508/nsf23508.htm)) is more responsive to and supportive of the research community by providing funding opportunities when, for whatever reason, travel may be restricted to Antarctica. Looking to the future, when competing priorities could prevent a scientist from going to Antarctica, this program offers a path to engage in Antarctic research remotely.

The second is developing cohorts of early career researchers through the Postdoctoral Research Fellowship ([NSF 22-635](https://www.nsf.gov/pubs/2022/nsf22635/nsf22635.htm)), the [AGU LANDInG Postdoctoral Fellowship Training Program](https://www.agu.org/AGU-LANDInG/), and the [Polar Science Early Career Community Office](https://psecco.org/about-psecco). Both the fellowship and the community support programs encourage nonpolar researchers to engage, offering opportunities to gain experience in or connecting with polar research and providing professional development and training specifically on diversity, equity, and inclusion. This initiative aims to develop inclusive and diverse leaders within the Polar research community and open pathways for new partnerships in polar research.

A third initiative is encouraging reuse of existing data, rescuing inaccessible data, and leveraging both physical and non-physical samples (e.g., data, films, recordings, etc.) to advance Antarctic research ([NSF 21-041](https://www.nsf.gov/pubs/2021/nsf21041/nsf21041.jsp)). The rich repositories of Antarctic data and samples are significantly more accessible than the Antarctic continent and sea floor. Capitalizing on existing work is incredibly cost effective and can build a wider network of researchers working on complicated Antarctic research topics.

The fourth initiative is encouraging the development and use of open-source software, tools, libraries, and frameworks that are critical for achieving polar scientific objectives ([NSF 23-053](https://www.nsf.gov/pubs/2023/nsf23053/nsf23053.jsp)). These goals leverage the existing open data discussed above; by supporting the cyber-infrastructure needed to reuse Antarctic data, the United States aims to encourage broader participation in Antarctic research. This is part of a larger effort by the United States government to focus on 2023 as a Federal [Year of Open Science](https://open.science.gov/), which also aligns with the Antarctic Treaty’s intention of “Freedom of scientific investigations in Antarctica and cooperation toward that end...” Software tools, libraries, and frameworks are playing increasingly prominent and impactful roles in Antarctic research and the United States wants to elevate the importance of the expertise required for this work.

The fifth initiative is supporting the development of engineering and technological solutions uniquely suited for working in the icy and underwater Antarctic environments ([NSF 22-617](https://beta.nsf.gov/funding/opportunities/engineering-technologies-advance-underwater)). This initiative highlights the importance of creating multidisciplinary teams that bring together experts across science disciplines and engineering fields. Increasingly, these emerging technologies are being integrated into smart, autonomous platforms that can remotely collect and transmit data year-round to open data repositories. An additional element for this initiative has been to bring members from engineering, technology, and Antarctic disciplinary sciences research communities together to consider how engineered and technological solutions, as well as enhanced connectivity, might be used to increase the accessibility as well as broaden participation in Antarctic research ([Antarctic Subsea Cable Workshop](https://www.pgc.umn.edu/workshops/antarctic-cable/)).

***Conclusions and Next Steps***

Together, these initiatives aim to increase the opportunities and accessibility of Antarctic research to a greater population of U.S. researchers. In addition, the focus on inclusion and accessibility via reuse of previously collected data housed in open access repositories and non-field research, will also reduce the human impact inherent in Antarctic field research. Many of these strategies can be employed by National Antarctic Programs in their current and future support of Antarctic science. The United States will continue to refine and improve initiatives and expectations for Antarctic research to increase inclusivity and accessibility.