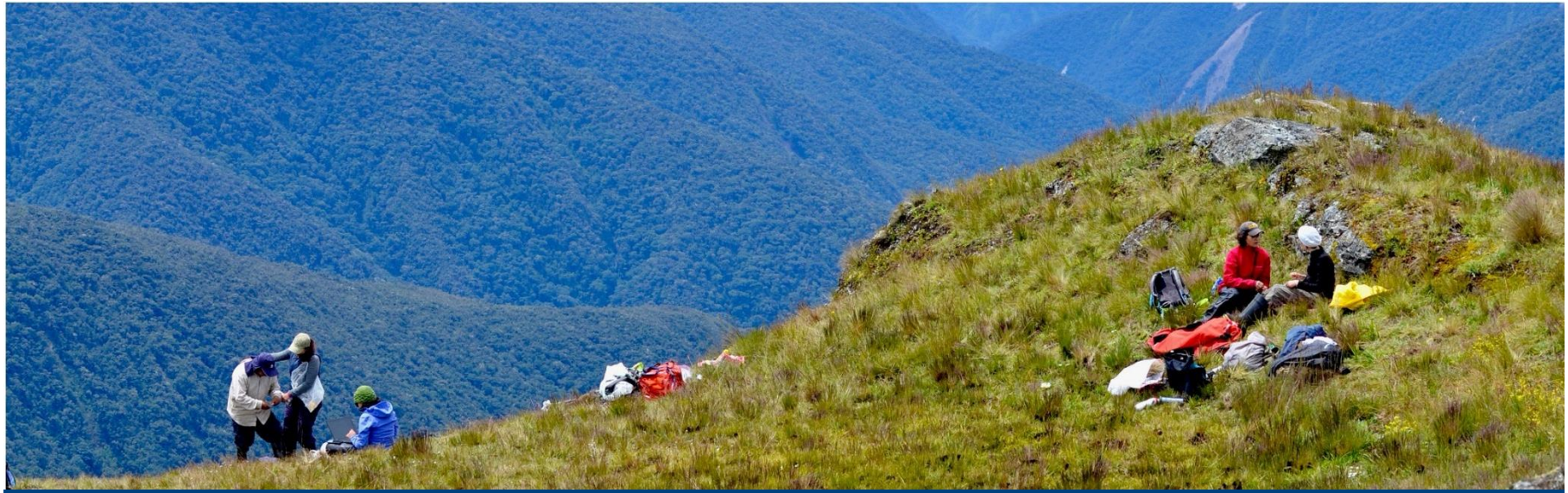

# Understanding community assemblage and functional diversity across elevational gradients from the tropics to the arctic

**Aud H. Halbritter**, Julia Chacón-Labella, Brian Enquist, Kari Klanderud, Brian S. Maitner, Sean Michaletz, Richard J. Telford, PFCT team, and Vigdis Vandvik

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Norwegian Directorate for Higher Education and Skills

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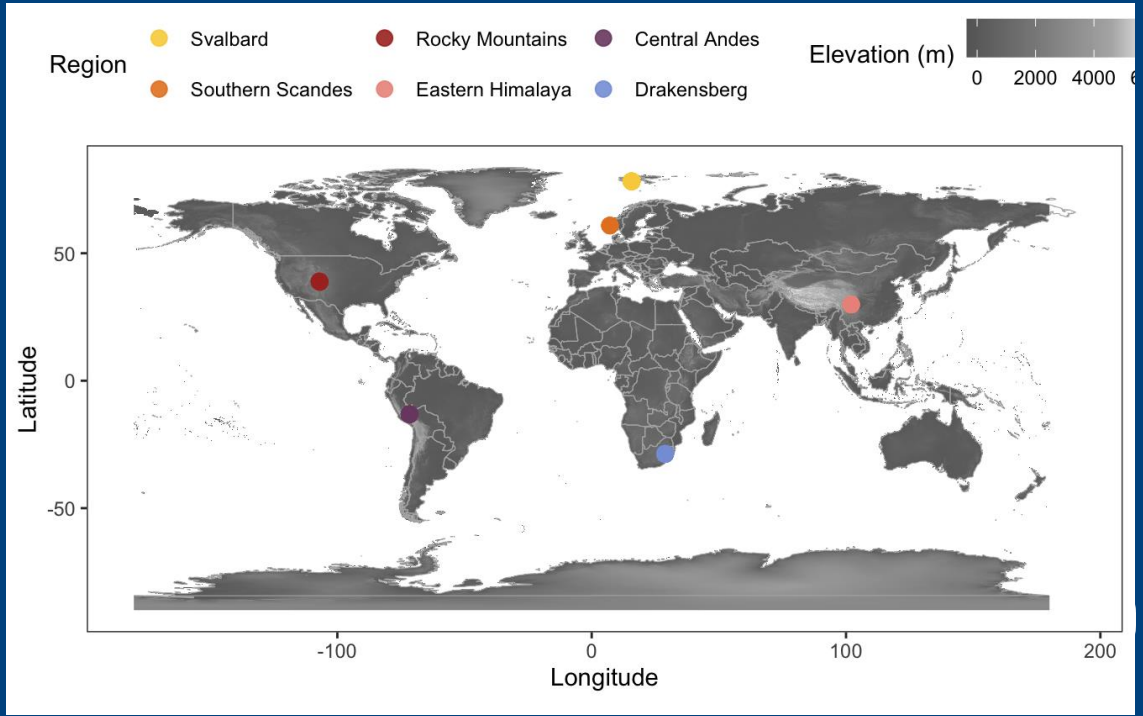
# Introduction

- Understanding community assembly
- Species and functional composition and diversity are affected by abiotic and biotic filtering
- Trait-based approaches to better predict community responses to global change
- Mountains as study systems

# How do alpine grassland communities respond in composition and function to environmental drivers along a latitudinal gradient?

From warmer tropical towards colder mountains we expect stronger environmental filtering leading to

- lower species richness and diversity
- smaller plants and more conservative traits
- decrease in trait variation



# Data collection: six mountain grasslands from Arctic to tropics

**Svalbard**

0 – 250 m a.s.l.
2.6 °C
335.8 mm

**Scandes**

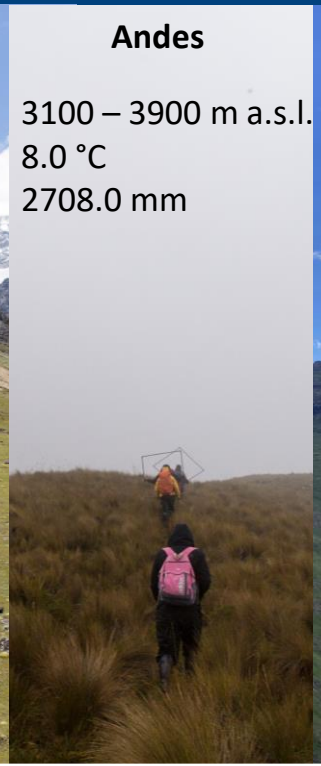
469 – 1590 m a.s.l.
7.8 °C
1366.2 mm

**Rockies**

2475 – 3458 m a.s.l.
9.5 °C
494.8 mm

**Himalaya**

3000 – 4000 m a.s.l.
7.9 °C
1457.5 mm



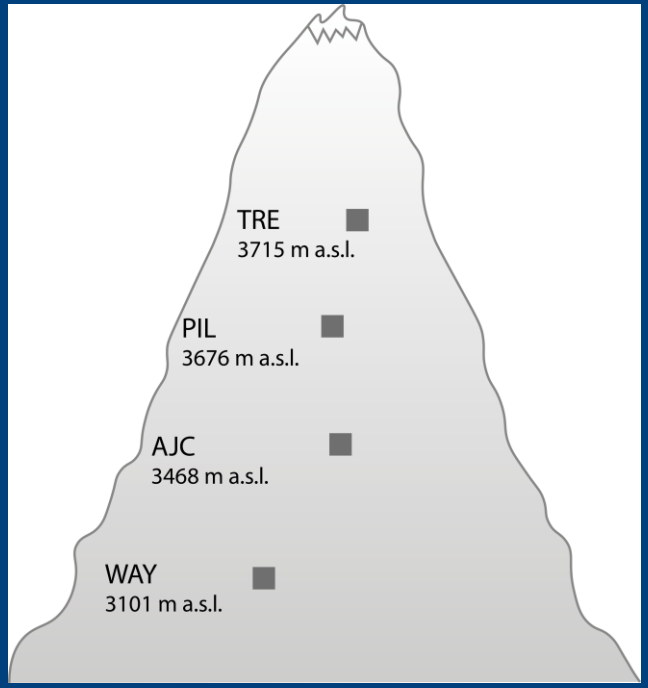
**Andes**

3100 – 3900 m a.s.l.
8.0 °C
2708.0 mm

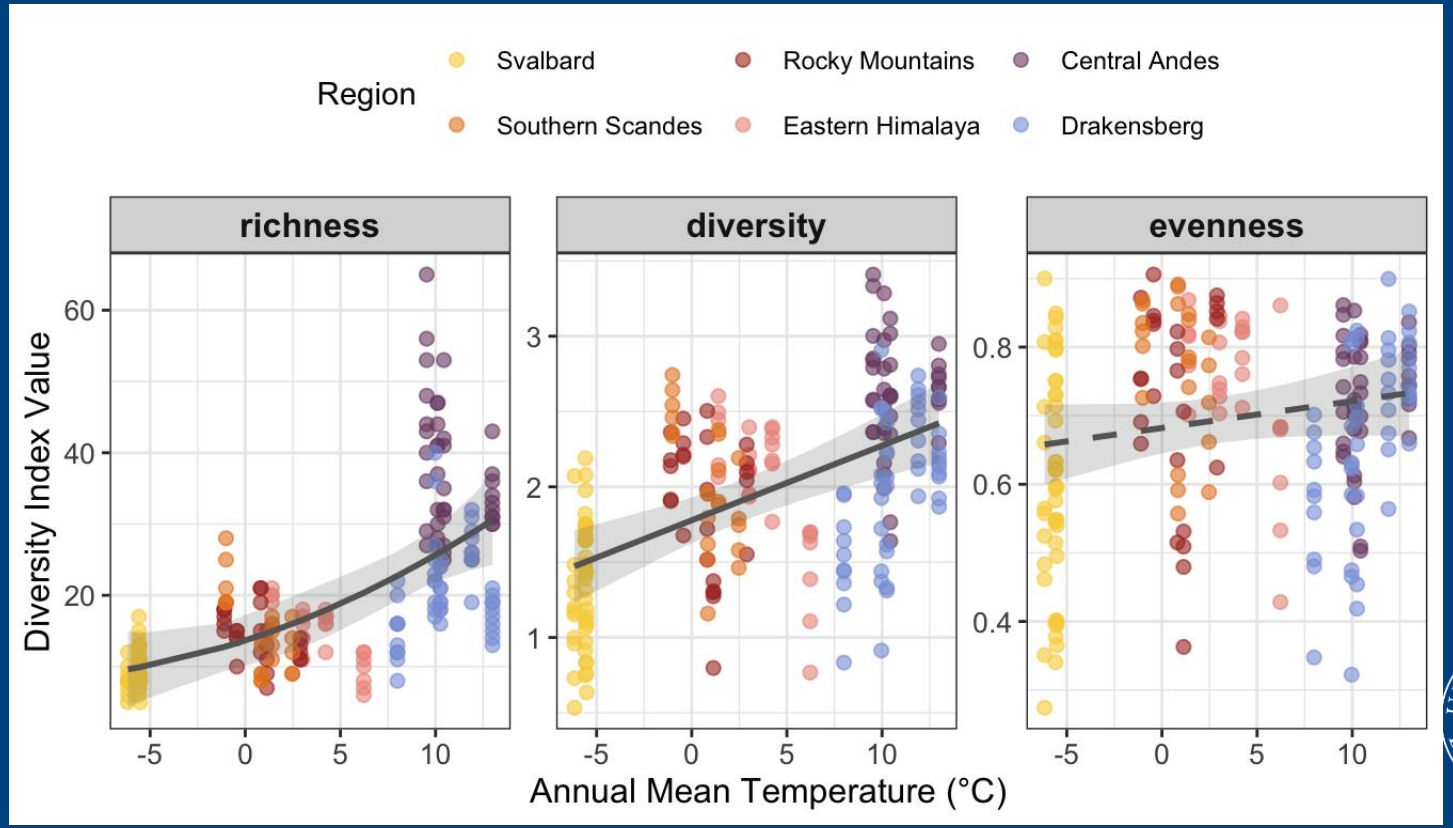
**Drakensberg**

2000 – 3000 m a.s.l.
10.0 °C
1265.3 mm

# Data collection: taxonomic and functional diversity

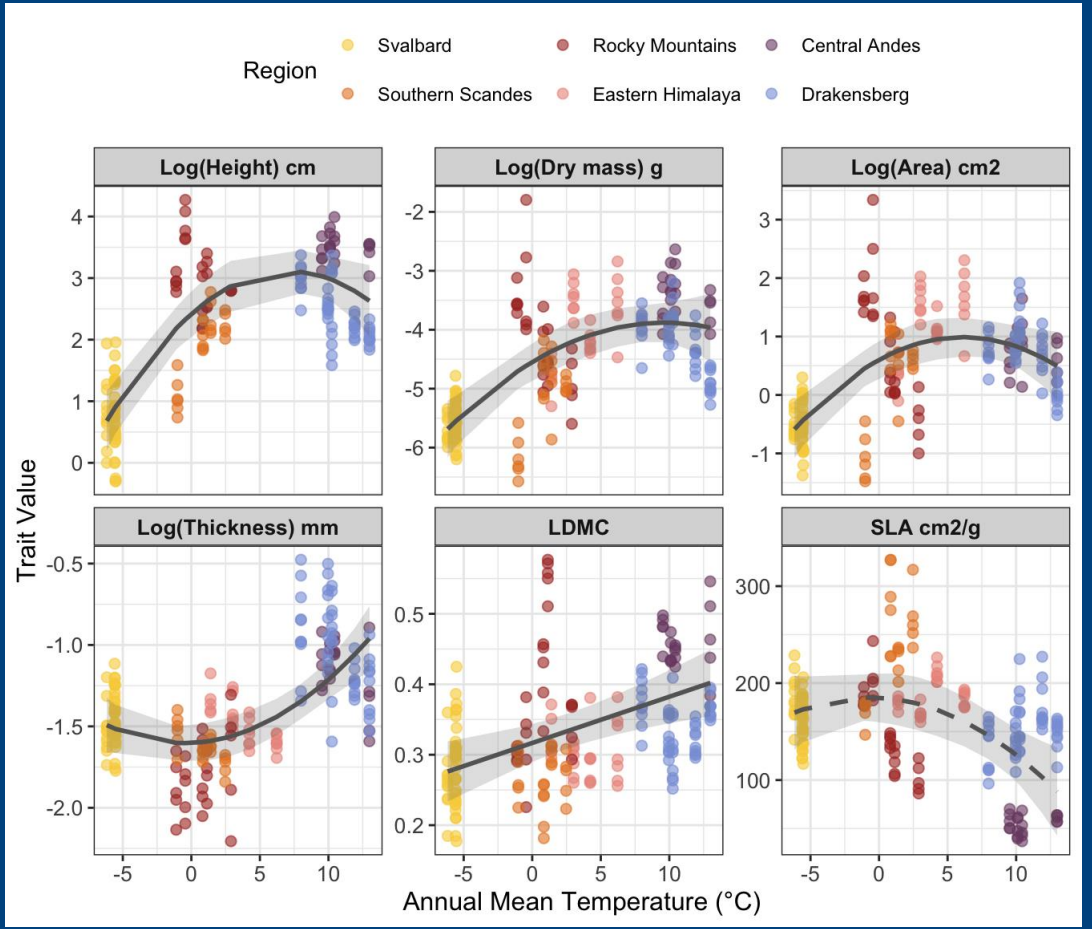



# Results: taxonomic diversity increases with temperature



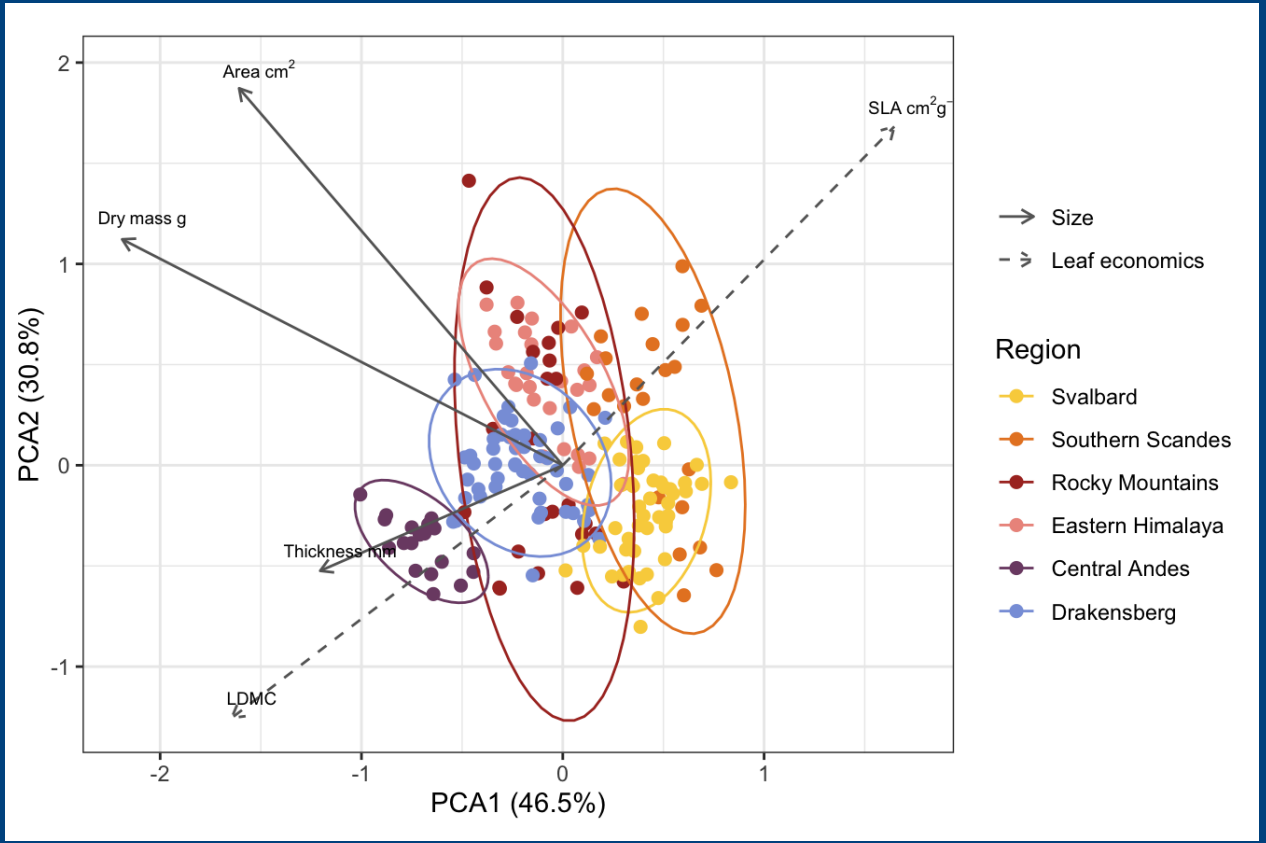
# Results

- Plant size increases with annual mean temperature
- Leaf size traits increase with annual mean temperature
- Leaf economic traits become more conservative with increasing annual mean temperature



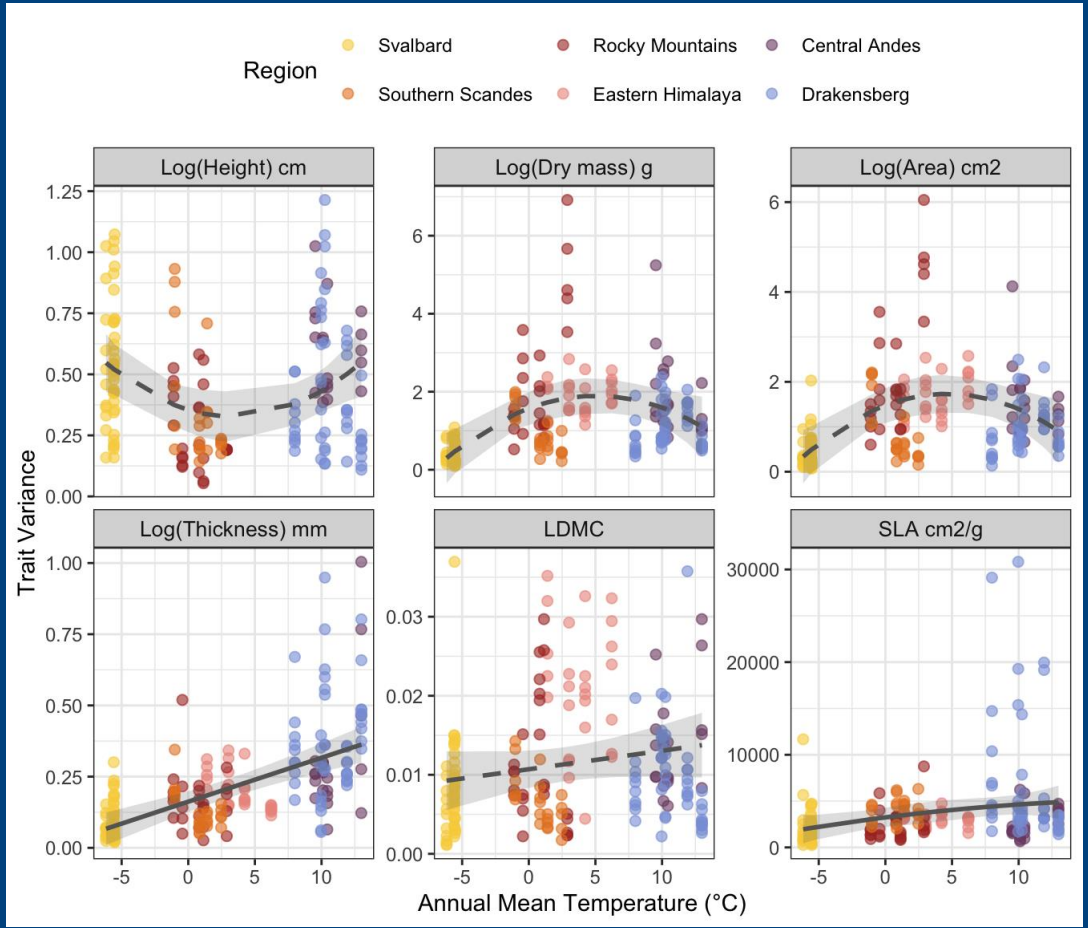
# Results: size versus leaf economic spectrum

Warmer regions have
- taller leaves
- more conservative traits

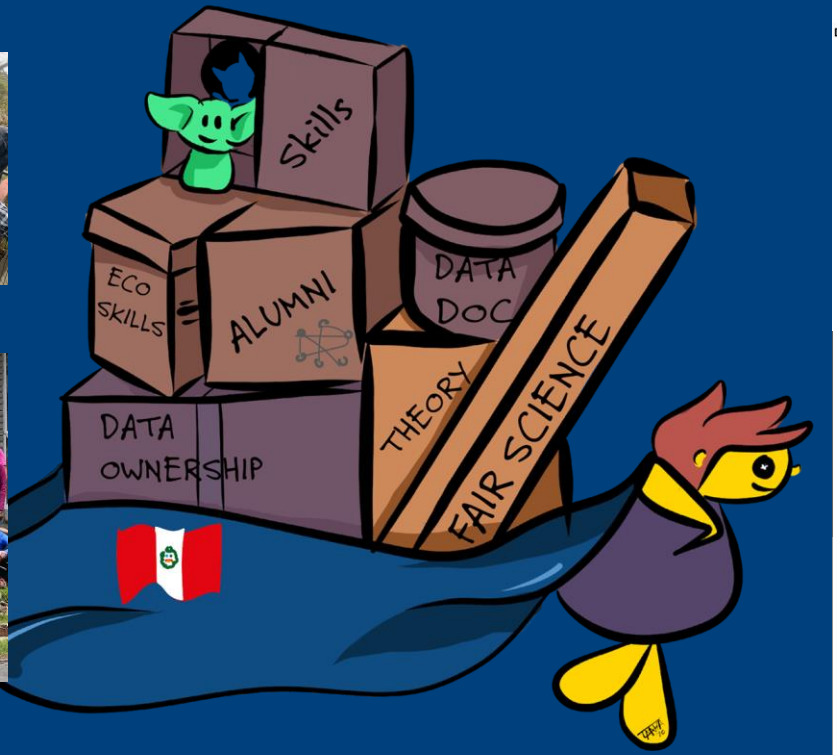


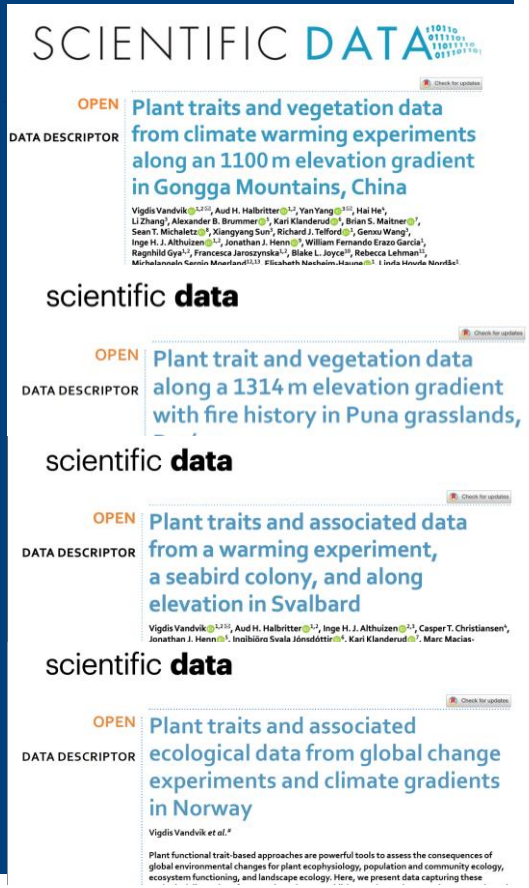
# Results: trait variance

- Most traits show no strong relationship with trait variance
- Leaf thickness and SLA show higher trait variation with increased annual temperature



# Community building, research-based learning, and Open Science





SCIENTIFIC DATA

OPEN DATA DESCRIPTOR

Plant traits and vegetation data from climate warming experiments along an 1100 m elevation gradient in Gongga Mountains, China

scientific data

OPEN DATA DESCRIPTOR

Plant trait and vegetation data along a 1314 m elevation gradient with fire history in Puna grasslands,

scientific data

OPEN DATA DESCRIPTOR

Plant traits and associated data from a warming experiment, a seabird colony, and along elevation in Svalbard

scientific data

OPEN DATA DESCRIPTOR

Plant traits and associated ecological data from global change experiments and climate gradients in Norway

Vigdis Vandvik *et al.*#

Plant functional trait-based approaches are powerful tools to assess the consequences of global environmental changes for plant ecophysiology, population and community ecology, ecosystem functioning, and landscape ecology. Here, we present data capturing these

# Thank you!

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