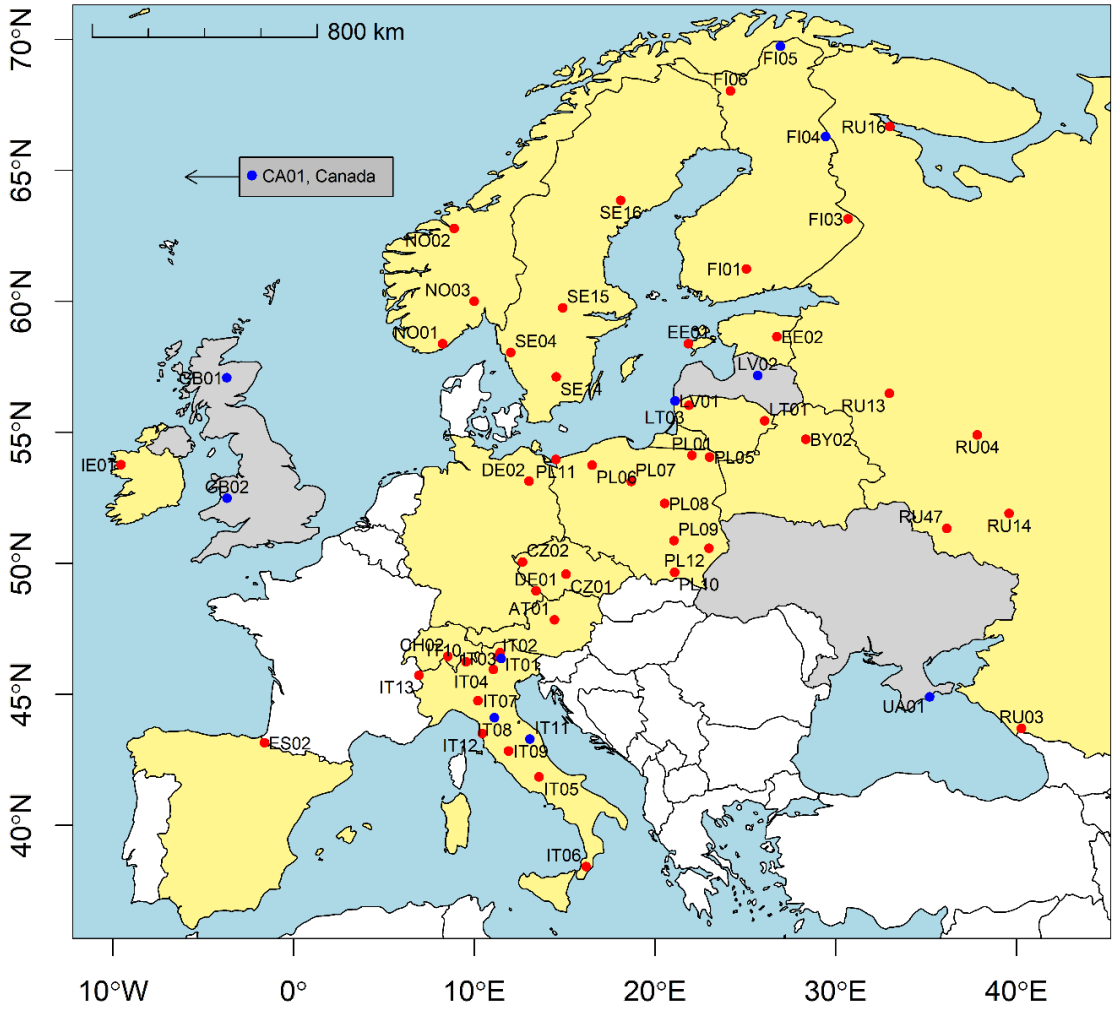
Current activities, ICP IM

ICP Integrated Monitoring of Air Pollution Effects on Ecosystems -

ICP IM

Ulf Grandin, Salar Valinia & James Kurén Weldon

The current ICP IM network

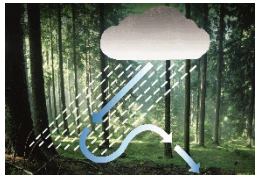


15 active countries

48 active sites

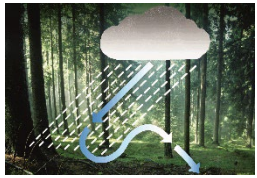
- Active IM site
- Inactive IM site

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



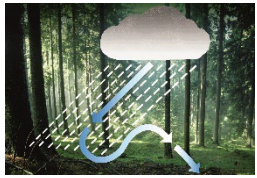
Key activities 2022-23

Activity	Status
Complete the migration of the IM Programme Centre from SYKE to SLU	Done
Installed passive mercury samplers at participating sites in collaboration with Canadian researchers	Done/running
Operationalise and advertise "IM light" as an attractive monitoring protocol, aiming at adding more ecosystem types in the ICP IM monitoring	Ongoing
Trends in heavy metal concentrations (scientific paper)	Submitted



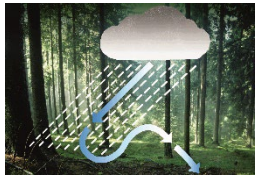
Key activities 2022-23

Activity	Status
Contribution to the revision process of the Gothenburg Protocol, in a coordinated process of the WGE	Ongoing
Modelling and assessment of biodiversity and ecosystem impacts (recovery from acidification)	Underway, plan to finish in 2023
Extend co-operation with eLTER in line with agreed MoU between eLTER and WGE	Ongoing



Other activities during 2023

Activity	Time frame
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

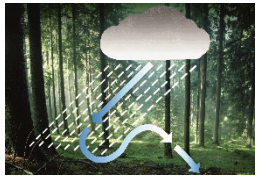


Task Force meeting, Lunz, Austria

Together with ICP Waters

- Joint scientific part
- Separate Task Force meetings

Included the official 25 year anniversary celebration of the Austrian IM site Zöbelboden, with representation from i.a. the government.



Task Force meeting, Lunz, Austria

Outcomes

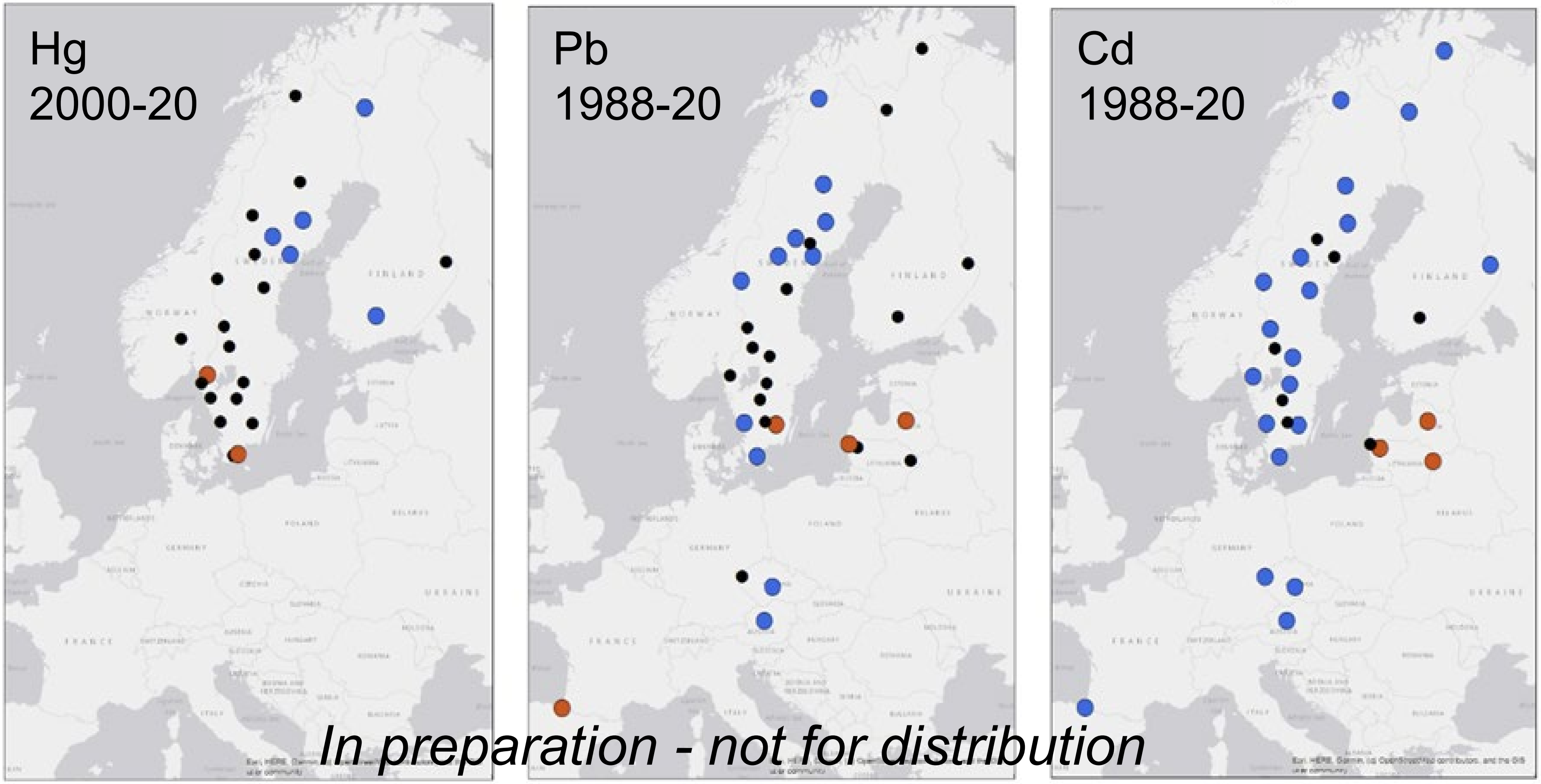
- Moving forward with open data, PC to develop transition roadmap
- Need to revise the manual in some sections:
  - Some variables are reported as means of means. Little use in research.
  - Raw data (re)submissions will be needed
  - Also harmonising with other ICP manuals as much as possible

Trends in heavy metal concentrations

Trends in runoff concentrations
- Decreasing
- No trend
- Increasing

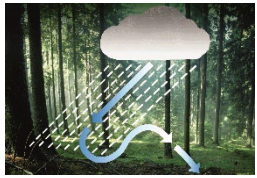
Trend analyses of concentrations of mercury, lead, and cadmium within the ICP Integrated Monitoring network and the Swedish environmental monitoring program.

Black: no trend,
Blue: decreasing trend,
Red: Increasing tend,
in water concentrations



In preparation - not for distribution

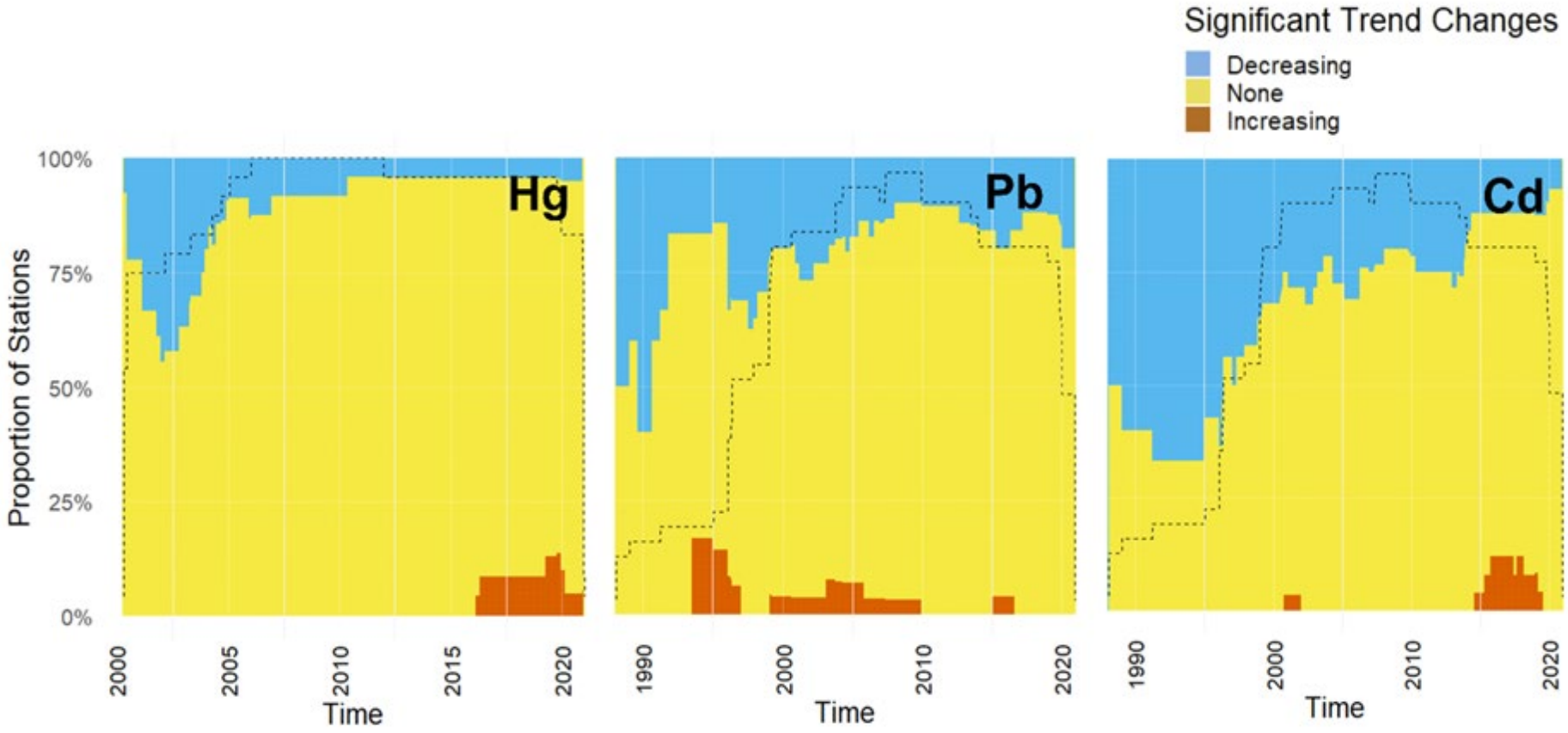
Eklöf et al., manuscript



Trends in heavy metal concentrations

Proportion of watercourses showing a significant increasing, decreasing or no trend in Hg, Pb, and Cd concentration.

Trends were analyzed by generalized additive models. Dashed lines show the proportion of the total number of stations with data for that time point.



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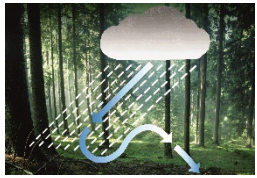
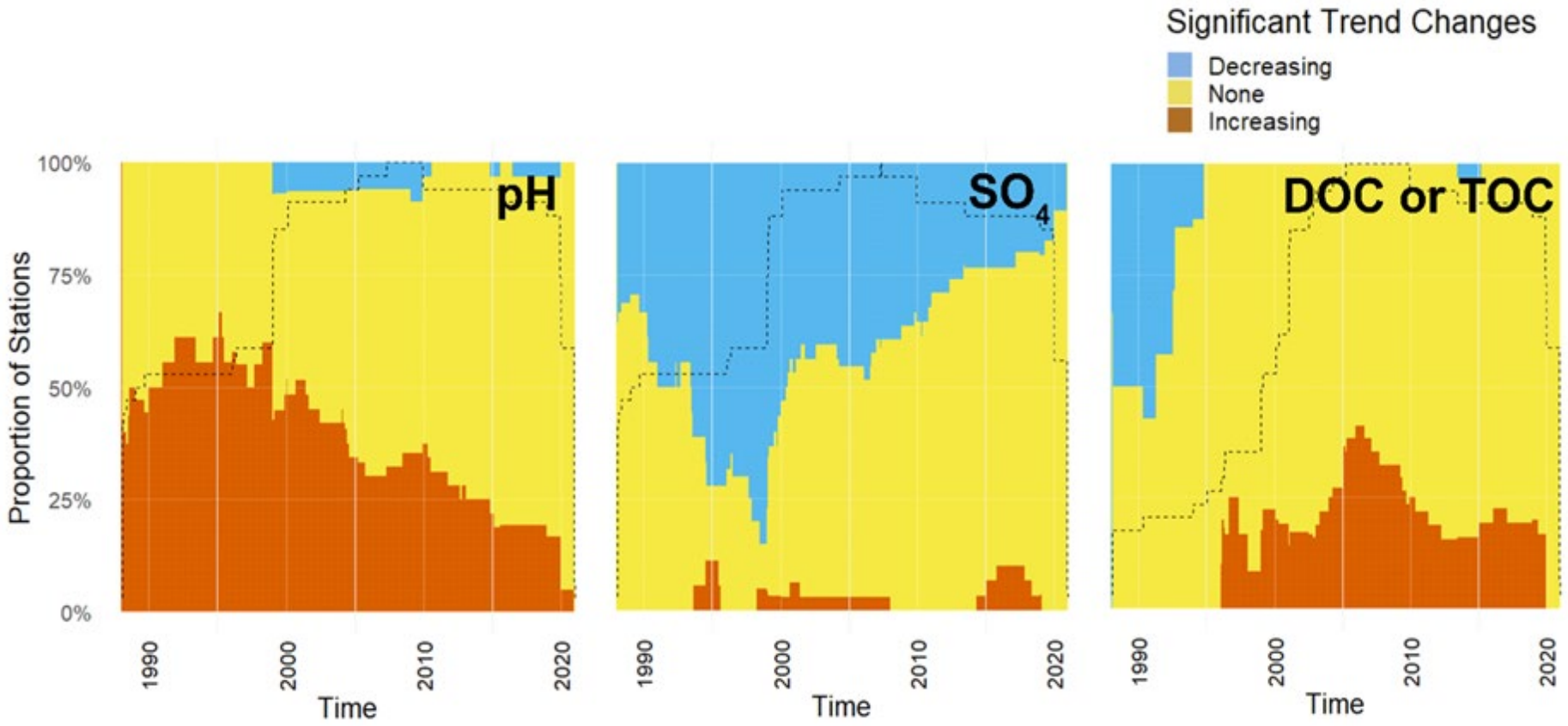


Trends in heavy metal concentrations

Proportion of watercourses showing a significant increasing, decreasing or no trend in pH, sulfate concentrations (SO4), and dissolved or total organic carbon (DOC or TOC)

Trends analyzed by generalized additive models. Dashed lines show the proportion of the total number of stations with data for that time point.



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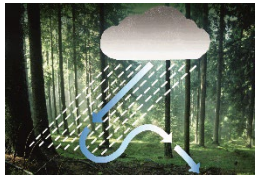
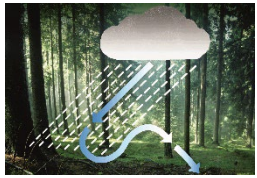


Trends in heavy metal concentrations

- Most of the water courses had no significant trends in Hg concentrations during 2000-2020. Significant decreasing trends of Hg were mainly observed during 2000-2005.
- Concentrations of Pb and Cd decreased in 35% and 70% of the water courses. The trends in concentration of these elements have flattened out after 2005.
- Causes? Declining deposition of heavy metals over Europe, although catchment recovery is suggested to be a rather slow process.
- Trends of heavy metals also coincide well with the recovery from acidification.
- Long-term trends in organic carbon do not coincide with the trends of heavy metals in these water courses.

Eklöf et al., manuscript

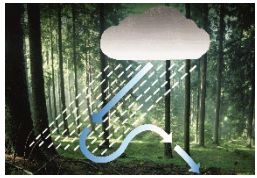


Modelling biodiversity recovery from acidification

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

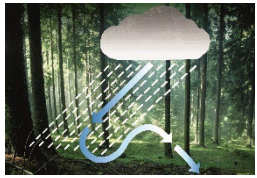
- ICP IM has excellent data in-depth but geographical coverage is limited.

- Pilot on Swedish IM sites. Regional assessments for policy purposes could be undertaken as a follow-up step in co-operation with networks with better regional coverage, using models and concepts developed and tested within ICP IM.



Co-operation with eLTER

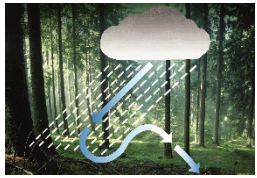
- Letter of co-operation signed and adopted in September 2022 Geneva meeting of the WGE
- ICP IM was tasked with moving the process forward



Co-operation with eLTER

The key areas are outlined in the agreed letter of co-operation

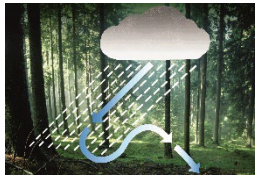
- Based on mutual benefit
- Standardization and harmonization
- Methodological development for both cost efficiency and data accuracy
- Scientific co-operation in data evaluation and analyses
- Network development for wider spatial coverage of harmonised and standardised monitoring
- eLTER RI Service Portfolio – for all kind of users



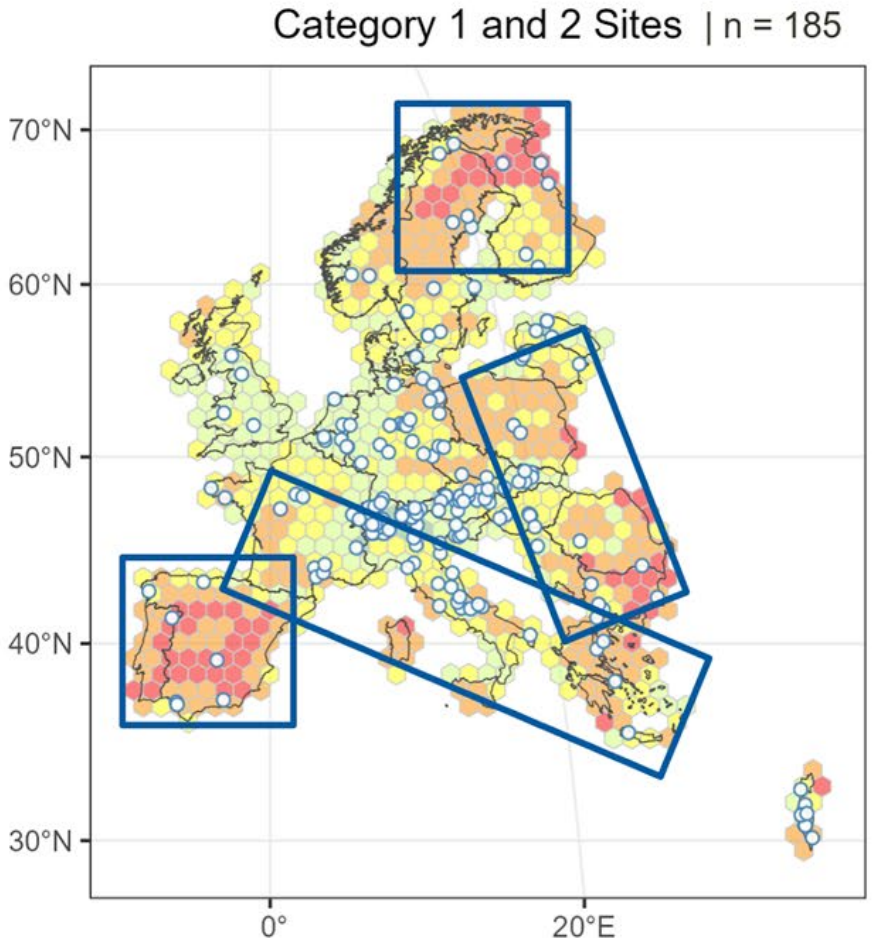
Co-operation with eLTER

- ICP IM hosted a workshop at an eLTER consortium meeting to discuss further action, and issue raised at several ICP Task Force meetings

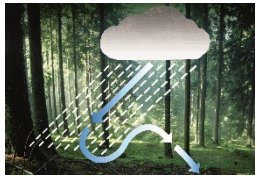
- Spatial coverage gap analysis, to identify where ICP sites that are not also eLTER sites may be able to fill critical gaps in the eLTER network, or vice versa



Gap identification exercise

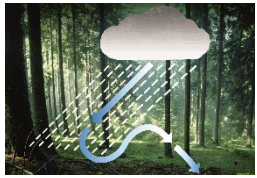


- Work in progress!
- Four main areas lacking coverage in eLTER RI identified
- Possibilities for exisiting sites in these areas to join and strengthen coverage?



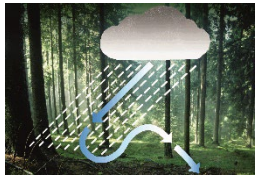
eLTER RI Standard observations

- Standard Observations (SO) for the eLTER Research Infrastructure are being worked on now
- Many rely on methods in ICP manuals
- Expert group will soon be formed for each SO to develop a draft protocol – input from WGE/ICPs obviously welcomed
- The work could also help in harmonisation of ICP manuals



WGE 24/25 workplan item suggestion

- In line with the agreed “Letter of Cooperation between eLTER RI and UNECE CLRTAP Working Group on Effects”, interested parties will engage with the ongoing work developing the eLTER Research Infrastructure. This includes, but is not limited to, maximising the use of common protocols.

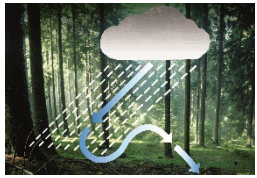


Proposals for 24/25 ICP IM workplan

- Scientific paper - Vegetation community resilience over time. Investigate whether deposition of atmospheric pollutants, climate change and/or their interactions have caused fluctuations within the system's adaptive capacity, or consistent directional change that challenges that capacity.

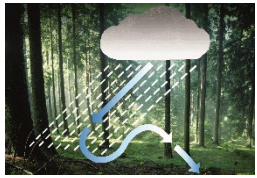
- A scientific paper or report on trends in heavy metal fluxes across ICP Integrated Monitoring sites.

- An assessment of the mercury data gathered by the newly installed passive samplers.



Proposals for 24/25 ICP IM workplan

- Making our database accessible, according to FAIR principles (at least to the data of those countries that are willing) and by publishing a data paper to explain the IM monitoring infrastructure in more detail and provide something for those using the data to cite.
- Initiate a revision of the IM manual. Mainly data reporting formats and harmonising protocols.
- Proof of concept for development of above ground vegetation monitoring in ICP IM sites using drone remote sensing (dependant on external funding being granted).



Thanks for your attention!

Kindla, ICP IM SE15,
Photo Nelly Zetterquist