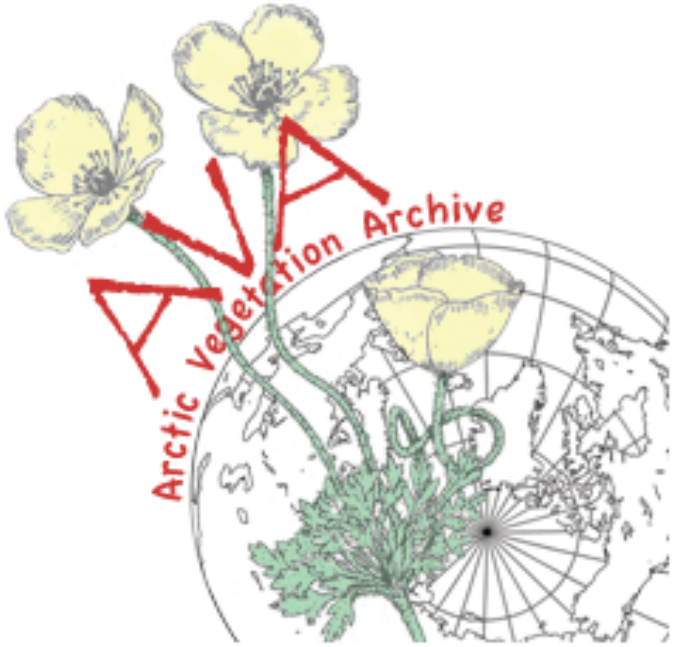


International Arctic Vegetation Database

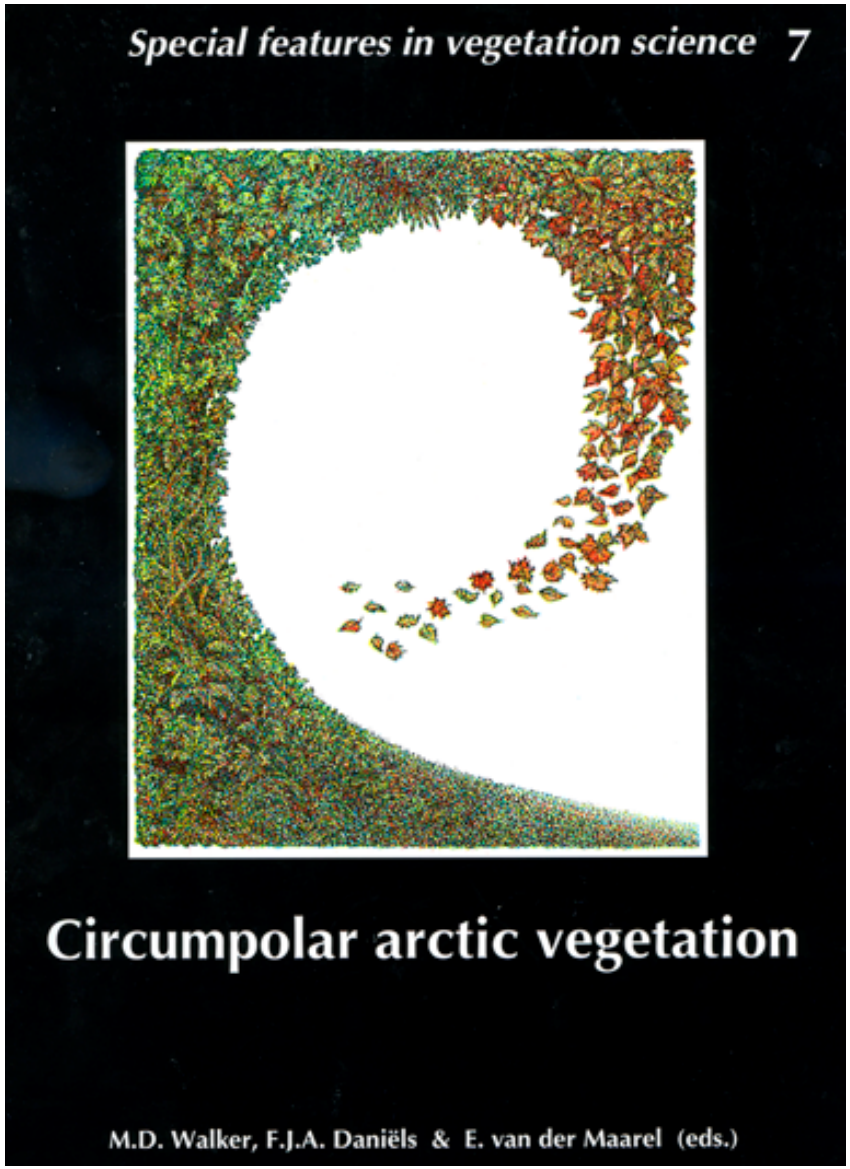
Skip Walker

Alaska Geobotany Center, Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, AK, USA

Overview of talk

- Milestones of the project
- Conceptual framework for the project
- A proposal for creating the AVA
- Timeline
- Funding

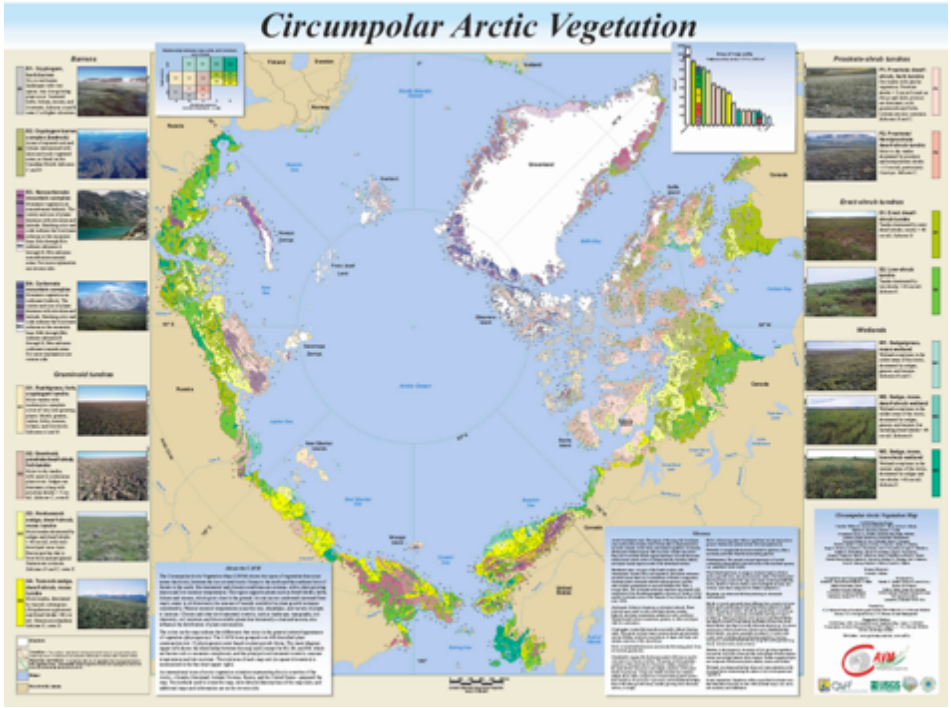
1992: Boulder, Colorado Workshop

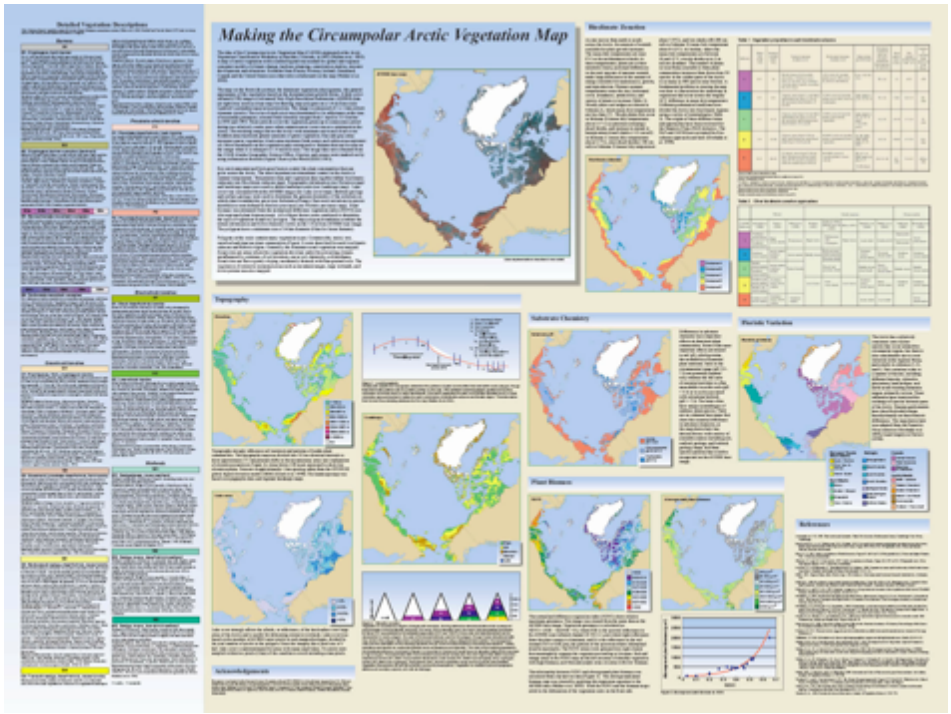


'Boulder Resolution' signed by 44 attendees at the workshop

"…Be it resolved that the international community of arctic vegetation scientists undertakes the the joint tasks of:

1. Creating a database of type relevé data, using the Panarctic Flora as a common taxonomical base;
2. Developing a comprehensive synthesis of phytosociological information through the publication of a Prodromus of arctic vegetation syntaxa; publication of a bibliography of arctic vegetation studies, and development of a revised syntaxonomical classification for the circumpolar region;
3. Compilation, editing and publishing an arctic circumpolar vegetation map depicting the distribution and boundaries of arctic vegetation north of the arctic tree line at a scale of 1:7,500,000 and legend that is acceptable and understood the the international community of plant scientists.





2003: Circumpolar Arctic Vegetation Map (CAVM)

First step in completing the Boulder Resolution

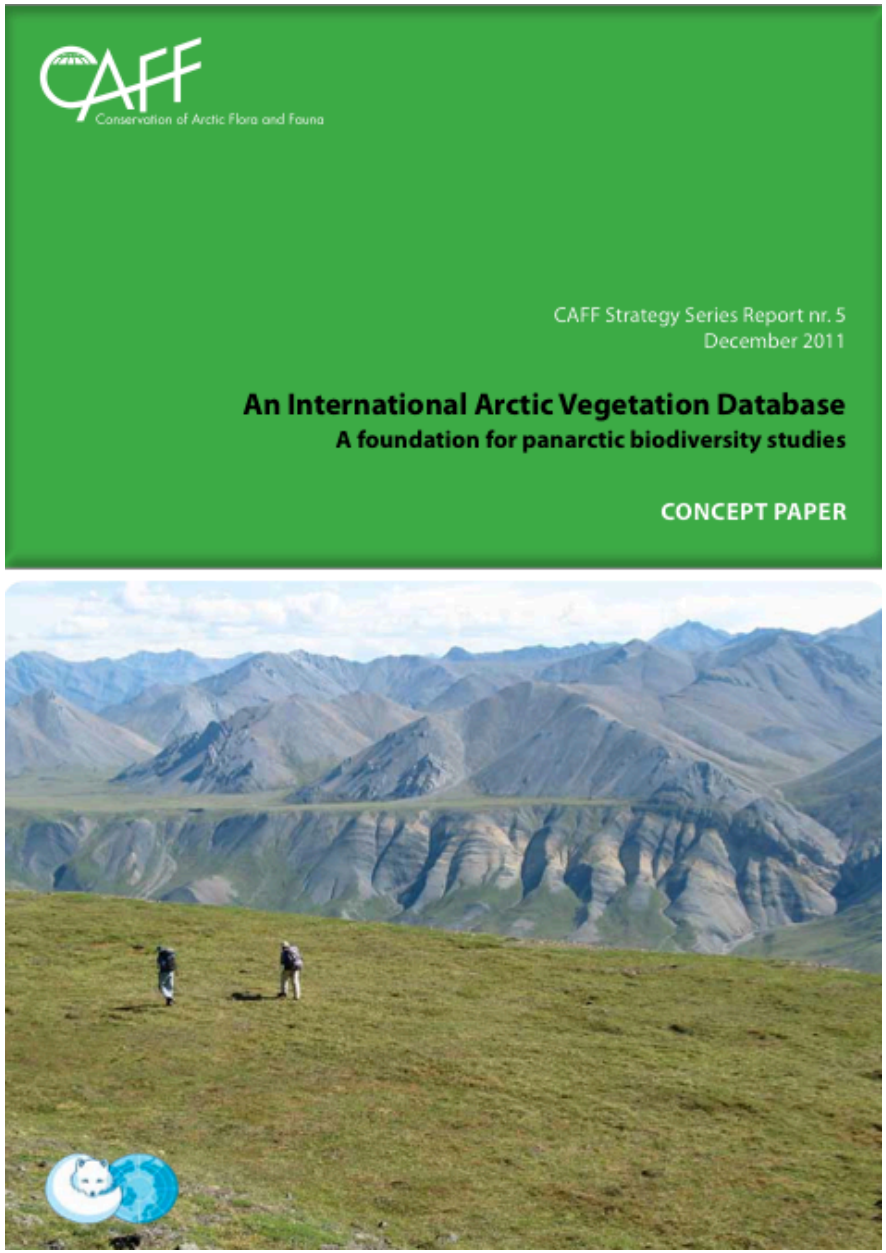
Proceedings from the concluding CAVM meeting in Tromsø, 2004

Classification and mapping of arctic vegetation

A tribute to Boris A. Yurtsev. A selection of contributions presented at the 2. Internat. Workshop on Circumpolar Vegetation Classification and Mapping, Tromso, Sommaroya, Norway, 2-6 June 2004

Ed.: Fred J.A. Daniels; Arve Elvebakk; Stephen S. Talbot; Donald A. Walker

2005. V , 375 pages, 205 figures, 135 tables, 24x16cm, 850 g
Language: English

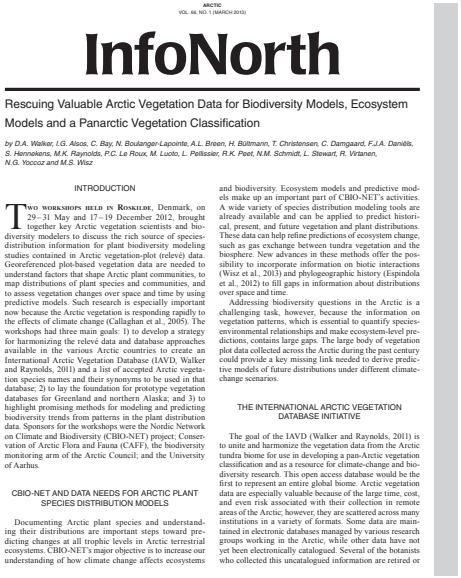


2011: International Arctic Vegetation Database Concept Paper

A unified web-based database containing as much of the Circumpolar Arctic relevé data as possible.

Walker, D.A. and Raynolds, M.K. 2011. CAFF Strategy Series No. 5.

2012: CBIO-NET workshops, Roskilde, Denmark



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InfoNorth

Rescuing Valuable Arctic Vegetation Data for Biodiversity Models, Ecosystem Models and a Panarctic Vegetation Classification

by D.A. Walker, I.G. Alsos, C. Bay, N. Boulanger-Lapointe, A.L. Breen, H. Bültmann, T. Christensen, C. Damgaard, F.J.A. Daniëls, S. Hennekens, M.K. Raynolds, P.C. Le Roux, M. Luoto, L. Pellissier, R.K. Peet, N.M. Schmidt, L. Stewart, R. Virtanen, N.G. Yoccoz and M.S. Wisz

INTRODUCTION

Two workshops held in Roskilde, Denmark, on 29–31 May and 17–19 December 2012, brought together key Arctic vegetation scientists and biodiversity modelers to discuss the rich source of species-distribution information for plant biodiversity modeling studies contained in Arctic vegetation-plot (relevé) data. Georeferenced plot-based vegetation data are needed to understand factors that shape Arctic plant communities, to map distributions of plant species and communities, and to assess vegetation changes over space and time by using predictive models. Such research is especially important now because the Arctic vegetation is responding rapidly to the effects of climate change (Callaghan et al., 2005). The workshops had three main goals: 1) to develop a strategy for harmonizing the relevé data and database approaches available in the various Arctic countries to create an International Arctic Vegetation Database (IAVD, Walker and Raynolds, 2011) and a list of accepted Arctic vegetation species names and their synonyms to be used in that database; 2) to lay the foundation for prototype vegetation databases for Greenland and northern Alaska; and 3) to highlight promising methods for modeling and predicting biodiversity trends from patterns in the plant distribution data. Sponsors for the workshops were the Nordic Network on Climate and Biodiversity (CBIO-NET) project; Conservation of Arctic Flora and Fauna (CAFF), the biodiversity monitoring arm of the Arctic Council; and the University of Aarhus.

CBIO-NET AND DATA NEEDS FOR ARCTIC PLANT SPECIES DISTRIBUTION MODELS

Documenting Arctic plant species and understanding their distributions are important steps toward predicting changes at all trophic levels in Arctic terrestrial ecosystems. CBIO-NET's major objective is to increase our understanding of how climate change affects ecosystems and biodiversity. Ecosystem models and predictive models make up an important part of CBIO-NET's activities. A wide variety of species distribution modeling tools are already available and can be applied to predict historical, present, and future vegetation and plant distributions. These data can help refine predictions of ecosystem change, such as gas exchange between tundra vegetation and the biosphere. New advances in these methods offer the possibility to incorporate information on biotic interactions (Wisz et al., 2013) and phylogeographic history (Espindola et al., 2012) to fill gaps in information about distributions over space and time.

Addressing biodiversity questions in the Arctic is a challenging task, however, because the information on vegetation patterns, which is essential to quantify species-environmental relationships and make ecosystem-level predictions, contains large gaps. The large body of vegetation plot data collected across the Arctic during the past century could provide a key missing link needed to derive predictive models of future distributions under different climate-change scenarios.

THE INTERNATIONAL ARCTIC VEGETATION DATABASE INITIATIVE

The goal of the IAVD (Walker and Raynolds, 2011) is to unite and harmonize the vegetation data from the Arctic tundra biome for use in developing a pan-Arctic vegetation classification and as a resource for climate-change and biodiversity research. This open access database would be the first to represent an entire global biome. Arctic vegetation data are especially valuable because of the large time, cost, and even risk associated with their collection in remote areas of the Arctic; however, they are scattered across many institutions in a variety of formats. Some data are maintained in electronic databases managed by various research groups working in the Arctic, while other data have not yet been electronically catalogued. Several of the botanists who collected this uncatalogued information are retired or

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- **2 meetings at the Cromwell in Roskilde.**
- **Sponsored by the Nordic Network on Climate and Biodiversity (CBIO-NET) and Aarhus University.**
- **Highlighted the application of a vegetation archive for modeling and predicting biodiversity.**
- **InfoNorth article in *Arctic* (Walker et al. 2013).**

Need for a panarctic vegetation database

Why now?

- **Global climate change has intensified efforts to inventory, classify and map the vegetation of the Arctic in much more detail than has been done previously.**
- **The amount of information in the Arctic (approximately 20,000 relevés) makes it feasible.**
- **Legacy information is in danger of being lost.**

Photo: D.A. Walker, Nuuk, Greenland

Why vegetation?

- **Key integrator of many of the physical and biological attributes of ecosystems.**
- **Often used in environmental and biodiversity inventories, land-use planning, remote-sensing, environmental management, and conservation evaluations.**

Why the Arctic?

Of all the global biomes, the Arctic Tundra Biome best lends itself to a unified international approach for managing its vegetation information.

- **Floristically and vegetatively the most homogeneous of the global biomes.**
- **Its entire list of known vascular plants, bryophytes and lichens are documented in up-to-date checklists.**
- **It is already mapped (CAVM Team 2003).**
- **If successfully applied here, it would be a model for application to other global biomes.**

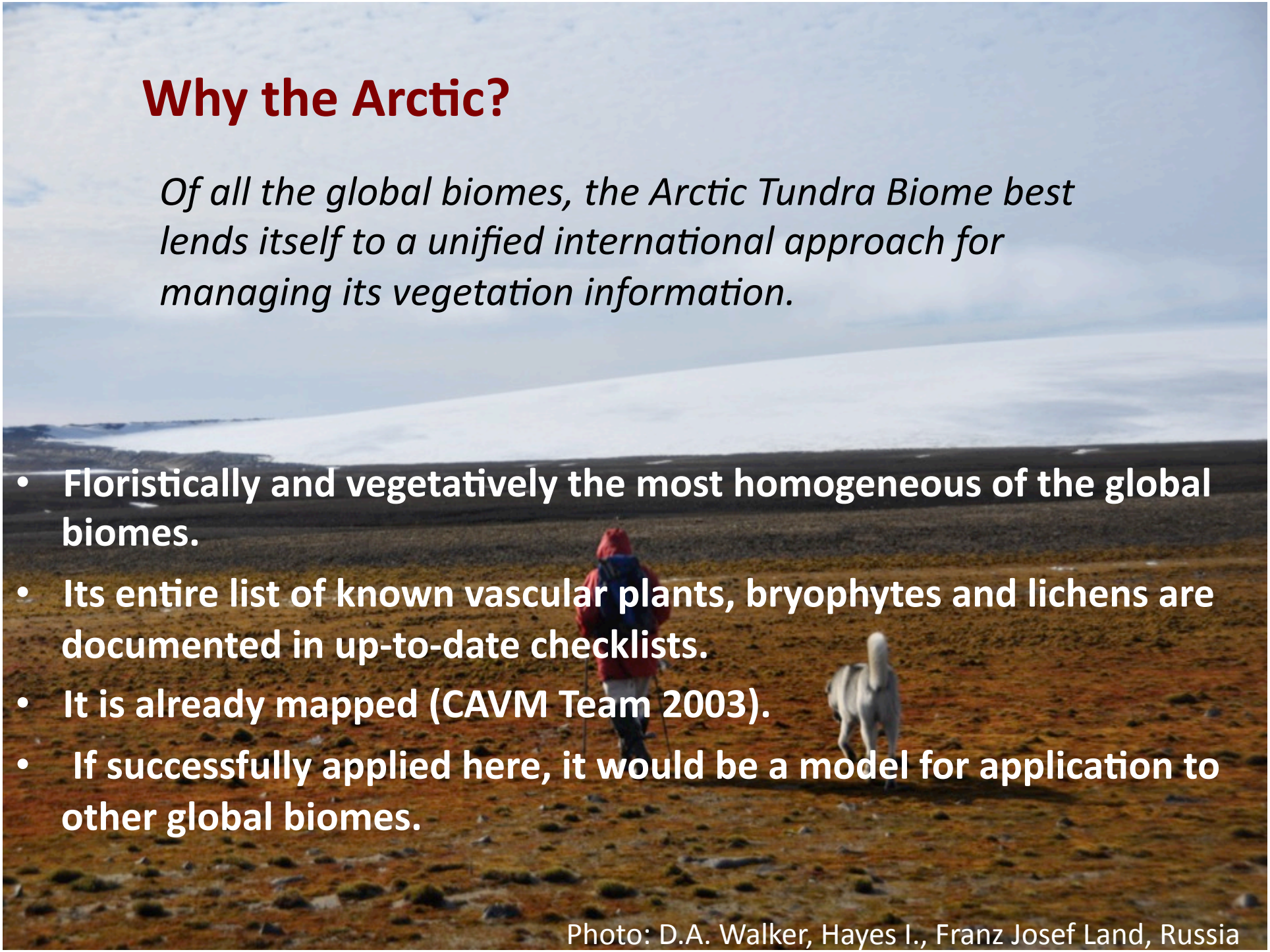


Photo: D.A. Walker, Hayes I., Franz Josef Land, Russia

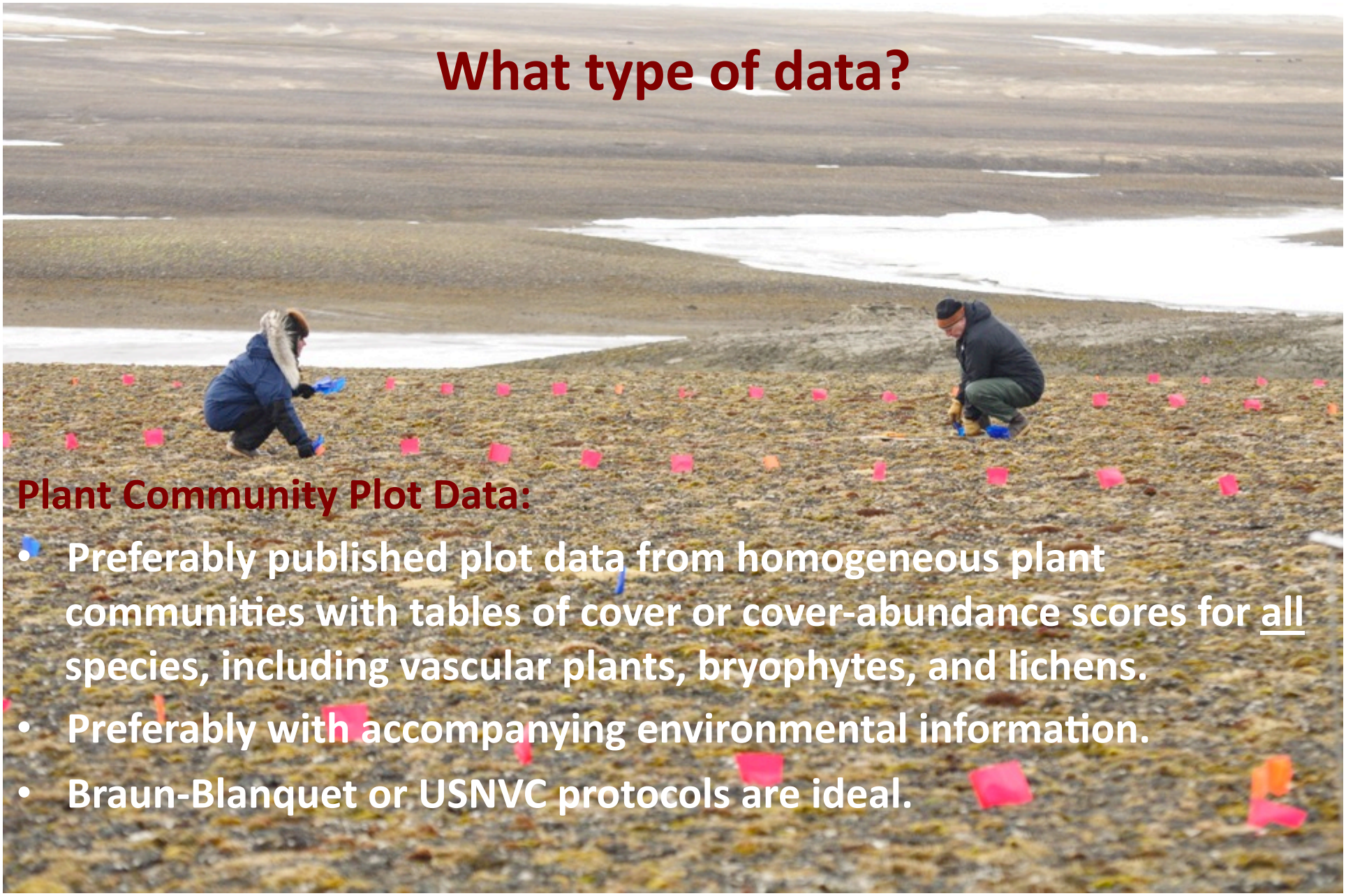
International Arctic Vegetation Database

Ultimate goals:

1. **Panarctic vegetation.**
2. **Prodromus (list) of Arctic plant communities.**
3. **Foundation database for biodiversity, ecosystem modeling, and remote-sensing studies.**
4. **Educational tool including web portal with descriptions, photos, maps of each plant community.**

Photo: D.A. Walker, Nuuk, Greenland

What type of data?



Plant Community Plot Data:

- Preferably published plot data from homogeneous plant communities with tables of cover or cover-abundance scores for all species, including vascular plants, bryophytes, and lichens.
- Preferably with accompanying environmental information.
- Braun-Blanquet or USNVC protocols are ideal.

Photo: G. Matyshak , Hayes Island, Franz Josef Land, Russia

Need to harmonize North American and European vegetation sampling and classification approaches

Photo: Ina Timling,
moss-cushion community,
Hayes Island, Franz Josef Land, Russia

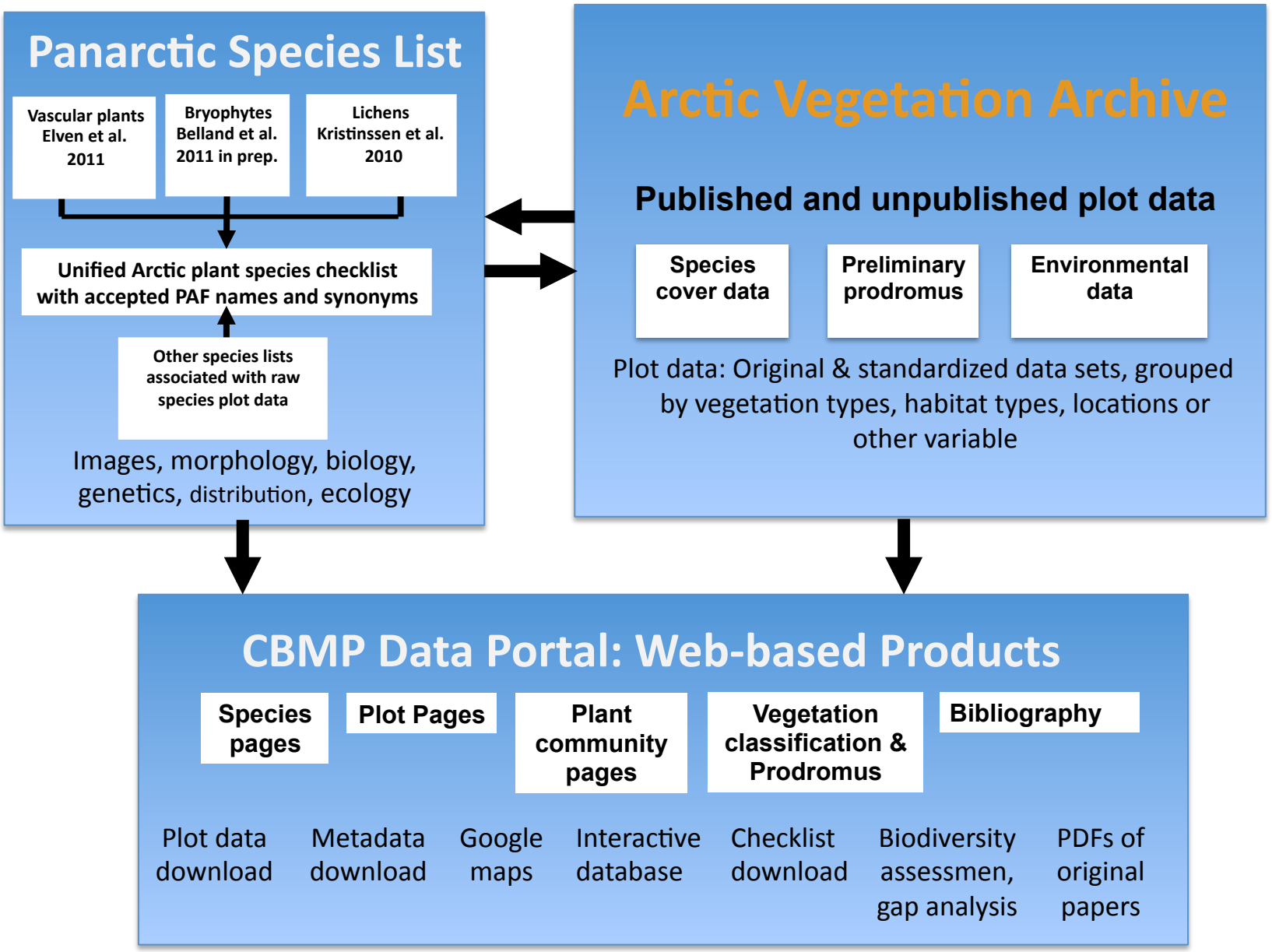
- **So much of the world is heavily invested in one or the other method (DeCaceras & Wiser 2011).**
- **The Arctic vegetation database would be constructed so that the date could be incorporated into either approach.**

Name Change to Arctic Vegetation Archive (AVA)

Photo: Ina Timling,
moss-cushion community,
Hayes Island, Franz Josef Land, Russia

- **AVA is compatible with EVA (European Vegetation Archive). Intention is to be a parallel effort and a subset thereof.**
- **Shorter easier to remember acronym. Certain degree of replication in the old name: The Arctic is "International".**
- **Derivation:**
  - **Latin: "Bird"**
  - **German: "Desired"**
  - **Persian: "A pleasant sound". associated with music.**
  - **Hebrew: "life" From Eve, and Chava**

Conceptual framework



CAFF Vegetation Web Portal

- **Will be part of the CAFF Arctic Biodiversity Data Portal.**
- **Hierarchy of pages linking vegetation maps to vegetation unit descriptions, species pages, and vegetation plot data.**

Arctic Vegetation Archive Workshop

14-16 April, 2013, Krakow, Poland

Skip Walker

Alaska Geobotany Center, Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, AK, USA

Alaska Geobotany Center
Institute of Arctic Biology

CAFF Flora Group

IASC

NASA
Land Cover
Land Use Change

UAF
UNIVERSITY OF ALASKA FAIRBANKS

Goals of the 2013 Kraków AVA meeting

- **Review the status of relevé data in each of the circumpolar countries.**
- **Unify the Arctic vegetation community behind an approach that is acceptable to all involved.**
- **Begin recruiting the people and resources necessary to complete the work.**

Photo: www.krakow.pl
http://krakow.pl/english/5666,artykul,krakow advantages.html

Proposed Timeline

- **Year 1-2: Organizing workshop, ASSW, Krakow, Poland. Complete IAVD prototypes. Obtain international funding.**
- **Year 2-4: Assemble data from literature sources at three main centers UAF (North America), Münster (Greenland and Scandinavia), and a to-be-determined site in Russia. Build server site software. Build web pages for data portal.**
- **Year 5-6: Test and release the database.**

Photo: D.A. Walker. Nenets reindeer herder, Yamal Peninsula, Russia

Funding

- Will require funds from a variety of international agencies.
- Proposals after this Krakow workshop.
- NASA is funding the Alaska component. Canada (CHARS) committed to developing the Canadian portion.
- Anticipated 5-6 year project.

NASA ABoVE initiative

Similar in scope to previous large NASA field campaigns in the grasslands, (FIFE) and boreal forest (BOREAS).

- **Pre-ABoVE: Preparation for ABoVE, data gathering phase.**
- **Just funded: "Recovery and archiving of key Arctic Alaska vegetation map and plot data for long-term vegetation analyses"**
- **Funds the Alaska Arctic Vegetation Archive and a hierarachical map database for Alaska.**

Concluding statements

- **The AVA was conceived 21 years ago to help consolidate the large amount of plot data from around the Arctic to aid in development of a circumpolar Arctic vegetation classification.**
- **The vision has recently been revitalized with the help of CAFF, IASC, and the CBIO-NET workshops and has the potential to contribute to a wide diversity of Arctic biodiversity, habitat, and ecosystem modeling efforts.**
- **The first steps to develop a collaborative effort for funding have been made.**

Photo: D.A. Walker. Franz Josef Land