Current activities, ICP IM
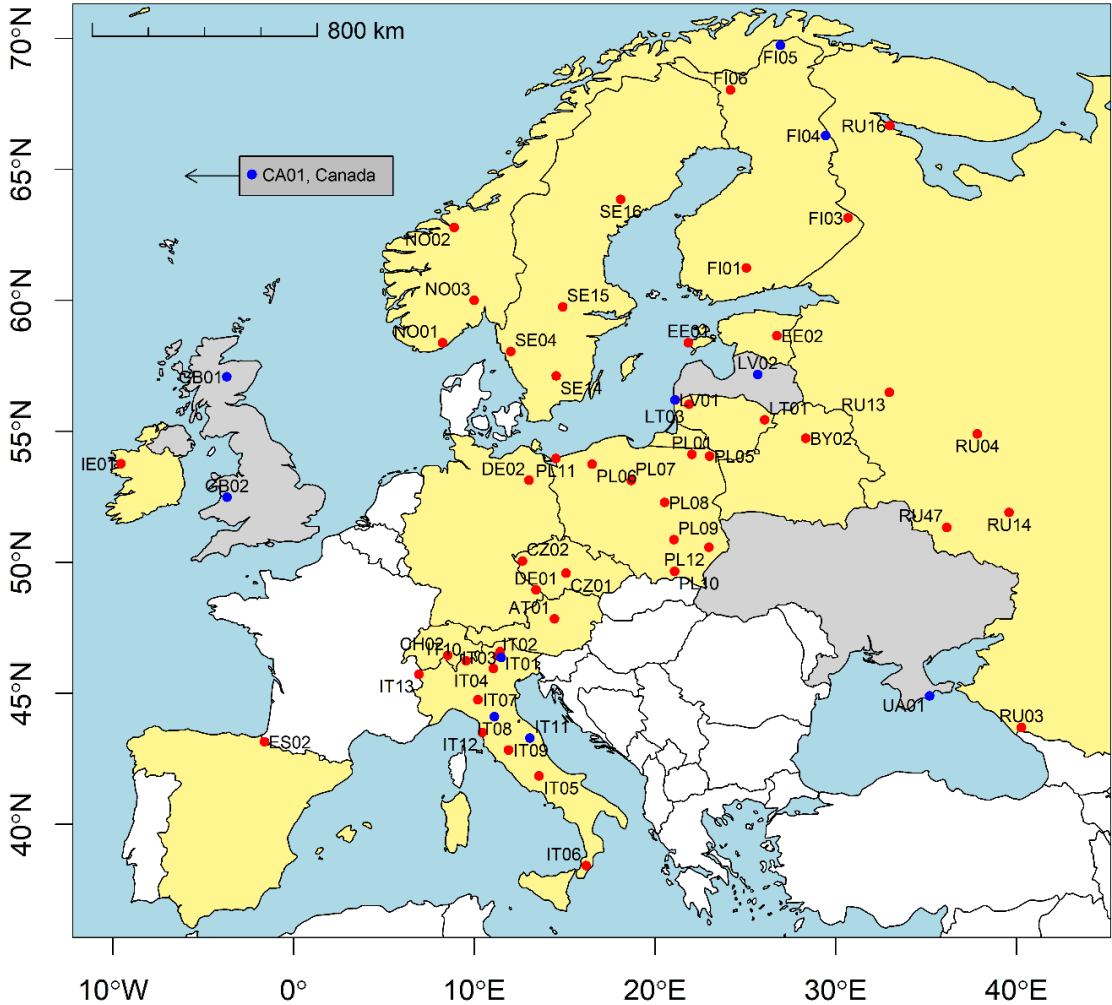
ICP Integrated Monitoring of Air Pollution Effects on Ecosystems -

ICP IM

Ulf Grandin, Salar Valinia & James Kurén Weldon

The current ICP IM network

15 active countries

48 active sites

● Active IM site

● Inactive IM site

▢ Country with active IM sites
▢ Country with only inactive IM sites
▢ Country without IM sites

Key activities 2023

Activity	Status
Installed passive mercury samplers at participating sites in collaboration with Canadian researchers	Done/running
Trends in heavy metal concentrations (scientific paper)	Under review
Modelling and assessment of biodiversity and ecosystem impacts (recovery from acidification)	Report written
Extend co-operation with eLTER in line with agreed letter of understanding	Ongoing

Other activities during 2023

| Activity	When
ICP IM Task Force meeting 2023 Together with ICP Waters in Lunz, Austria	9-11 May 2023
Submission of quality-controlled data for year 2022	Dec. 2023
ICP IM Annual Report 2023	2023
Reporting of ICP IM activities to WGE	2023

Task Force meeting, Prague, Czechia

- 28-30th May
- Joint meeting with ICP Waters
- In person encouraged but possibility for remote presentations
- Registration open at IM website under "Meetings and Activities"

# Disturbance, deposition and vegetation community stability

- Can deposition and/or other disturbances be linked to reduced vegetation community stability?
- Statistically summarise community composition and track changes over time
- Aneboda (SE14) damaged by storm Gudrun (2005) and following bark beetle attack
- Bark beetles killed most large spruce, radically changing conditions
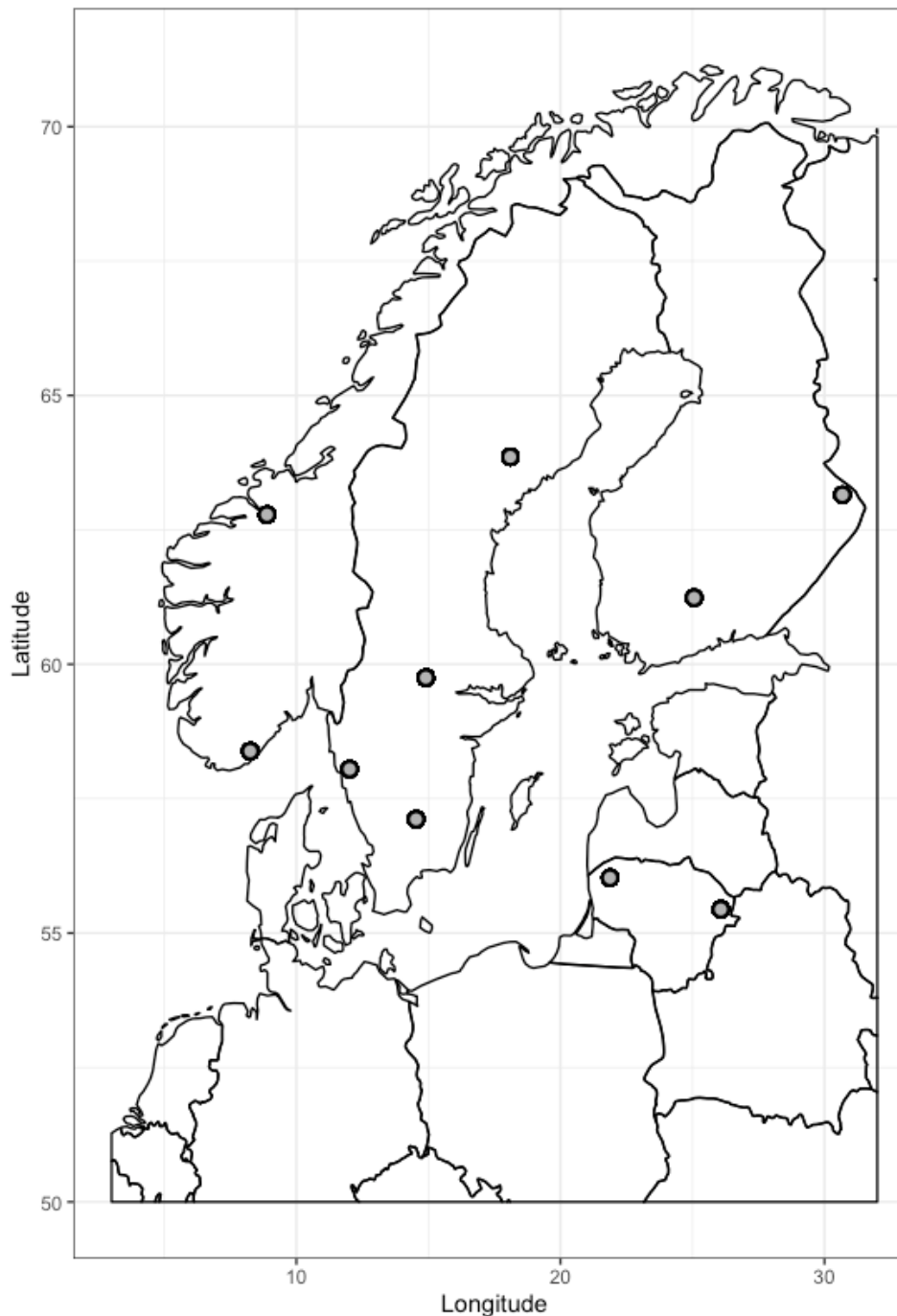
Stability, resilience

- Patterns moved in ordination space over time as an indication of stability and resilience

- Light blue line is Aneboda, the heavily disturbed site

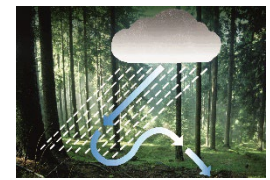- Most plots show limited movements within "basin of attraction"
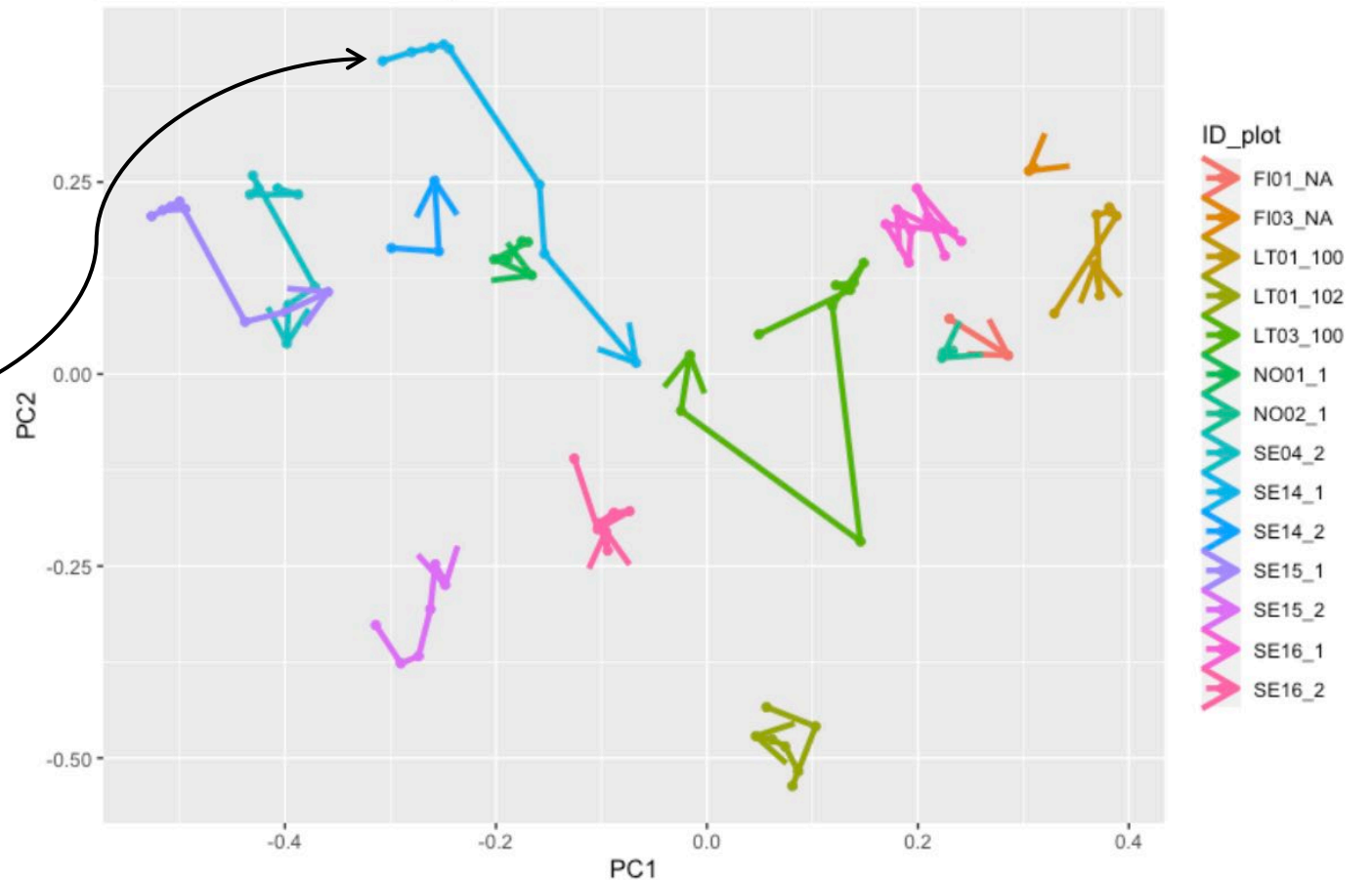
Stability, resilience

- Cumulative distance moved in ordination space over time as an indication of community stability

- Light blue line is Aneboda, the heavily disturbed site

- Next step is to relate these distances to deposition, using data from more sites
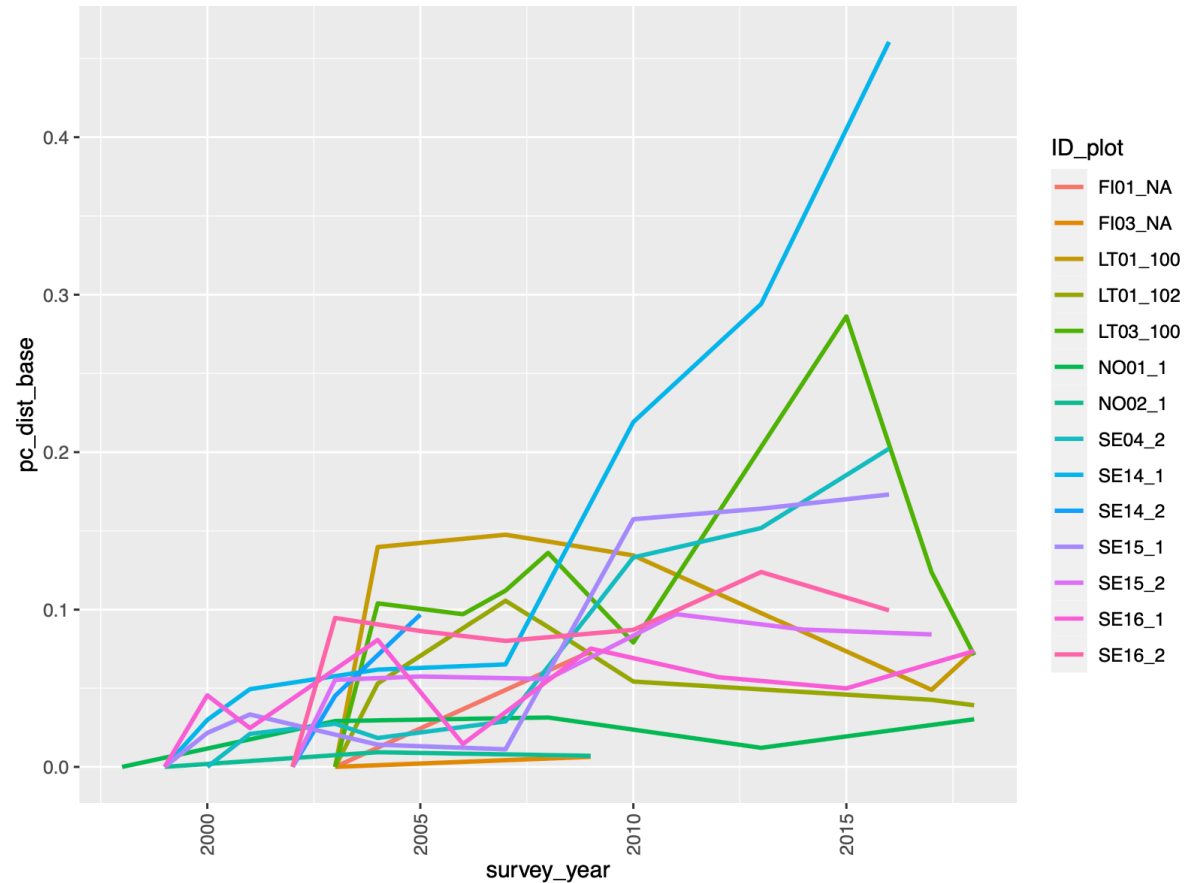
Mercury project

- Global project led by Canada (EPA) to test passive mercury samplers

- First data now available to participants

- We will publish an evaluation once more data are available, during 2025 (as specified in workplan)
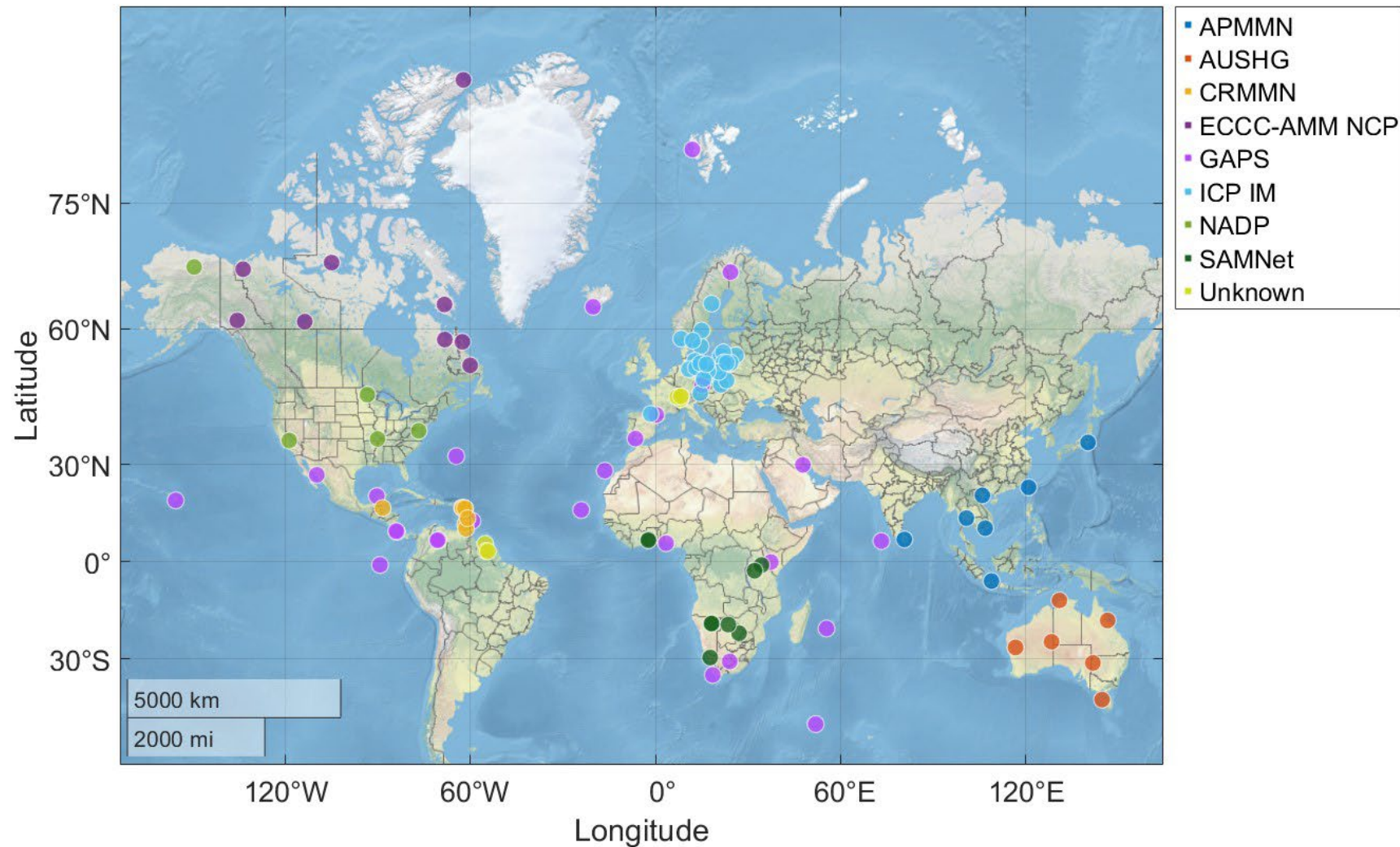
Modelling biodiversity recovery from acidification

- Dynamic geochemical soil model (VSD+) coupled to a statistical plant response model (PROPS) to investigate recovery patterns in plant diversity after acidification. Investigate confounding factors at Swedish sites where we have excellent background knowledge

- Modelled/observed "probability of occurrence"
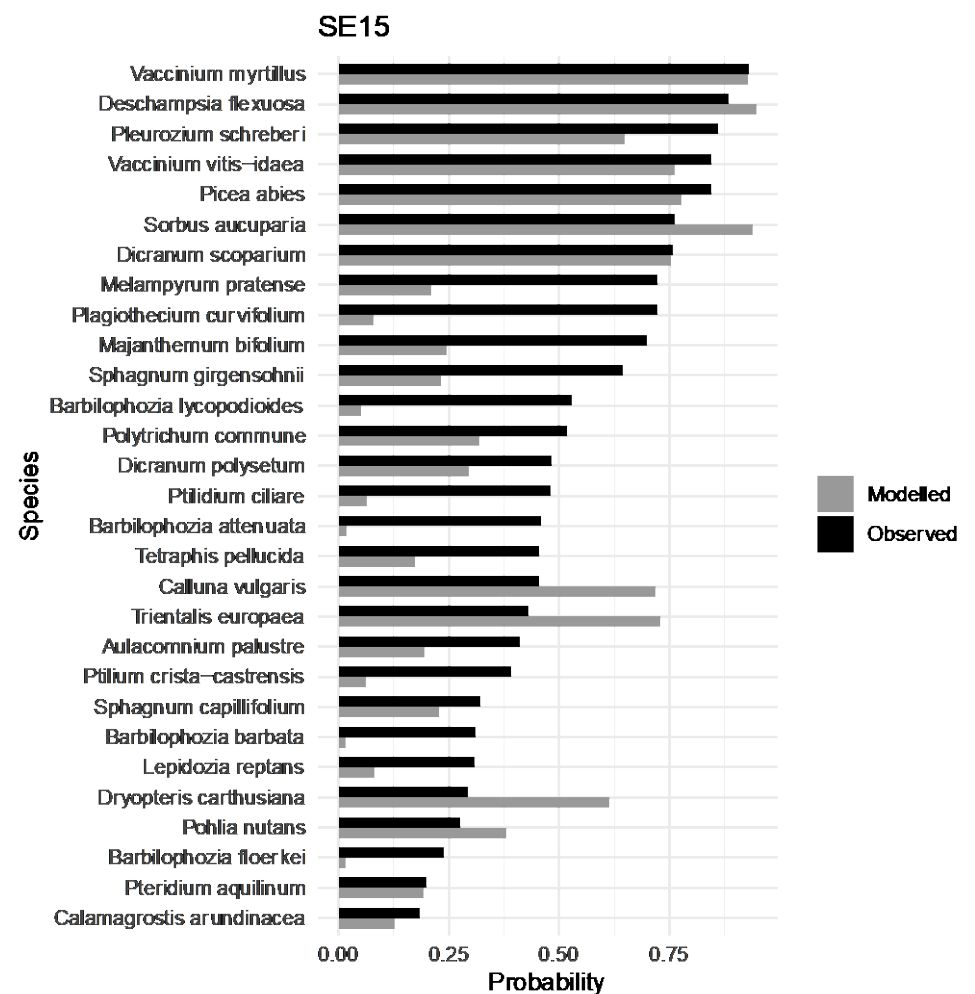
Modelling biodiversity recovery from acidification

- Often underestimates probability of non-vascular parts of the forest floor vegetation (at least at these sites)
- More important role of bryophytes and lichens in boreal/boreo-nemoral forests than in the sites further south where training data concentrated?

Site	Vascular correlation	Non-vascular correlation
SE04	0.72	0.42
SE14	0.65	0.44
SE15	0.81	0.60
SE16	0.63	0.48

Spearman rank correlation between modelled and observed probability of occurrence

Open data

- General move towards open data, funders (and journals) increasingly require this. Assumption that publicly funded data should be publicly available, demand for reproducibility

- ICPs asked at Geneva 2022 meeting to discuss making data open

- We have a great resource in our data that could be used more than currently, and also for other research questions

Open data

**How to ensure acknowledgement for producing open data?**

- By attribution licence (CC BY)

- Make data citable

- Publish a data paper, offering co-authorship to data owners, and gaining citations

- Not everyone needs to agree – can publish data from those parts of the network that are willing, the rest remains by request only

RECOMMENDED LICENSE

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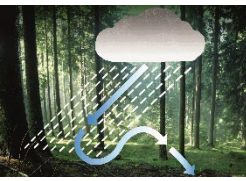
Open data

- IM discussed this in general terms at previous TF meeting

- All countries requested to discuss and come to TF meeting this year with decision

- We then move forward with open publication and data paper with those partners who want to
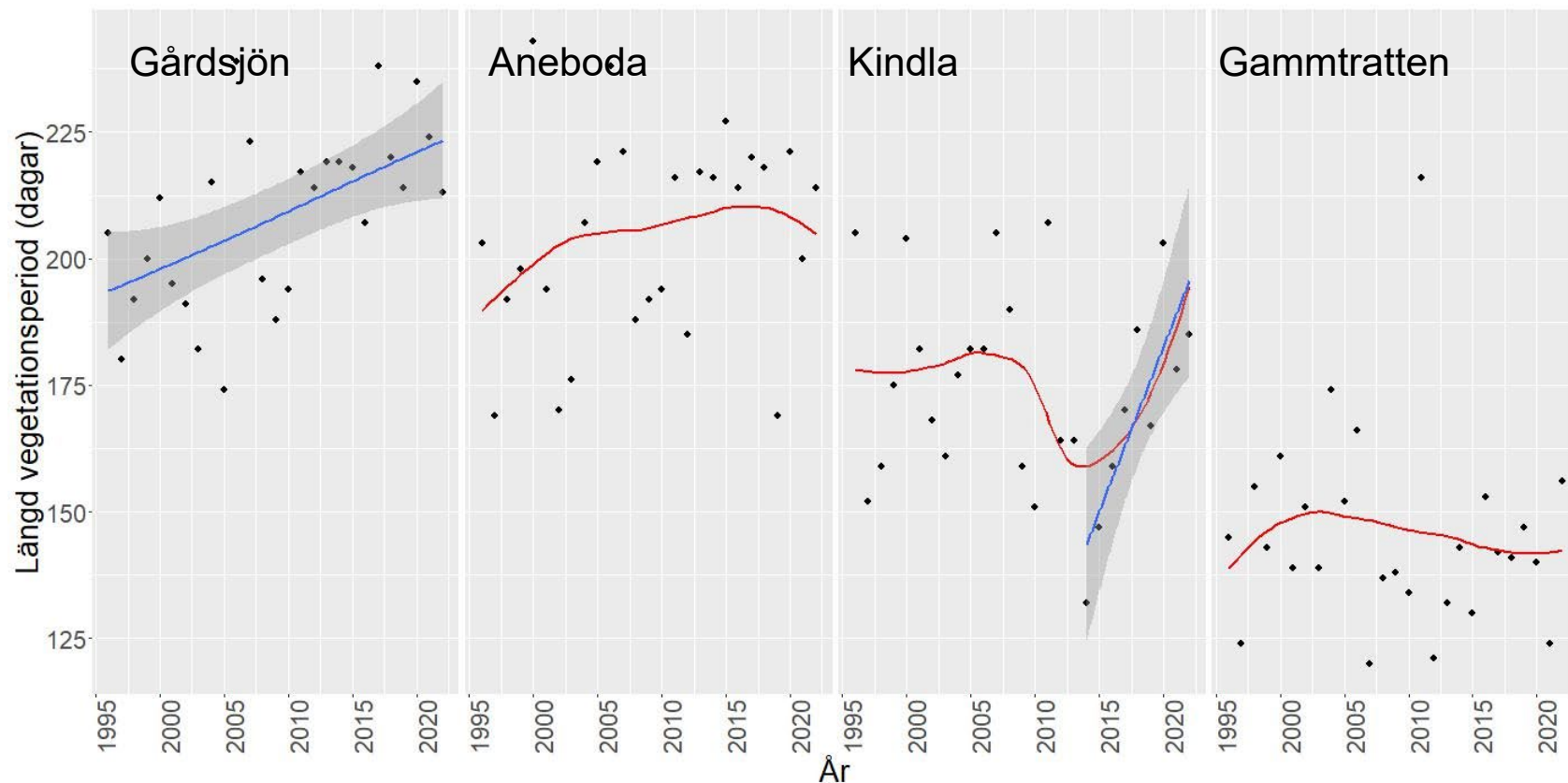
Manual revision

- Beginning a rolling revision process for the IM manual
- Some sections are unclear or outdated
- Discussion and working group formation at TF meeting

Climate change

Length of the vegetation period at the IM sites from 1996 to 2021. The sites are sorted after decreasing length of the vegetation period. Non-significant trends among years are indicated by a "smoother" (red line), and significant changes (Regional Kendall test, p < 0.05) by a blue regression line.

- Time series is now long enough that we can see effects of climate change

- The vegetation period at SE04 (Gårdsjön) has increased by around a month since 1995

Co-operation with eLTER

- Continuing work according to letter of understanding

- Potential for mutual benefit, and many overlapping sites

- Work is now underway on eLTER standard observation protocols, which in many cases involves integrating ICP manuals (Forests, IM, Water)

- Metadata, semantics development helps open publication

- New protocols developed in eLTER for e.g. biodiversity monitoring beyond vegetation can be considered by ICPs

Current workplan – looking forward to 2025

- 1.1.1.26 Scientific paper on effects of N and S deposition on vegetation community stability over time
- 1.1.1.27 Scientific paper/report on: (a) trends in HM fluxes across ICP IM sites; and (b) assessment of mercury data gathered by new passive samplers
- 1.1.1.28 Make ICP IM database open access under feasible licence and principles, and publish associated data paper
- 1.1.1.29 Initiate revision and update of IM manual. Beginning rolling revision of manual, will continue into next workplan
- 1.1.1.30 Provide update in long-term changes in atmospheric deposition and runoff water chemistry of sulfate, inorganic N and acidity
- 1.1.1.31 Proof of concept for development of above-ground vegetation monitoring in ICP IM sites using drone remote sensing

Thanks for your attention!