THE AVA AS A SOURCE FOR UNDERSTANDING SPATIAL DISTRIBUTION OF ARCTIC BIODIVERSITY

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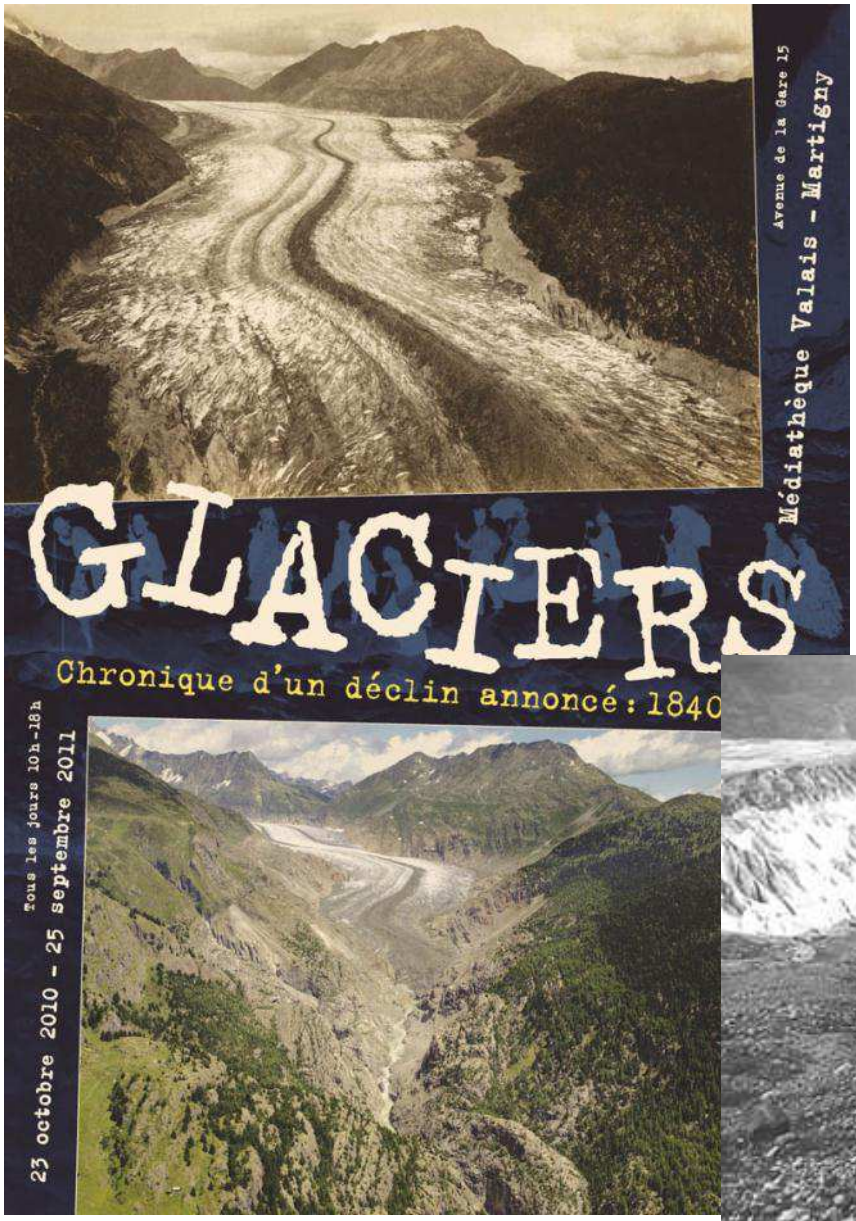
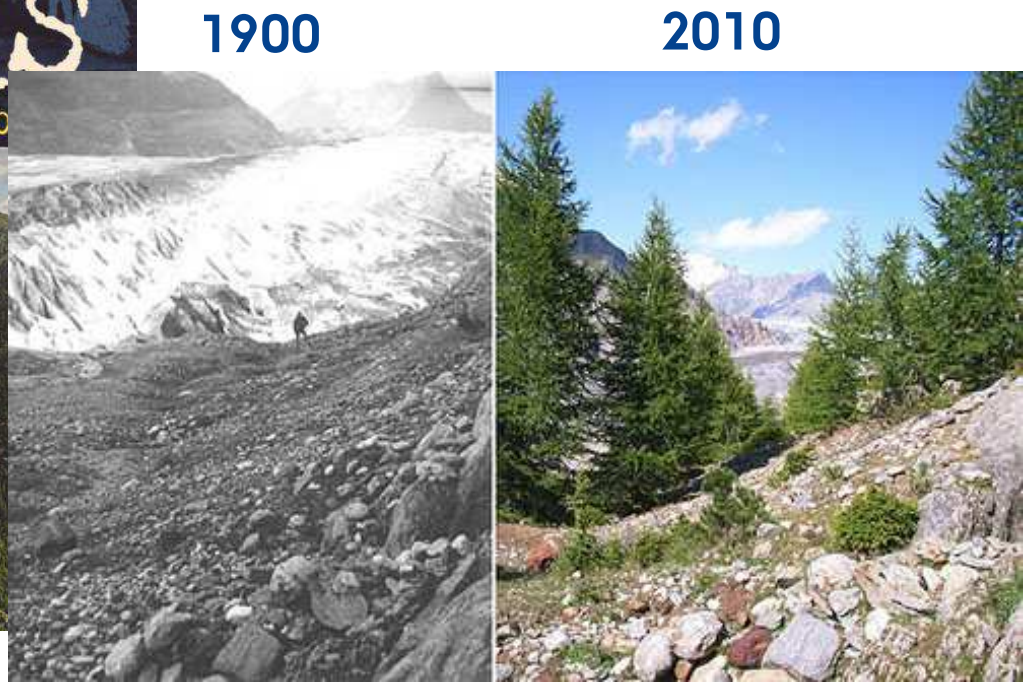
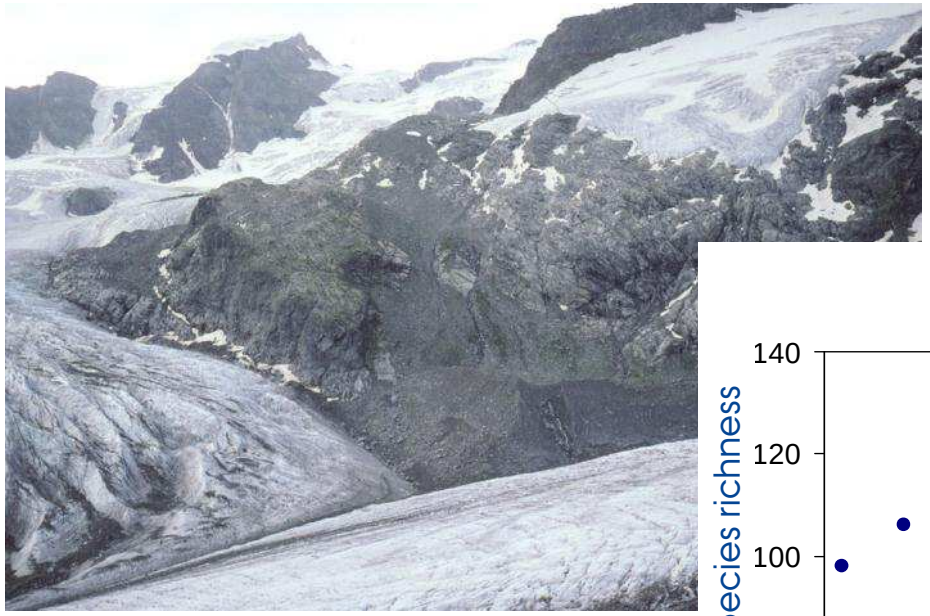
Egevang/ArcPic

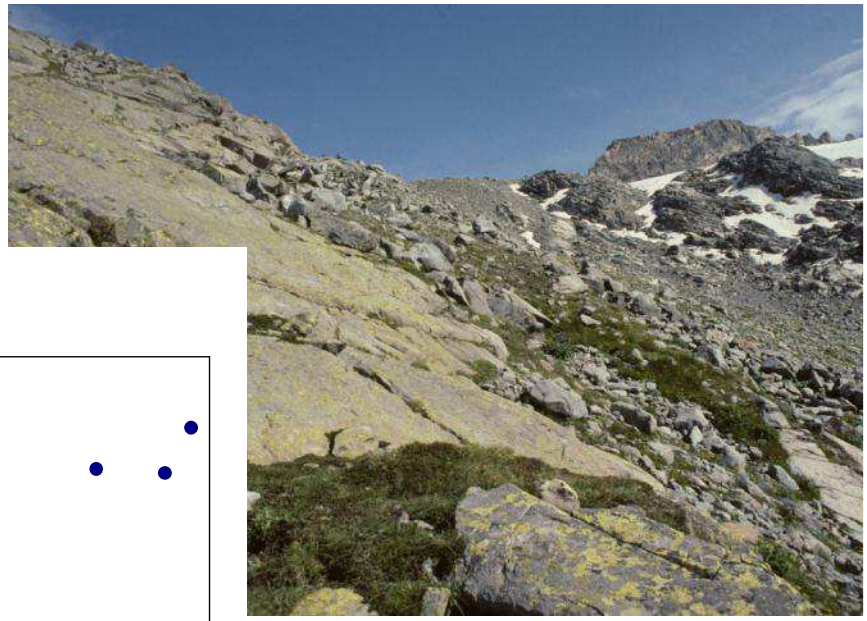


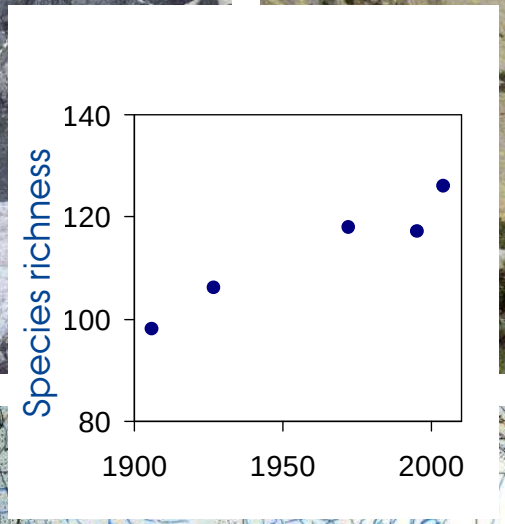


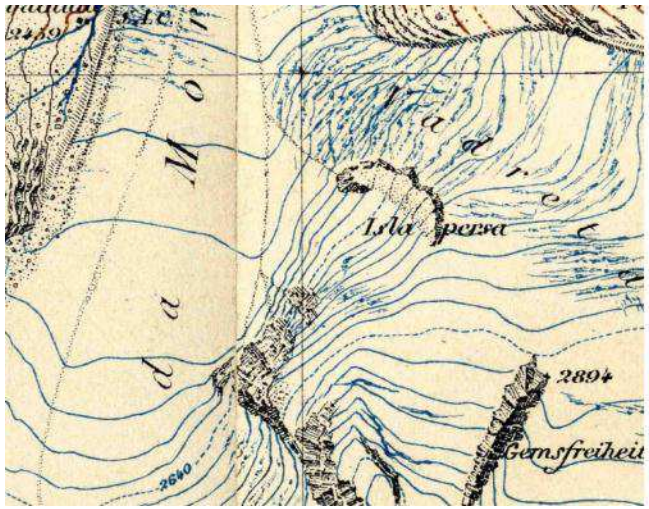
Glacier retreat in the Alps

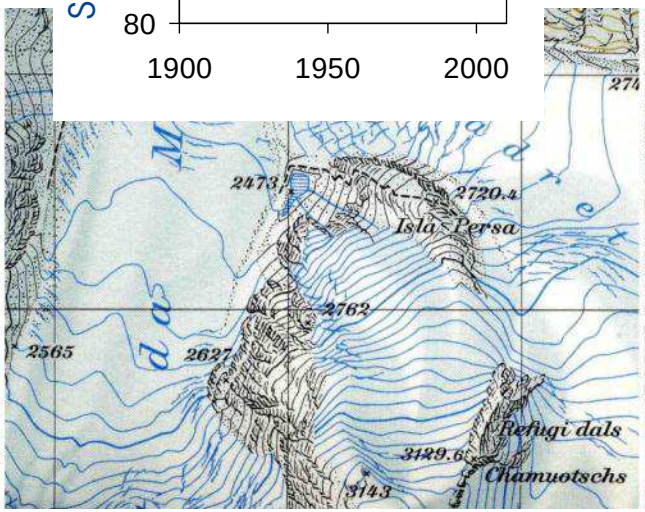
Médiathèque Valais & Pascal Vittoz

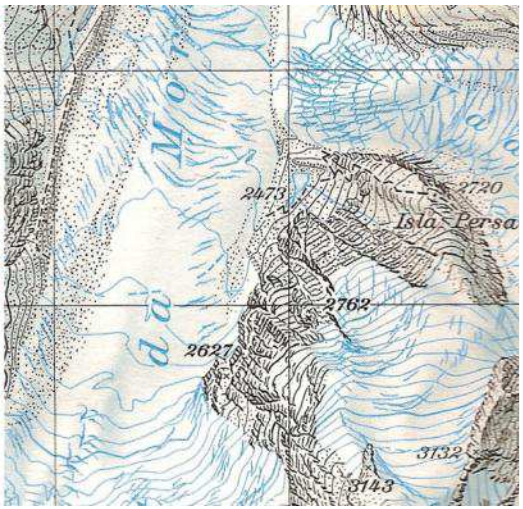








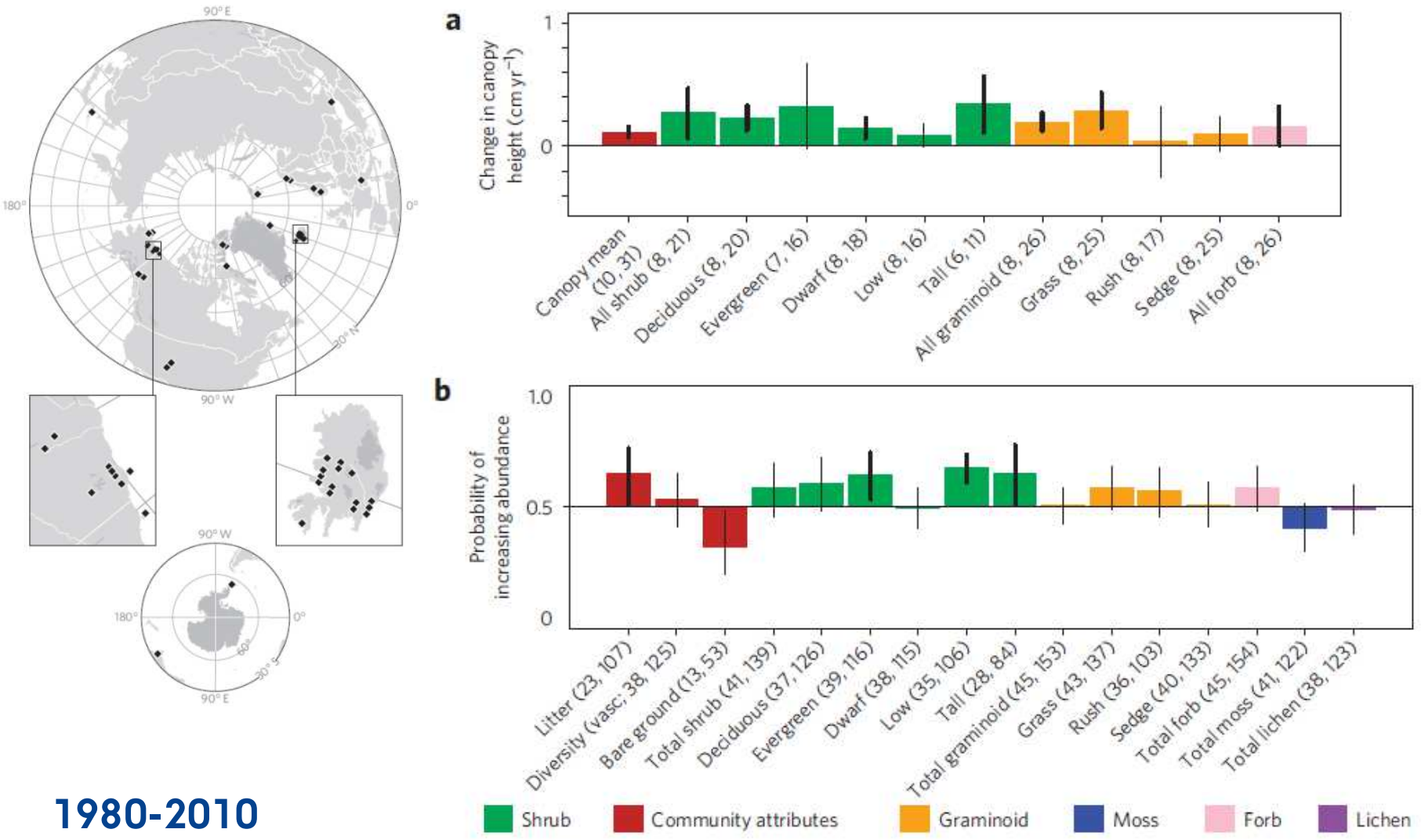




1930 **1960** **2000**

Change on Isla Persa Nunatak

Vittoz et al. 2008 *JVS*

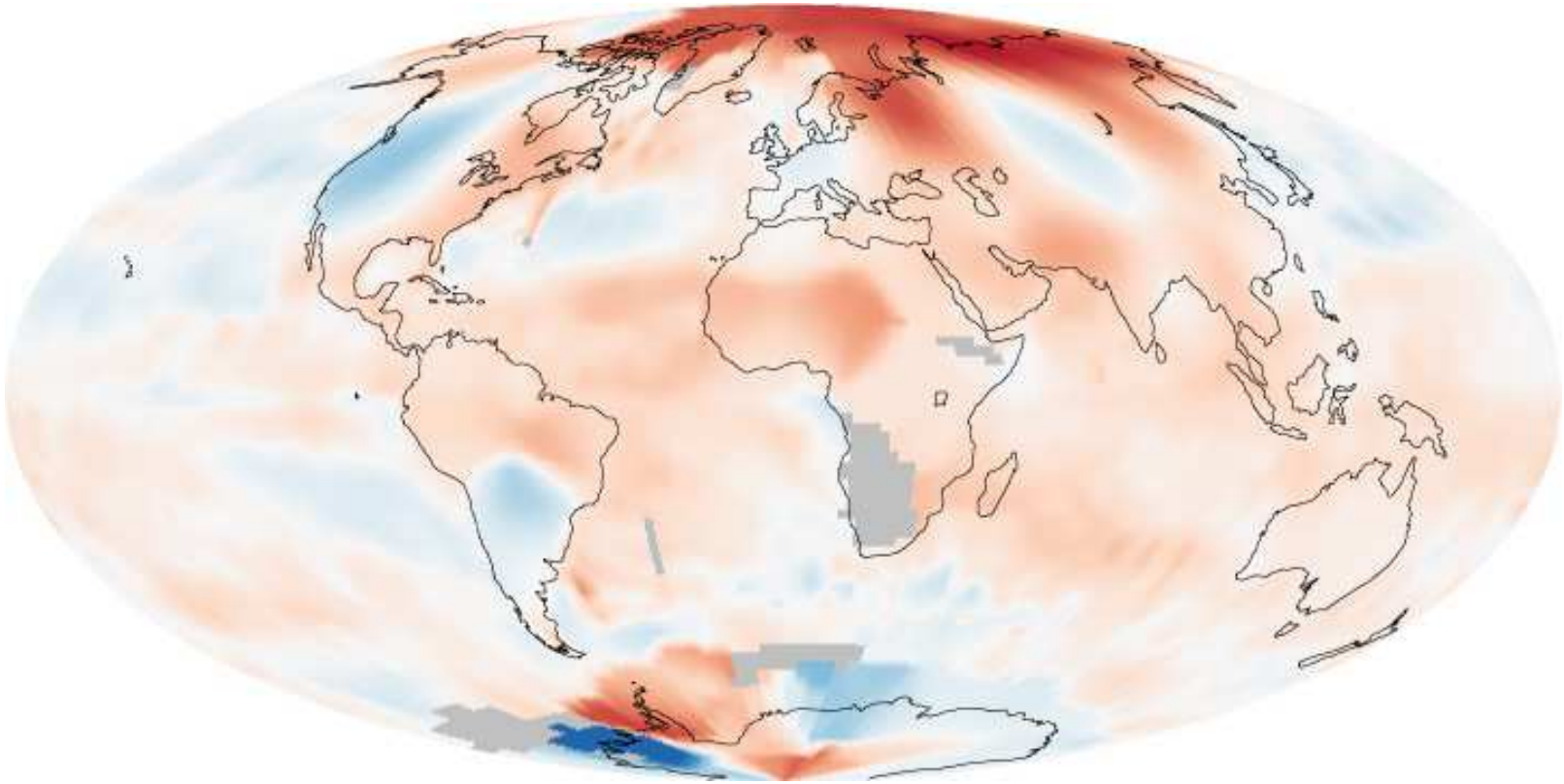


1980-2010

Vegetation change in the Arctic

Elmendorf *et al.* 2012 *Nature Climate Change*

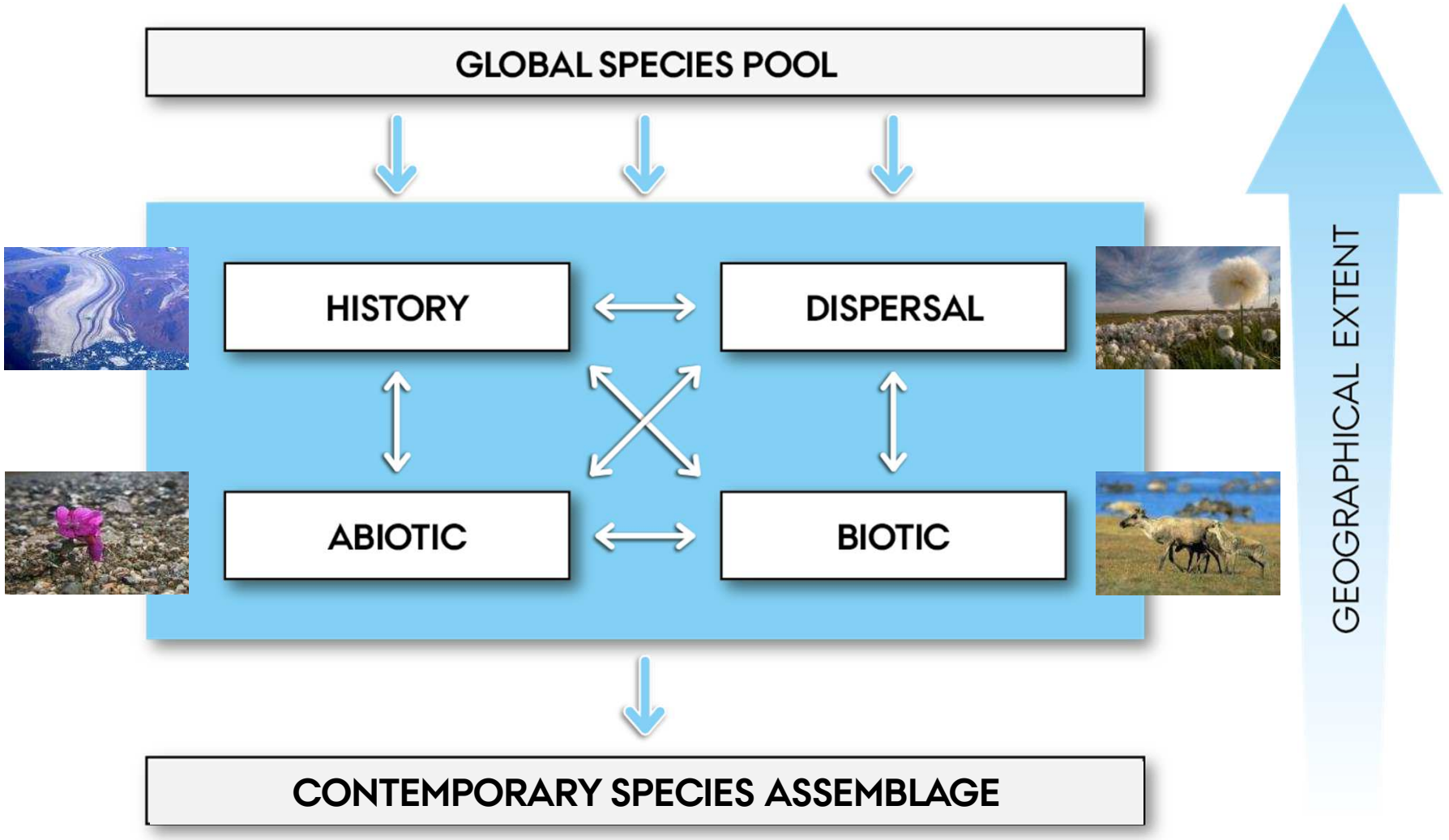
Climate change in the Arctic



Anomalies 2010, from baseline 1951-1980

NASA

WHAT SHAPES SPECIES ASSEMBLAGES?

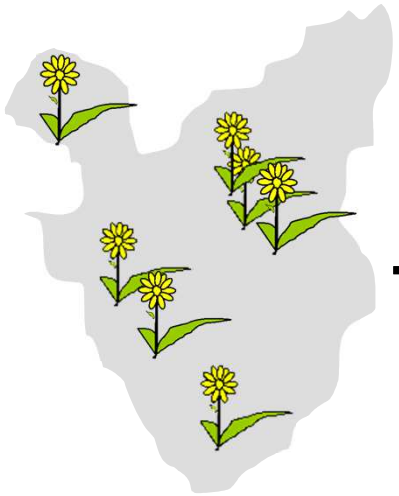


Quantifying relationships?

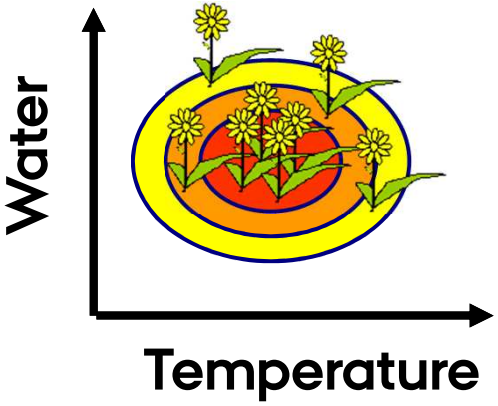
Wisz *et al.* 2013 *Biological Reviews*

SPECIES DISTRIBUTION MODELLING (SDMS)

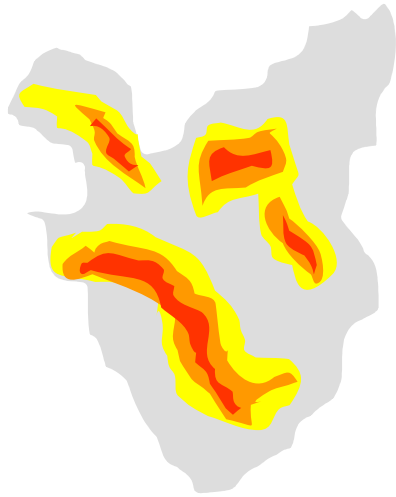
Data collection



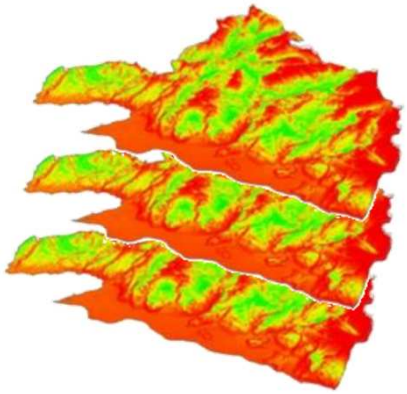
Statistical modelling



Spatial projection



Stacking SDMs



Sp1

Sp2

Sp3

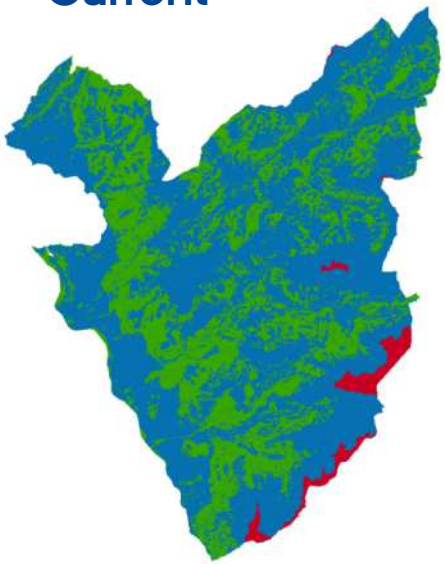
...

Communities

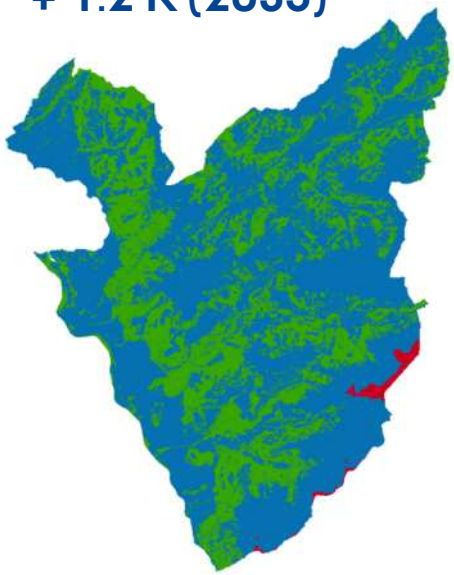
Accounting for:

- Biotic interactions
- Dispersal
- Scenarios
- ...

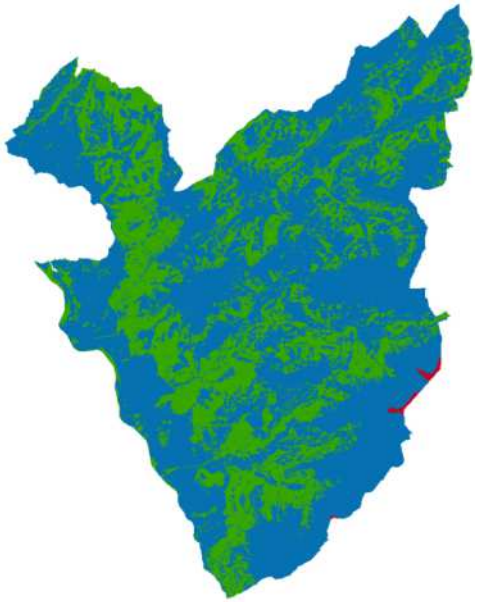
Current



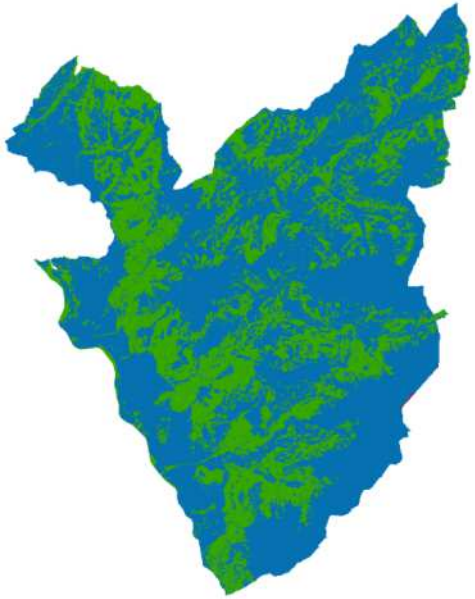
+ 1.2 K (2035)



+ 2.3 K (2060)



+ 3.2 K (2085)



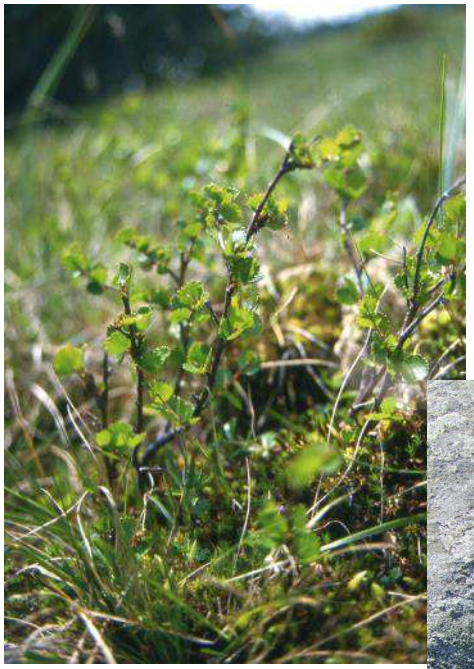
Forest

Potential distribution

Plebeius glandon

Descomptes et al. *In preparation*

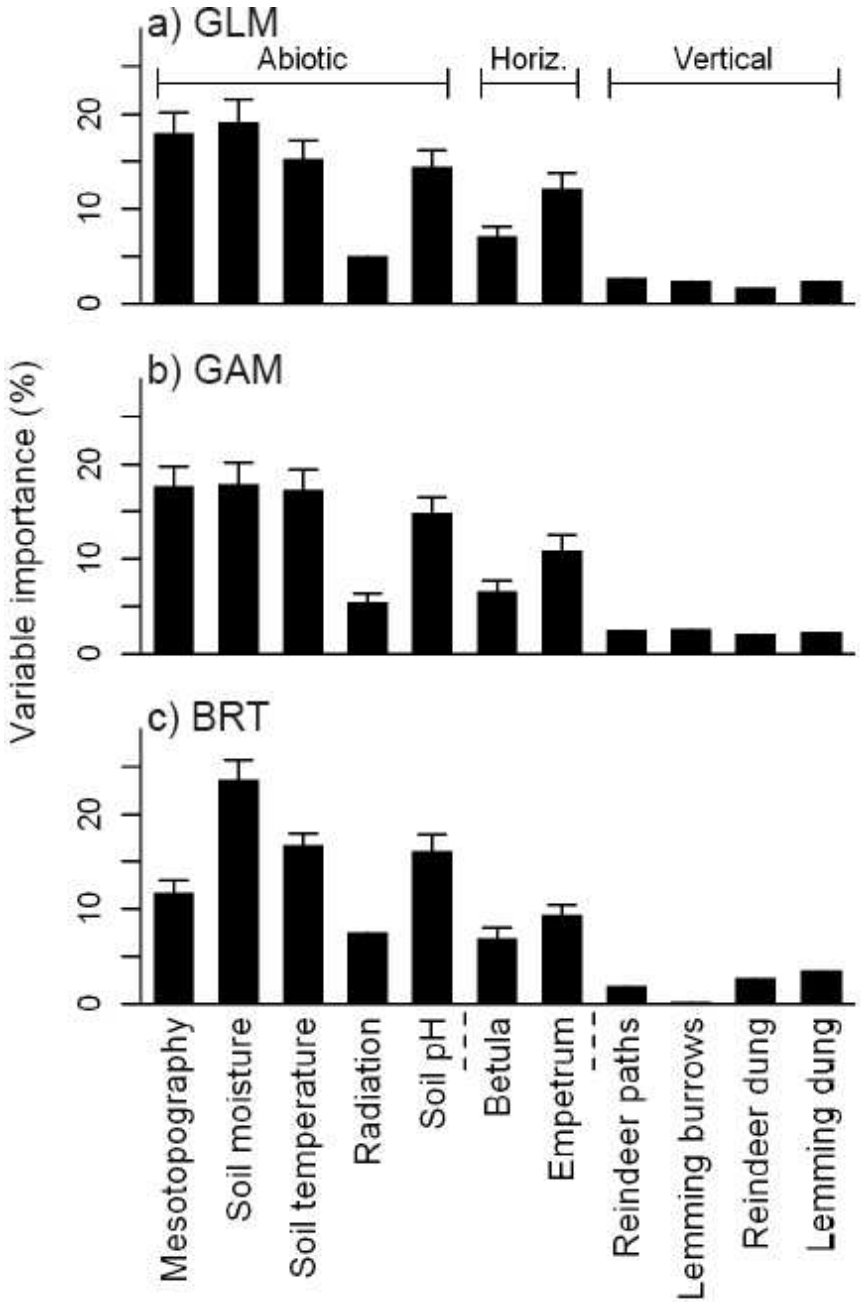
FENNOSCANDIAN VEGETATION AND BIOTIC INTERACTIONS

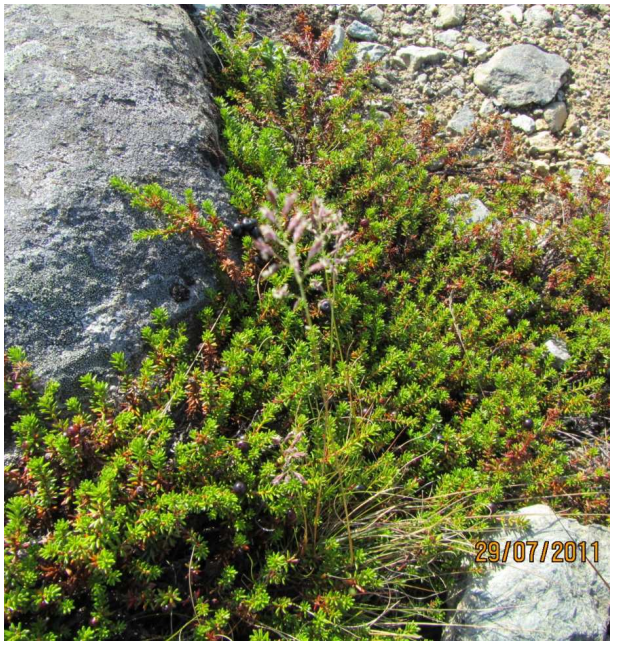


Dominant plants

Lemmings

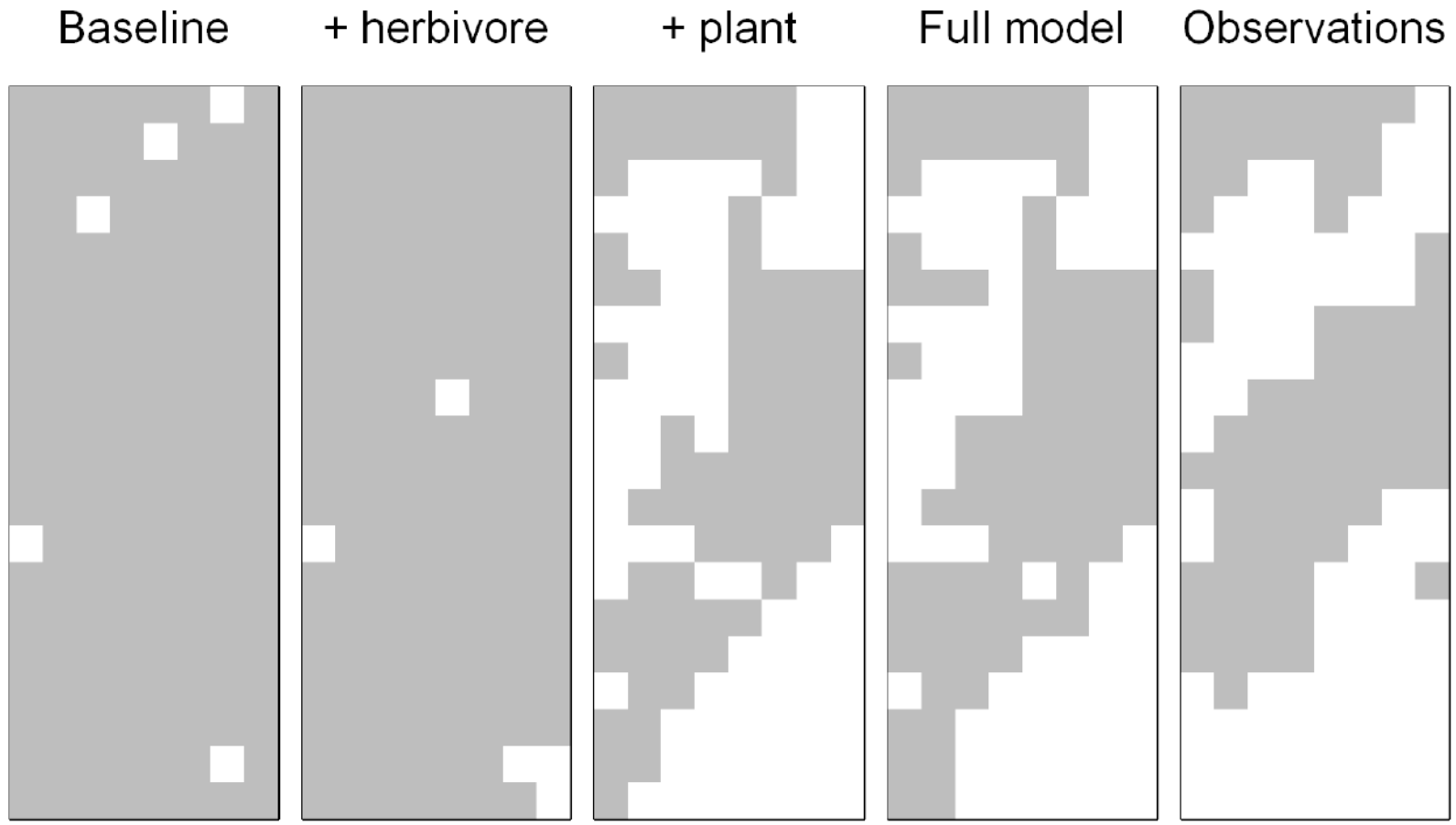
Reindeers





Le Roux, Lenoir, Pellissier, Wisz & Luoto, 2013, *Ecology*

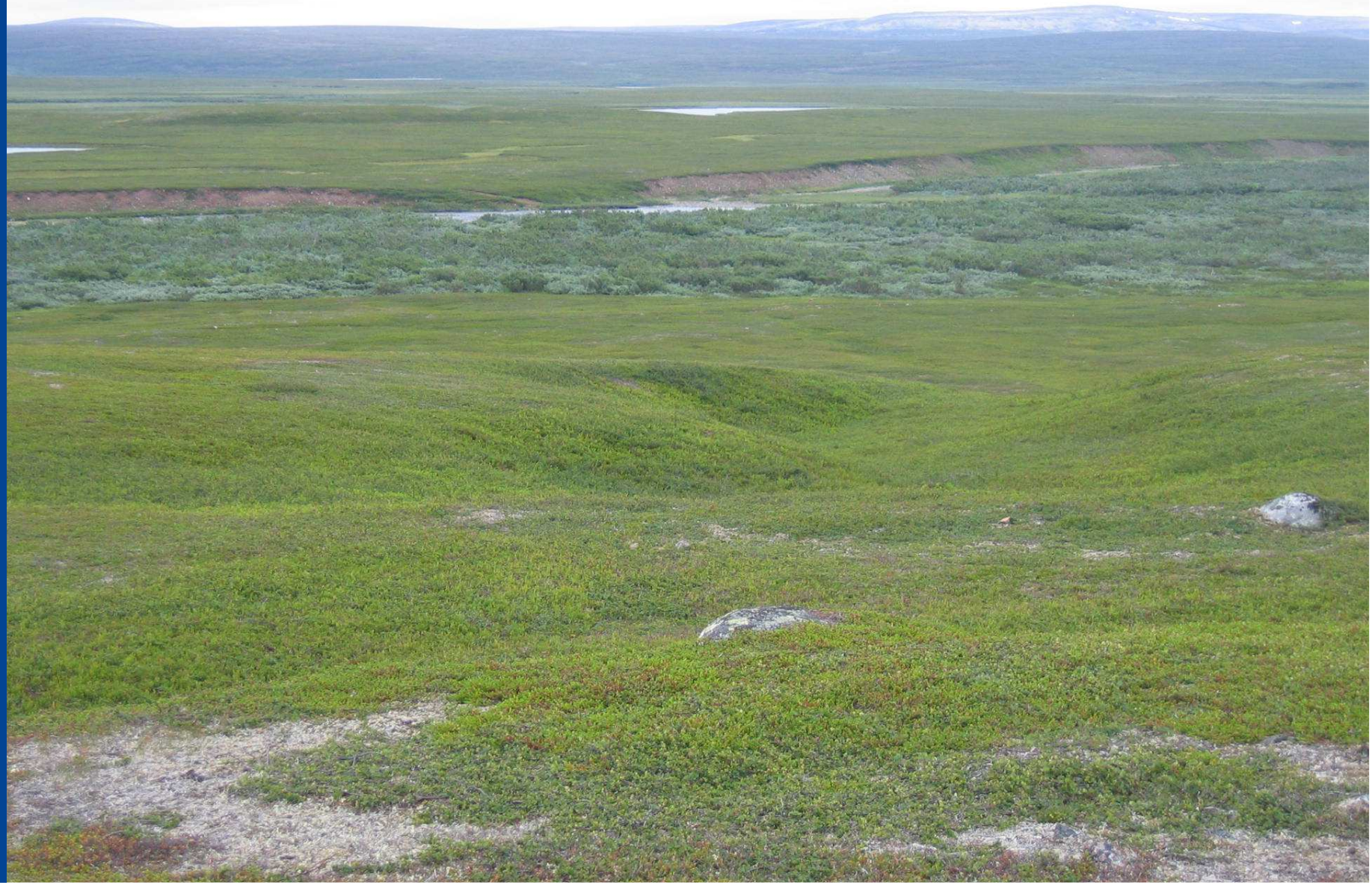
IMPROVEMENT OF DISTRIBUTION



Le Roux, Lenoir, Pellissier, Wisz & Luoto, 2013, *Ecology*

Pellissier et al. 2010 *Ecography*

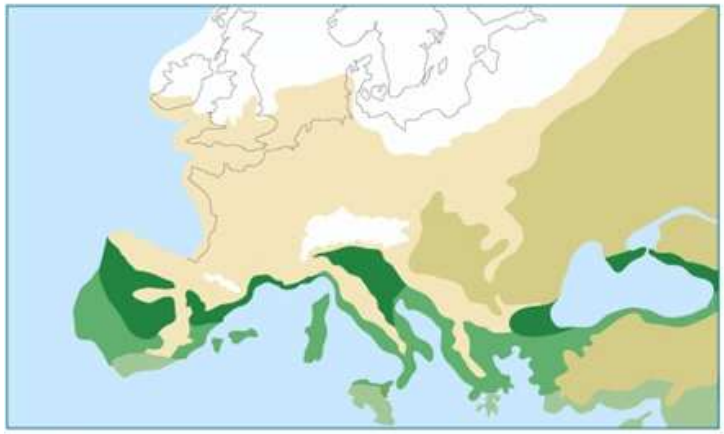
EMPETRUM HERMAPHRODITUM...
EFFECT AT LARGE SCALE



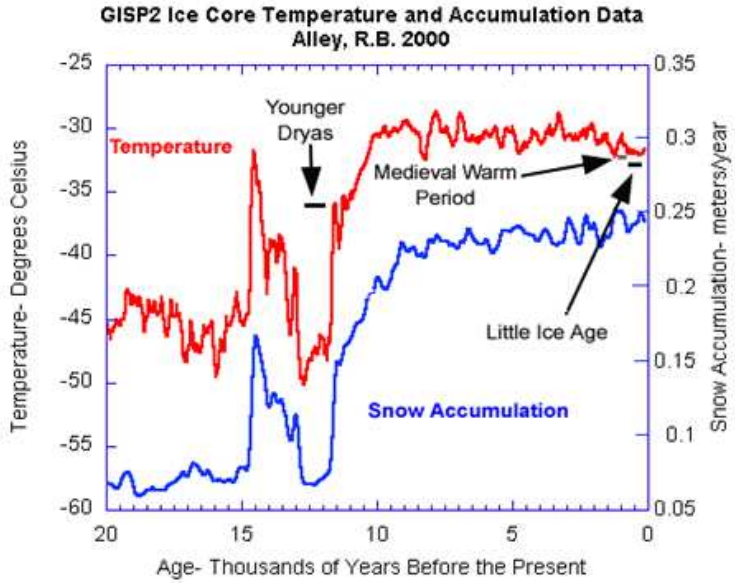
HINDCASTING TO PAST CLIMATE

A Modern vegetation

Ice
Tundra and mountain
Boreal forest
Deciduous and conifer forest
Mediterranean scrub
Prairie-steppe



B Glacial vegetation



The quaternary glaciations

Ruddiman, 2nd edition

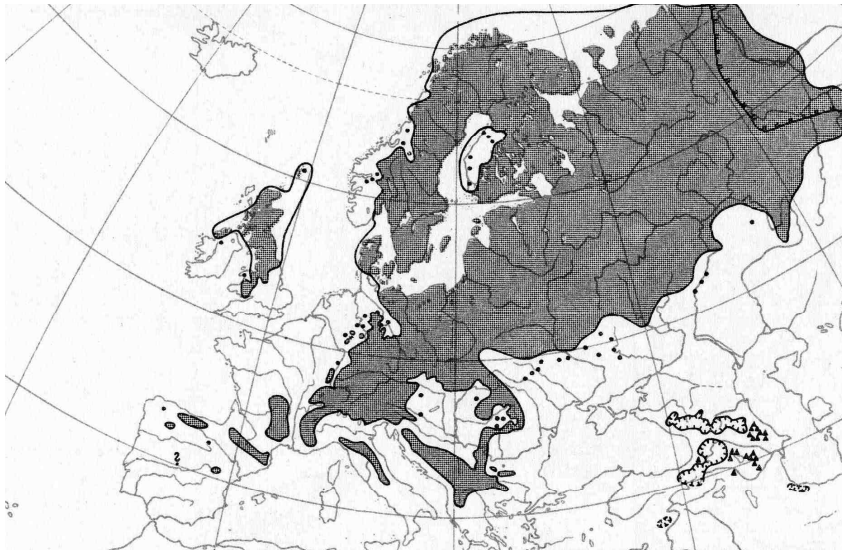
QUATERNARY GLACIATIONS AND RECOLONISATION

Fagus sylvatica

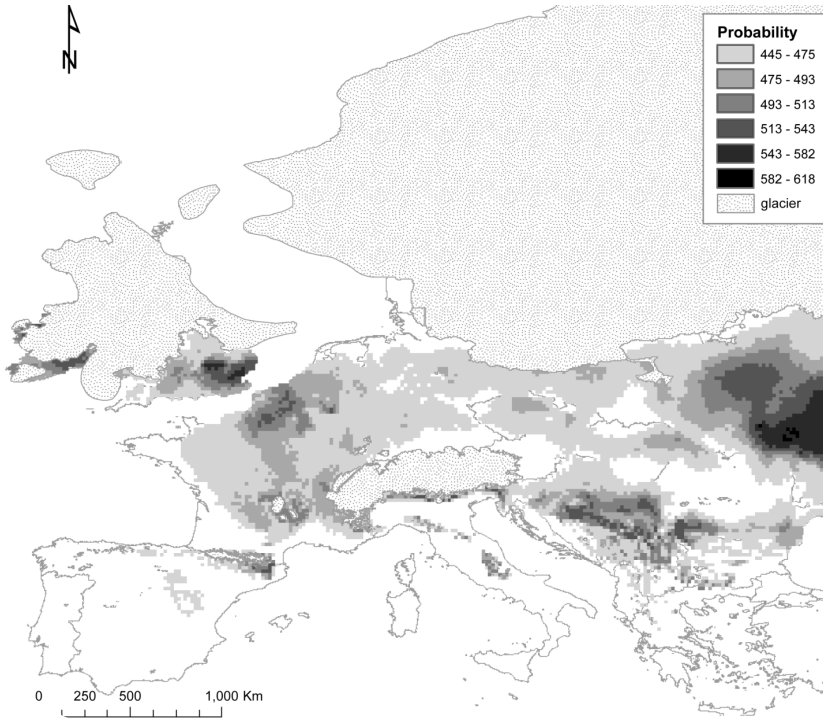
Mus musculus

Sorex anareus

Current



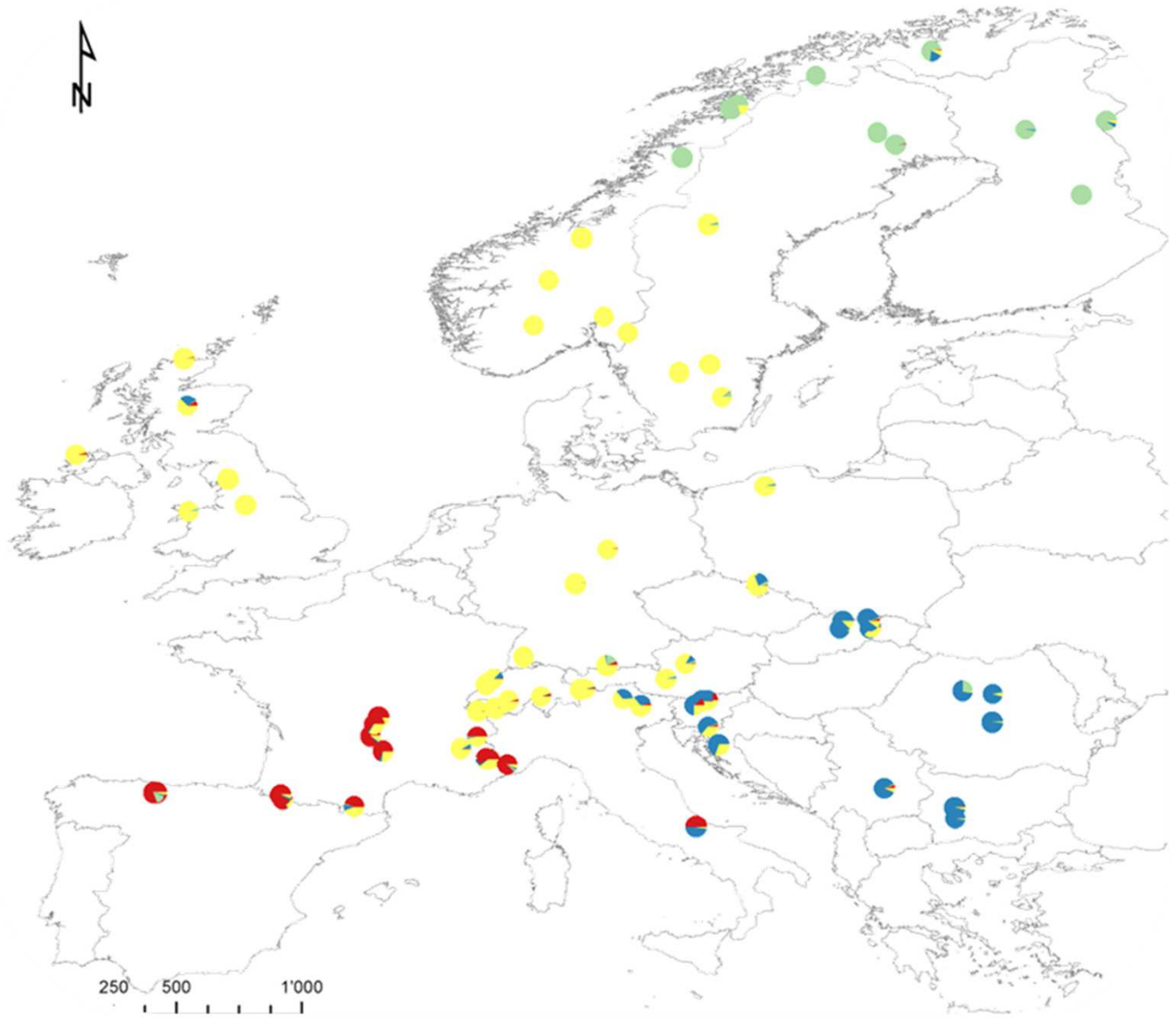
-24’000



An exemple with Trollius europeaus

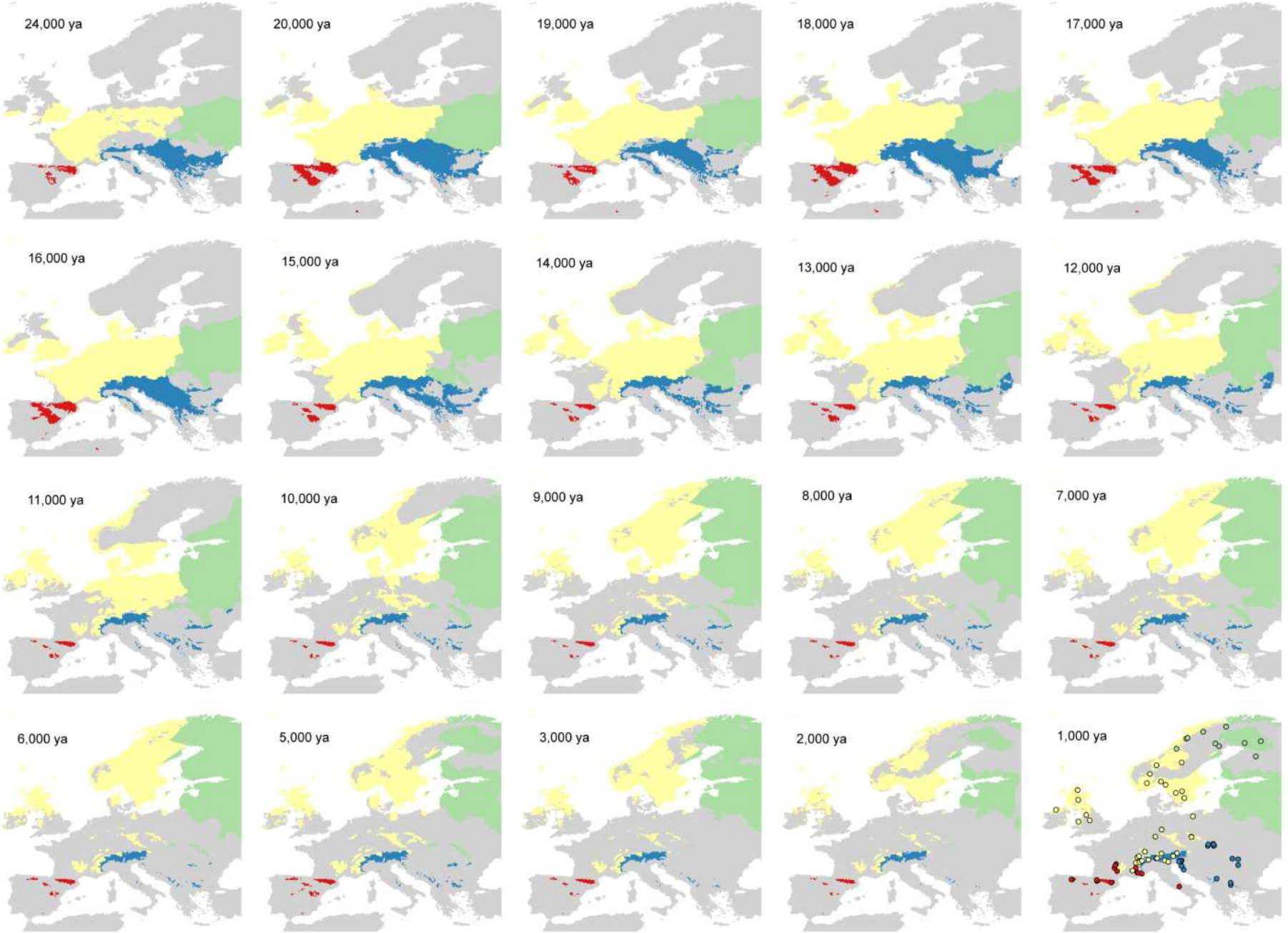
Espindola, Pellissier, et al. 2012, *Ecology Letters*

CURRENT GENETIC STRUCTURE



AFLP data

Espindola, Pellissier, et al. 2012, *Ecology Letters*



Dynamic modelling of *T. Europeaus* through time

Espindola, Pellissier, et al. 2012, *Ecology Letters*

GLOBAL BIODIVERSITY INFORMATION FACILITY (GBIF)

free and open access to biodiversity data
GLOBAL BIODIVERSITY INFORMATION FACILITY

Species: ***Gadus morhua* Linnaeus, 1758**

Baccalo

»Kingdom: Animalia »Phylum: Chordata »Class: Actinopterygii »Order: Gadiformes »Family: Gadidae »Genus: *Gadus* »Species: *Gadus morhua*

Actions for *Gadus morhua*

Explore:	Occurrences (Over 1,000 records) Names and classification
List:	Countries with occurrences Datasets with occurrences
Download:	Darwin Core records One-degree cell density overlay for Google Earth Placemarks for Google Earth (limit 10,000)

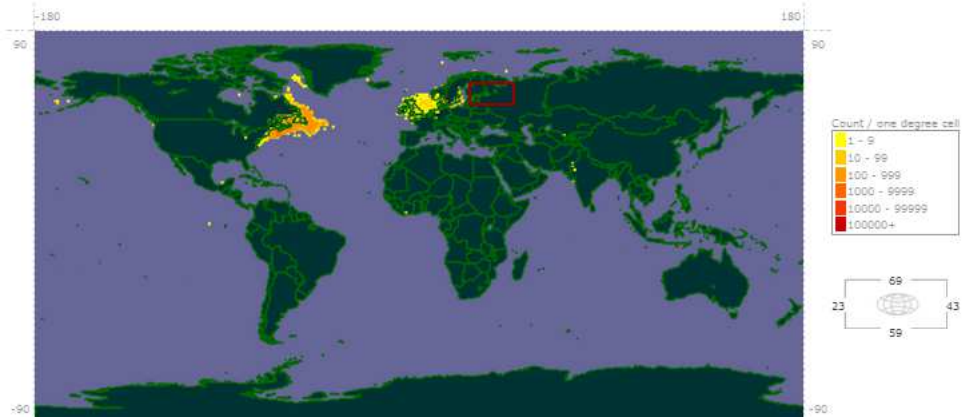
Names and classification

According to The Species 2000 and ITIS Catalogue of Life: FishBase in Species 2000 and ITIS Catalogue of Life: 2011 Annual Checklist

Name	*Gadus morhua* Linnaeus, 1758
Classification	»Kingdom: Animalia »Phylum: Chordata »Class: Actinopterygii »Order: Gadiformes »Family: Gadidae »Genus: *Gadus* »Species:
Status	Accepted name
Synonyms	*Gadus morhua callarias, Gadus callarias, Gadus arenosus, Gadus callarias hiemalis, Gadus heteroglossus, Morrhua vulgaris, Gadus morhua k punctatus, Morhua vulgaris, Morrhua americana, Gadus callarias kildinensis, Asellus major*
Record URL	http://www.catalogueoflife.org/annual-checklist/details/species/id/12149500
Record URL	12149500
Globally unique identifier	urn:lsid:catalogueoflife.org:taxon:990e1f16-4aa4-11e2-92fb-569cdfeac142:col20130128
Feedback	Feedback to The Species 2000 and ITIS Catalogue of Life on the classification of *Gadus morhua* Linnaeus, 1758

Please note that this feedback reaches the publisher of the nomenclatural (name-related) information. If your feedback concerns

Occurrence overview



Gadus morhua

THREE TAXONOMIC GROUPS

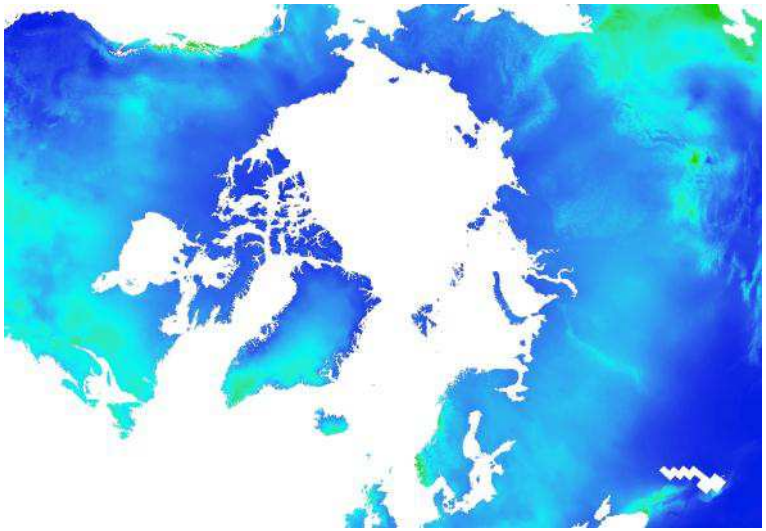


Vascular plants, lichens and bryophytes

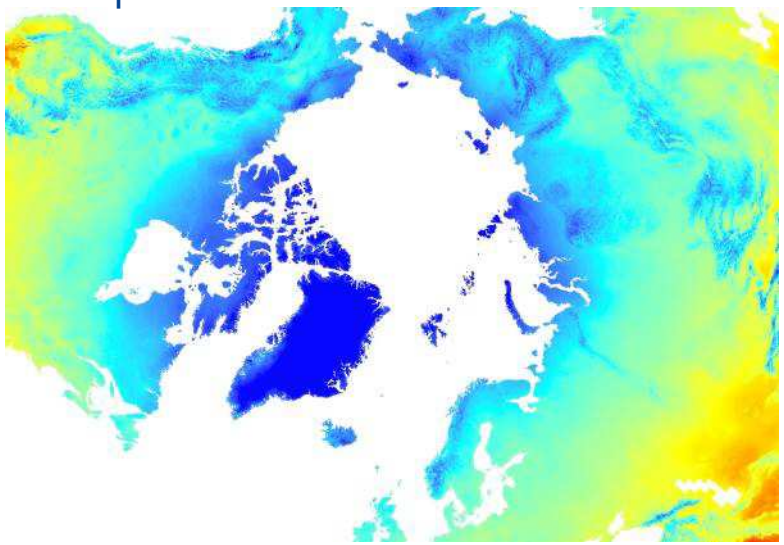
Stewart et al. *In prep.*

COMBINED WITH GEOGRAPHIC INFORMATION SYSTEM (GIS)

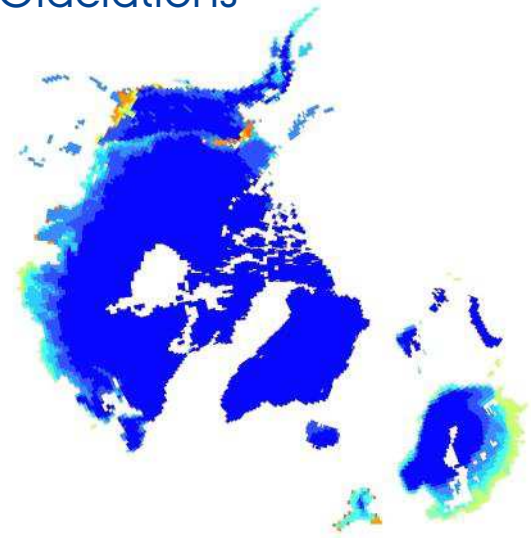
Moisture



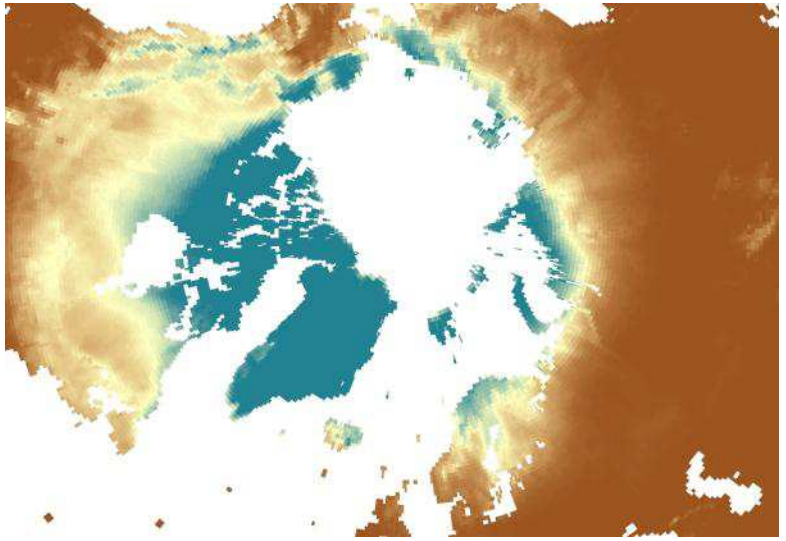
Temperature

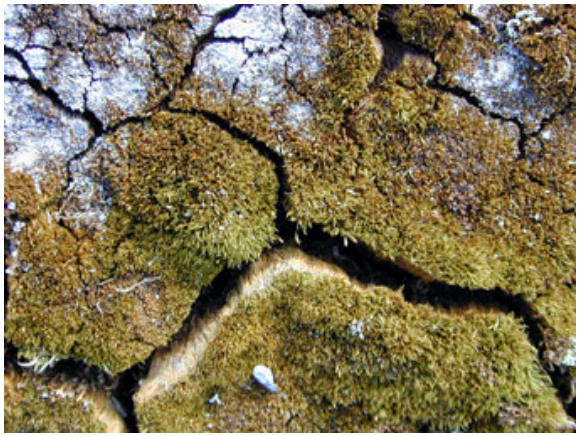


Glaciations



Climatic stability





Limited dispersal ability (Lenoir et al. 2012) and recolonisation after glaciations

Good dispersal ability (Lenoir et al. 2012)
Higher richness in cold areas

Higher richness in warmer and productive areas. **No evidence of glaciation effect**.

Stewart et al. *In prep.*

CONCLUSIONS

AVA COMBINED WITH **STATISTICAL MODEL**
AS A TOOL TO:

- UNDERSTAND ARCTIC PLANT DIVERSITY
- UNDERSTAND PLANT COMMUNITY ECOLOGY
- UNDERSTAND POPULATION GENETIC STRUCTURE
- FORECAST FUTURE CHANGES TO ECOSYSTEMS

Thank you !

Acknowledgements