7th ICP Forests Scientific Conference

Poster Pitching

Riga/ Latvia, 22th May 2018

Poster Pitching - Overview

ICP Forests SILAVA THÜNEN

1 **Patricia Adame *et al.*:** Litter carbon stock variability in the Spanish forest types

2 **Vicent Calatayud *et al.*:** Current ambient and elevated ozone effects on poplar: a global meta-analysis and response relationships

3 **Goran Češljar *et al.*:** Trends of average tree defoliation on sample plots Level I in Serbia

4 **Albert Ciceu *et al.*:** Crown defoliation effect on tree growth rates recorded at the Romanian Level II plots

5 **Alexandru - Liviu Ciuvat *et al.*:** Influence of climatic changes on the foliar nutrition of the main forest species found in ICP Level II core plots in Romania

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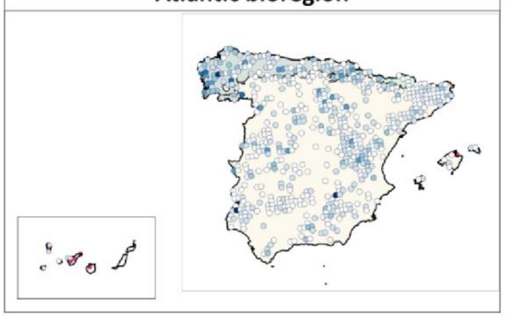
LITTER CARBON STOCK VARIABILITY IN THE SPANISH FOREST TYPES

ADAME P, CAÑELLAS I, GONZALEZ AI, GUERRERO S, TORRES MB, ALBERDI I

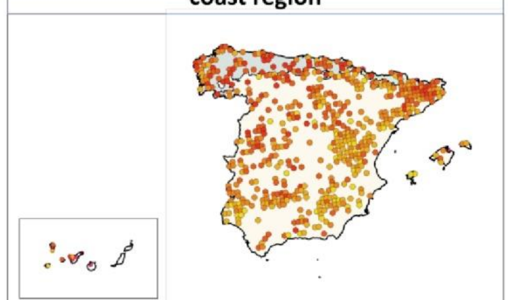
DATA
- 596 plots (ICP Forest Level I)
- Biomass, carbon and nitrogen stock of litter

→ High variation intra-plot and inter-plot in biomass, therefore also in carbon

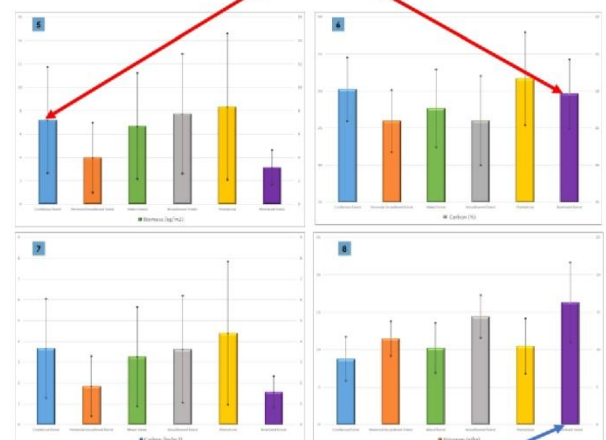
Highest biomass and carbon results for Atlantic bioregion



Lowest nitrogen results for Mediterranean coast region



Plantations and coniferous forest show higher results in biomass and carbon.



Highest value for nitrogen is riverbank broadleaved forest

GOBIERNO DE ESPAÑA — MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD
INIA — Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria
GOBIERNO DE ESPAÑA — MINISTERIO DE AGRICULTURA Y PESCA, ALIMENTACIÓN Y MEDIO AMBIENTE

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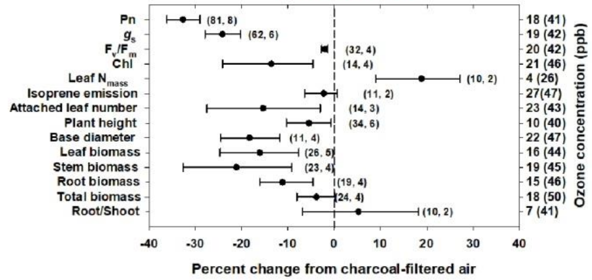
Current ambient and elevated ozone effects on poplar: a global meta-analysis and response relationships

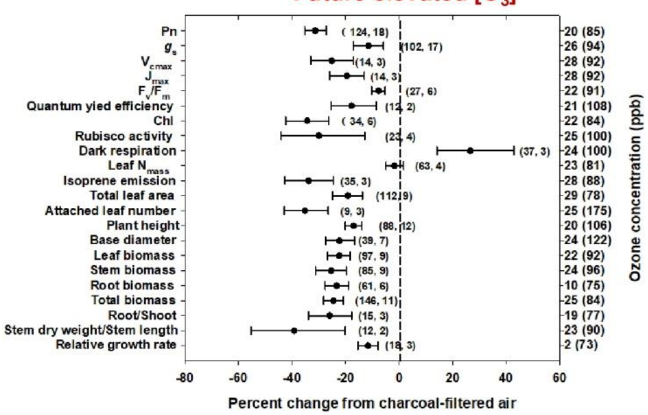
Vicent Calatayud[1], Bo Shang[2], Feng Gao[2], Zhaozhong Feng[2] (1) Fundación CEAM, Paterna, Spain. (2) RCEES, CAS, Beijing, China

- Poplars are one of the most economically important trees in temperate areas of the world.
- Background O_3 levels have increased in the northern Hemisphere from 10–15 ppb to approximately 50 ppb (8-h summer seasonal average) since the end of the 19th century. Models predicted that tropospheric [O_3] could further rise 20-25% by 2050, and up to 40%-60% by 2100 if the current emission trends continue.
- Poplars are considered to be rather O_3 sensitive plants with a variable sensitivity among clones.

Current [O_3]



Future elevated [O_3]

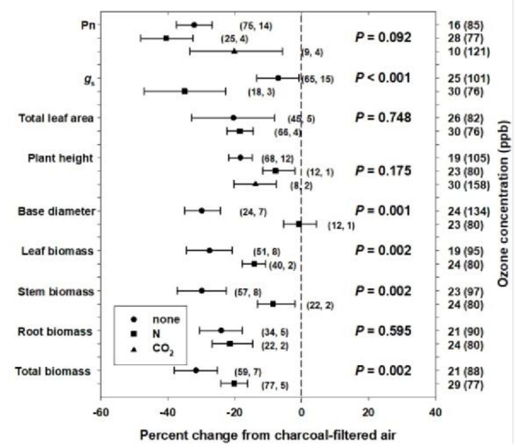


Objectives:

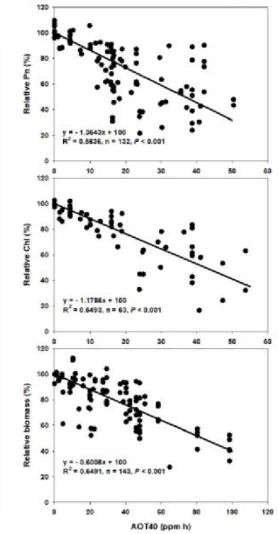
•To provide a synthesis of the current and future O_3 effects on poplar by means of a meta-analytic review (51 studies were used, covering years 1980-2017).

•To develop O_3 exposure-response relationships for key response variables.

Factors



AOT40-Relationships



- Current [O_3] has significantly reduced CO_2 assimilation rate (P_n) by 33% in mature leaves and total biomass by 4% in comparison with [O_3] close to preindustrial times (Charcoal-filtered air of OTCs, CF treatment).
- An increase in future [O_3] would further enhance the reduction in total biomass by 25%, plant height by 17% and plant leaf area by 19%. Therefore, O_3 may lessen the climate change mitigation potential of this sensitive tree
- O_3 effects can be moderated by adding nitrogen.
- Isoprene emissions will decline by 34% under elevated [O_3], with feedback implications by reducing the formation of secondary air pollutants including O_3.
- Reduced stomatal conductance and lower foliar area might potentially increase runoff and freshwater availability in O_3 polluted areas.
- Relationships are expected to improve O_3 risk assessment and also to support the inclusion of the effect of O_3 in models addressing plantation productivity and carbon sink capacity

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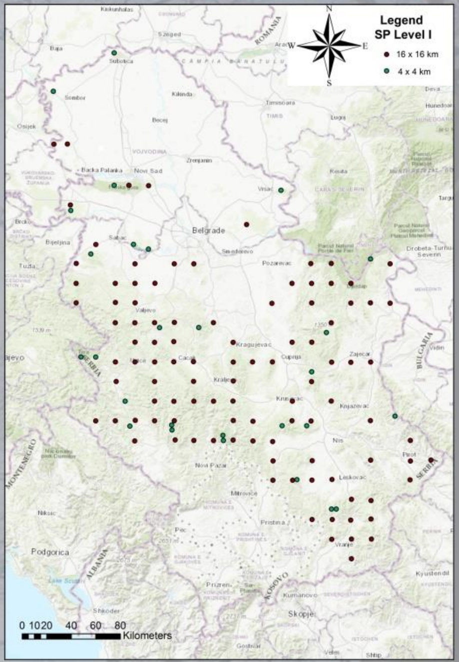
Trends of Average Tree Defoliation on Bioindication Sample Plots Level I in Serbia

Češljar G., Đorđević I., Rakonjac Lj., Stefanović T., Gagić - Serdar R., Momirović N.

Introduction

This research shows the results of monitoring of forests in Serbia in the period 2004-2017. On the basis of the collected data until now, trends of average defoliation are summarized in the case for broadleaves and conifers, as well as for certain types of trees.

Study area

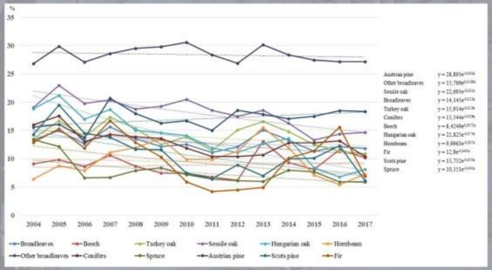


Methods

The statistical method is used in the process of analyses of defoliation, and in narrow sense, method of trend analysis. In order to monitor the trends of defoliation, statistical techniques based on the analysis of time series are used (*Đorđević et al.*, 2013).

Results

Within beech (0,7%) and other broadleaves (1,1%), is present positive exponential growth rate, while within other broadleaves trees hungarian oak (-7,5%), records highest negative exponential growth rate. On the other side, within all conifer types are present negative exponential growth rates, and this is especially evident with scots pine (-5,5%). Observing years with highest average defoliation for all types of trees, 2004 (15,0%) and 2005 (14,4%), are separated with the highest values, while the lowest values are present during 2011 (9,9%) and 2017 (9,6%). Also, by analysing obtained results, it can be noticed that most of the species, records significant rise in 2007, 2013 and 2016, from up to then recorded average defoliations.



Trends of average tree defoliations in Serbia (2004-2017)

Conclusion

Despite negative exponential growth rates in most tree species, specific deviations of average defoliations in some years, can give us guidelines for research and finding possible reasons for this (*Češljar et al., 2014*). In Serbia, mentioned years are recorded as extreme hot and dry, which may indicate that trees, in terms of defoliations, reacted most on the influence of abiotic stress factor, in this case because of high temperatures and lack of precipitation over long period of time, which was very present in mentioned years (*Češljar et al.*, 2013).

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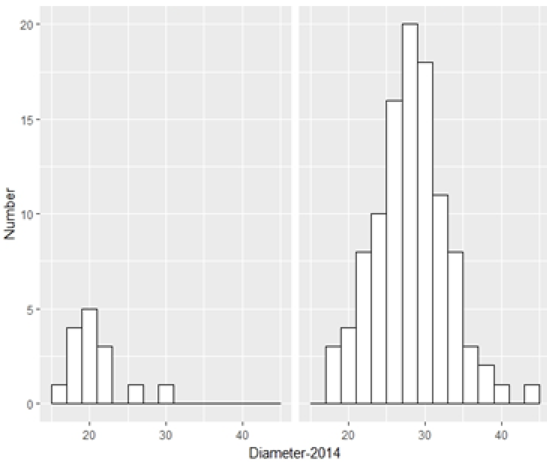
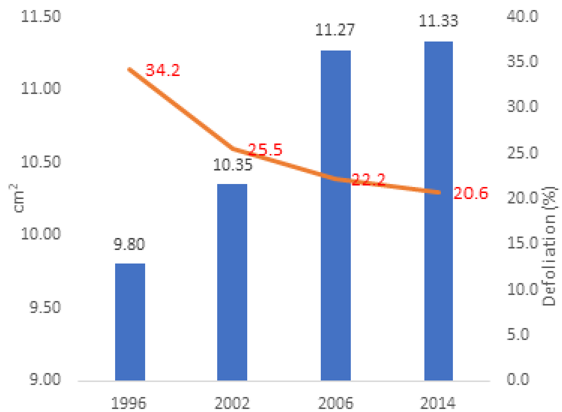
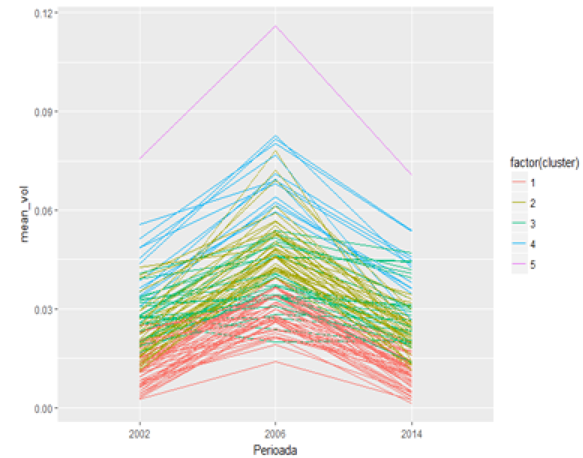
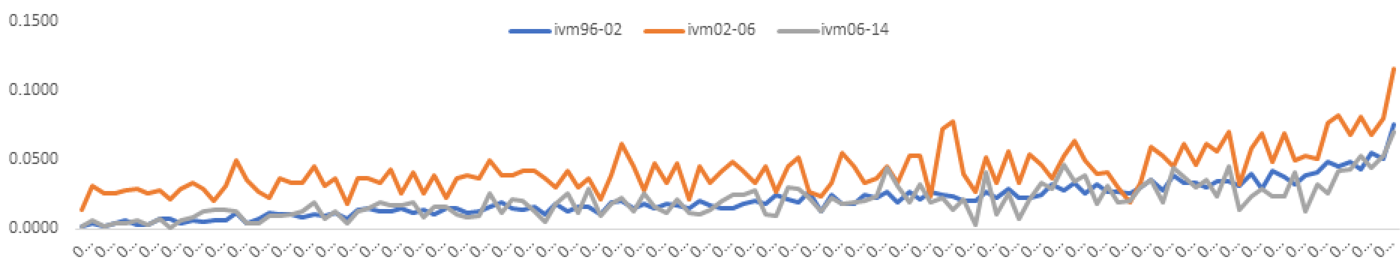
Crown defoliation effect on tree growth rates recorded at the Romanian level II plots









7th ICP Forests Scientific Conference -21-23 May, 2018, Riga, Latvia

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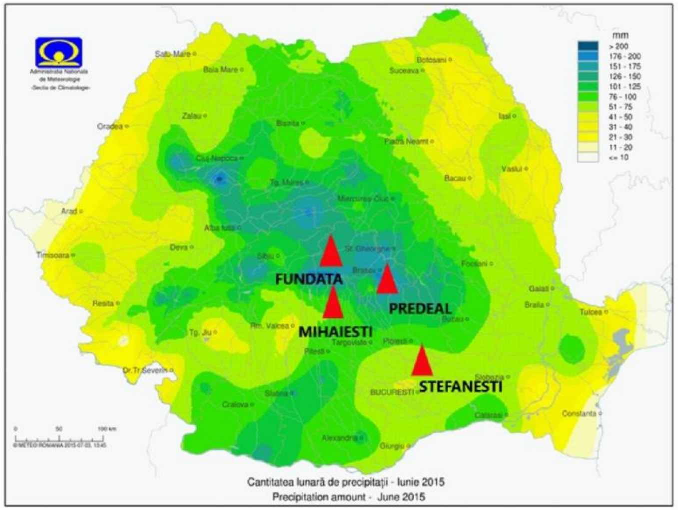
INFLUENCE OF CLIMATIC CHANGES ON THE FOLIAR NUTRITION OF THE MAIN FOREST SPECIES FOUND IN ICP LEVEL II CORE PLOTS IN ROMANIA

Authors: Alexandru Liviu CIUVAT, Lucian Dinca, Raluca-Elena ENESCU, Emil-Vlad CRISAN



Cantitatea lunară de precipitații - Iunie 2015
Precipitation amount - June 2015

Plots location and description

Plots area: 2500 m

Altitude:

Fundata FAG: 1300 m
Predeal MOLID: 1185 m

Main species:

Fundata FAG: Europeean beech (Fagus sylvatica)
Predeal MOLID: Norway spruce (Picea abies)

Age:

Fundata FAG: 57 years
Predeal MOLID: 100 years

Climate change forecasts for Romania indicate an increase of the mean temperatures especially in the south of the country, affecting mostly oak stands, but also the lower altitude beech and spruce stands.

Chemical elements concentrations and climate factors values

Spruce	Nutrition - Chemical elements (mg/g)						Climate factors		
Year	N	S	P	Ca	Mg	K	T (°C)	P (mm)	Ia
1993	12,74	0,99	1,48	4,66	1,35	6,06	4,3	776,08	54,27
1995	13,89	1,07	1,48	4,86	1,23	6,65	4,52	986,58	67,94
1997	13,19	0,93	1,48	4,42	1,3	5,72	3,92	994	71,40
2013	11,85	1	1,17	6,13	1,02	3,89	6,04	864,68	53,90
2015	12,58	1,06	0,89	5,68	0,83	6,03	6,69	874,3	52,38
Beech	**Foliar nutrition - Chemical elements (mg/g)**						**Climate factors**		
Year	**N**	**S**	**P**	**Ca**	**Mg**	**K**	**T (°C)**	**P (mm)**	**Ia**
1993	21,39	1,86	1,8	8,76	1,4	7,64	4,00	740,65	52,92
1995	20,81	2,02	1,36	11,34	1,8	8,35	4,31	538,22	37,62
1997	28,42	2,89	1,38	12,11	2,43	12,33	3,66	608,34	44,54
2011	26,58	0,244	2,16	1,14	2,91	1,81	5,33	543,3	35,44
2013	12,74	2,1	1,6	2,64	2,18	2,77	6,34	694,1	42,48
2015	28,6	2	1,2	14,45	1,39	9,48	6,54	833,30	50,38

Foliar nutrition and climate factors correlations

BEECH	N	S	P	Ca	Mg	K	T (°C)	P (mm)	Ia
N	1,000000	-0,240952	-0,278926	0,452948	-0,224289	0,609504	-0,093407	0,371429	0,3142
S	-0,240952	1,000000	-0,029990	0,094720	0,138645	0,156153	0,024759	-0,085714	0,0857
P	-0,278926	-0,029990	1,000000	-0,600828	0,766925	-0,163223	0,082418	-0,200000	-0,2571
Ca	0,452948	0,094720	-0,600828	1,000000	-0,404553	0,562565	-0,107438	0,371429	0,5428
Mg	-0,224289	0,138645	0,766925	-0,404553	1,000000	-0,179845	0,038462	-0,657143	-0,7142
K	0,609504	0,156153	-0,163223	0,562565	-0,179845	1,000000	-0,263736	0,200000	0,4857
T (°C)	-0,093407	0,024759	0,082418	-0,107438	0,038462	-0,263736	1,000000	0,371429	-0,1428
P (mm)	0,371429	-0,085714	-0,200000	0,371429	-0,657143	0,200000	0,371429	1,000000	0,8285
Ia	0,314286	0,085714	-0,257143	0,542857	-0,714286	0,485714	-0,142857	0,828571	1,0000
SPRUCE	**N**	**S**	**P**	**Ca**	**Mg**	**K**	**T(°C)**	**P (mm)**	**Ia**
N	1,000000	-0,172085	0,645018	-0,522829	0,023256	0,509839	-0,313059	0,176944	0,1501
S	-0,172085	1,000000	0,054299	0,664489	-0,654818	0,087160	0,281594	-0,107156	-0,2053
P	0,645018	0,054299	1,000000	-0,458427	0,139122	0,520351	-0,601656	-0,068596	0,1028
Ca	-0,522829	0,664489	-0,458427	1,000000	-0,393912	-0,658908	0,531782	-0,135957	-0,1484
Mg	0,023256	-0,654818	0,139122	-0,393912	1,000000	0,191413	-0,373882	0,155496	0,3395
K	0,509839	0,087160	0,520351	-0,658908	0,191413	1,000000	-0,389982	0,148347	0,0893
T°C	-0,313059	0,281594	-0,601656	0,531782	-0,373882	-0,389982	1,000000	-0,092940	-0,4289
P (mm)	0,176944	-0,107156	-0,068596	-0,135957	0,155496	0,148347	-0,092940	1,000000	0,8642
Ia	0,150134	-0,205382	0,102894	-0,148480	0,339589	0,089366	-0,428955	0,864286	1,0000

National Institute for Research and Development in Forestry “Marin Drăcea” (INCDS)

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One size does *not* fit all: climate, N deposition and management of forest biomass removal in Norway

Nicholas Clarke, Volkmar Timmermann, Kjell Andreassen, Jørn-Frode Nordbakken

ICP Forests 7th Scientific Conference, Riga 22.05.2018

- The future Norwegian climate is likely to be warmer, wetter and wilder, possibly with increased C and N in runoff
- N deposition is still high in the south-west, so use of N fertilisers for increased C sequestration in this area is questionable
- Challenges with landslides and avalanches if forest harvesting is intensified in areas with steep terrain and high, increasing precipitation
- Local and regional differences, so local and regional solutions needed

Poster Pitching – 1 to 11

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SHAPING FUTURE FORESTRY FOR SUSTAINABLE COPPICES IN SOUTHERN EUROPE:

The contribution of LIFE FutureForCoppiceS project

Cutini A.[1], Gottardini E.[2], Bagella S.[3], Fratini R.[4], Patteri G.[5], Ciucchi B.[6], **Bertini G.[1]***, Chianucci F.[1], Fabbio G.[1]

BACKGROUND and AIM

Different management regimes have direct effect on forest processes on environmental changes and climate mitigation

Coppice forests are widely distributed in EU, where they cover approximately 23 millions ha

Coppice forests provide a number of goods, from energy (fuelwood) to non-wood production (mushrooms, honey, cork, fruits) and a number of ecosystem services (recreation, water, biodiversity)

Coppice forests are included in the level II network, BUT coppice is a management option barely considered in SFM

Aim of the Project is to compare consolidated and new SFM indicators to get an improved coppice forests' management

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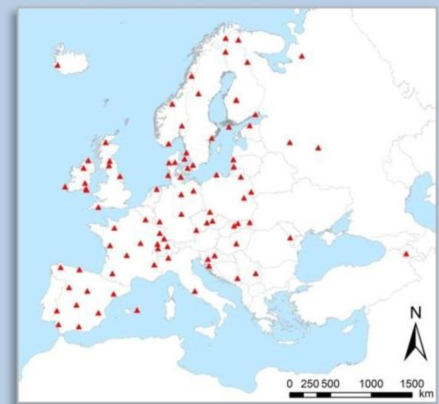
Eutrophication risk of European forests: a first approximation using empirical critical loads and atmospheric chemistry transport models

Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2018-104
Manuscript under review for journal Atmos. Chem. Phys.
Discussion started: 12 February 2018

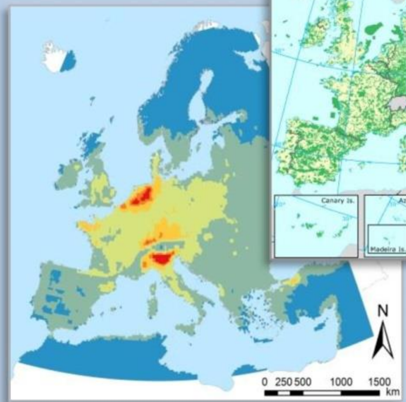
Atmospheric Chemistry and Physics
Discussions
Open Access
EGU

Modelled deposition of nitrogen and sulfur in Europe estimated by 14 air quality model-systems: Evaluation, effects of changes in emissions and implications for habitat protection

Vivanco et al., 2018



Comparison and evaluation of models

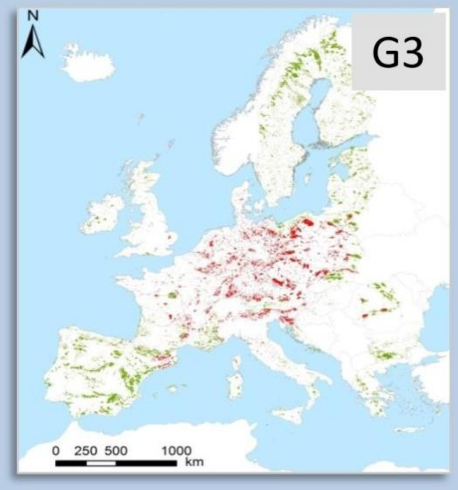


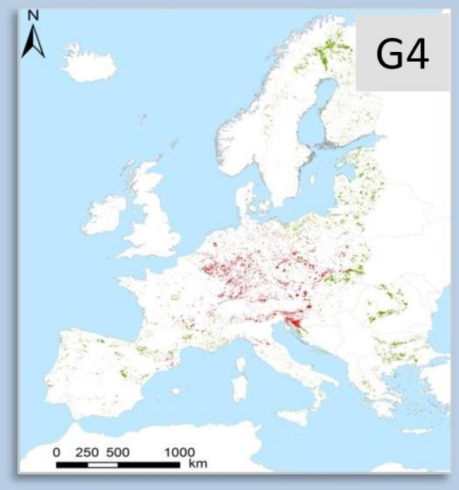
Mean of best models

Natura 2000 Network

Habitat types

Bobbink and Hetteling (2011)





Risk assessment

EUNIS code	Area in Natura 2000 network	CL (kgN/ha)	CL_{exc}	CL_{exc}^2
G1	25%	15.0	4%	14%
G2	1%	15.0	0%	5%
G3	21%	10.0	34%	53%
G4	9%	10.8	32%	58%

RISK ASSESSMENT OF FOREST HABITAT CLASSES

CL: Empirical Critical Load used in this assessment; **CL_{exc}:** Percentage of the assessed area with a N deposition (mean of ensemble) execeeding the CL; **CL_{exc}^2:** CL_{exc} when using mean plus standard deviation of the ensemble.

EUNIS codes: G1 *- broadleaved deciduous woodland;* ***G2*** *- Broadleaved evergreen woodland;* ***G3*** *- coniferous woodland;* ***G4*** *- mixed deciduous and coniferous woodland*

Coniferous (G3) and mixed woodlands (G4) were among the six habitats with the largest surface area at risk (34% and 32%, respectively)

CTM should provide dry deposition data as a function of leaf area index (LAI) or habitat type in order to be more suitable for risk assessment

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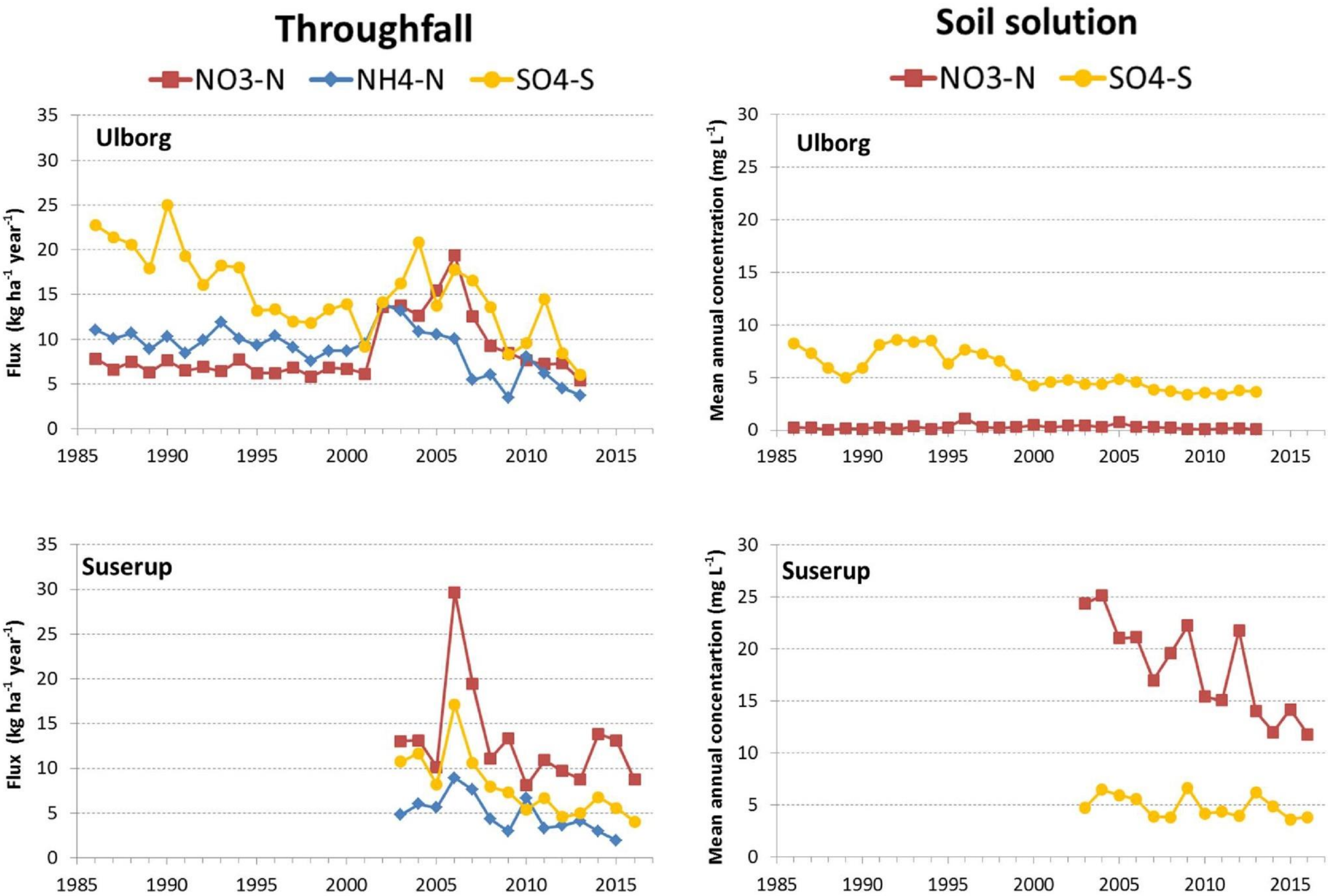
Time trends: N and S throughfall fluxes and soil solution concentrations



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EnviDat: a Service for Researchers

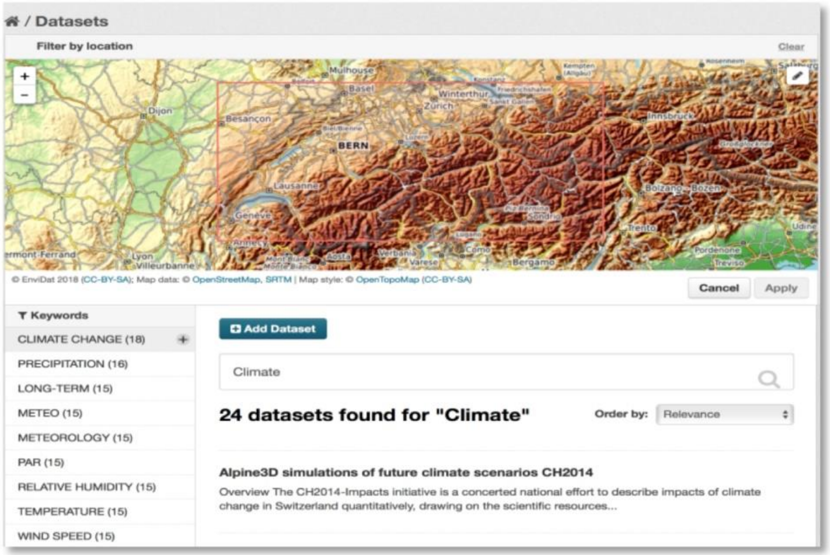
*EnviDat is the **WSL portal** providing **unified and managed access** to environmental monitoring and research data. EnviDat has the capability to **host and publish** data sets.*

- ❖ **Unified access** but **distributed curation**
- ❖ **Balance interests** of data producers and data users
- ❖ Enable WSL data producers to **exploit the data and publish**
- ❖ Online at www.envidat.ch

  Contact envidat@wsl.ch

  Questions/More Information?

  COME SEE THE POSTER!



Poster Pitching – 12 to 22

ICP Forests SILAVA THÜNEN

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CHANGES IN VASCULAR PLANT COMMUNITIES IN THE THIRD TO FIFTH YEAR IN AN EXPERIMENTAL TREE TRIAL ON ARABLE LAND

Krēsliņa Vita[1,2] (kreslinavita@gmail.com), Lazdiņa Dagnija[1], Štikāne Kristīne[1,2]
[1]Latvian State Forest Research Institute "Silava" , Salaspils, Rīgas iela 111, LV-2169
[2]University of Latvia, Rīga, Jelgavas iela 1, LV-1004

The studied object is located in Latvia, in Skrīveri district, in "Pardenči". In this area, short rotation tree species were planted. In this study, we have paid attention to willow, birch, aspen, grey alder to compare the difference of plant species composition. Vegetation sampling was done in the third to fifth year after tree planting.

The amount of plant species in the plantation tends to decrease. Conditions are changing and short rotation coppice starts to look more like young forest.

To see if there are any dominant plant species characteristic for forests, indicator species analysis was done. Indicator species analysis showed differences between all plots.

In the fifth year after planting, the canopy of the trees ar getting connected and vegetation is changing and getting more homogenous. The main vegetation consists of meadow plants, The only forest plant specie found as a dominant in the experimental tree trial is *Fragaria vesca*.

Experimental tree trial

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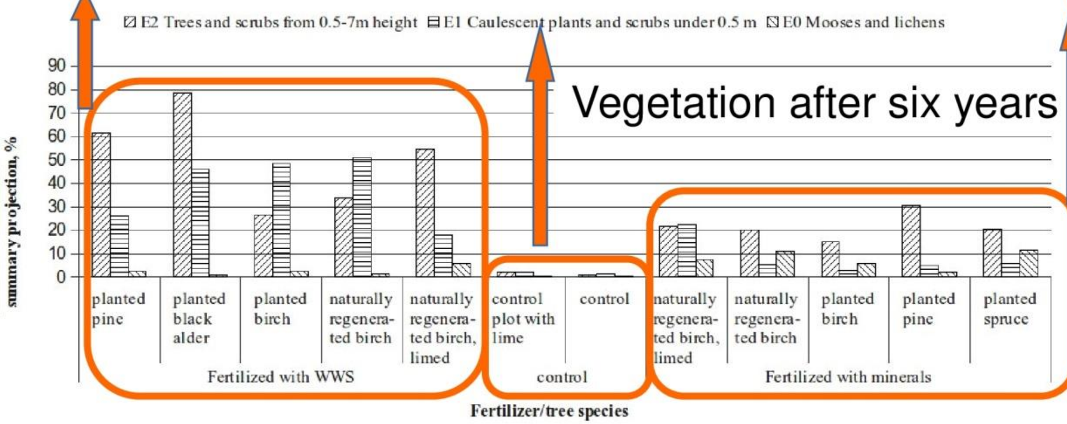
Development of reforested stand on former peat mining area – a case study (excursion stop)

One year after planting and fertilization!



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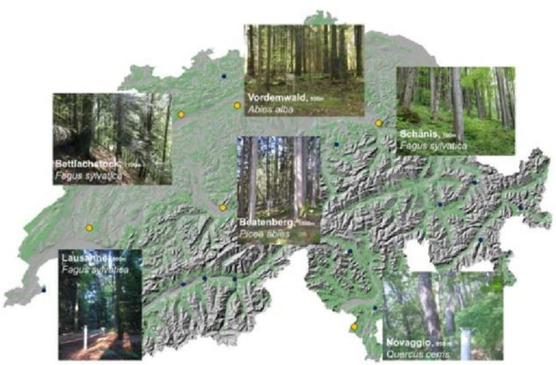
Trends in dissolved organic carbon in soil solution at Swiss level II plots

Katrin Meusburger*, Anne Thimonier, Elisabeth Graf Pannatier

*Swiss Federal Research Institute WSL; *katrin.meusburger@wsl.ch*

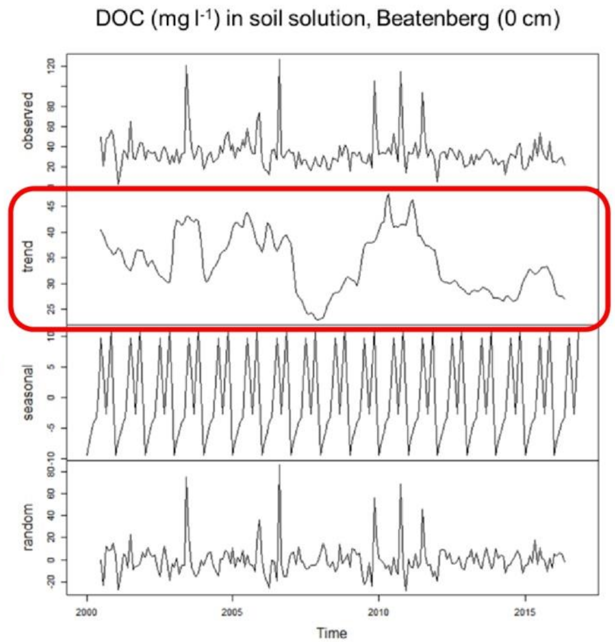
6 Swiss Level II plots:

- trends (2000-2016) of total DOC in soil solution and throughfall
- Hydrophobic DOC fraction (2006-2012)
- mean of UV-spectrometry at 260nm



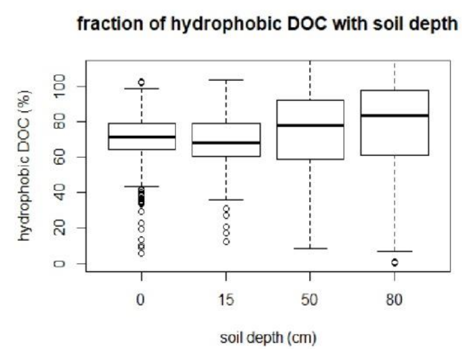
Total DOC concentration:

- **Inconsistent trends** of total DOC in soil solution
- predominance of positive trends in 0cm
- Cyclic trend component:



Hydrophobic DOC fraction:

- **consistent trends**
- **negative** trends of hoDOC in soil solution in 0 and 15cm depth
- Constant proportion (~71-75%) of hydrophobic DOC fraction with soil depth



- **This implies…**

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Nutrients in litterfall and forest floor in two adjacent forest ecosystems in the area of mountain Ossa in northeastern Greece

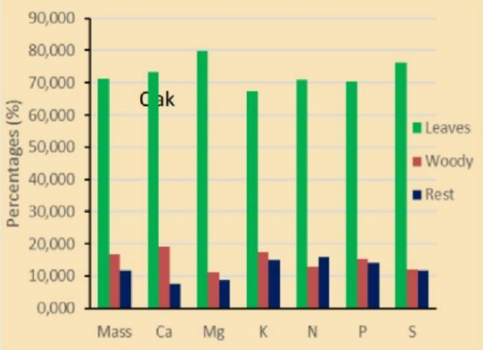
P. Michopoulos[1], K. Kaoukis[1], G. Karetsos[1], C. Samara[2], Th. Grigoratos[2]

[1]H.A.O. DEMETER-Institute of Mediterranean Forest Ecosystems and Forest products Technology, Terma Alkmanos, Athens 115 28, Greece, Email: mipa@fria.gr

[2]Environmetal Pollution Control Laboratory, Department of Chemistry, Aristotle University Thessaloniki, 541 24

In this work the fluxes of mass and the nutrients Ca, Mg, K, N, P and S were determined in the litterfall of two adjacent forest ecosystems of Hungarian oak (*Q. frainetto)* and beech (*F. sylvatica*) in the area of Ossa (a mountain situated in northeastern Greece) in the period 2010-2015.
The work examines the species effect, i.e. the effect that different tree species have on certain ecological parameters. More specifically:

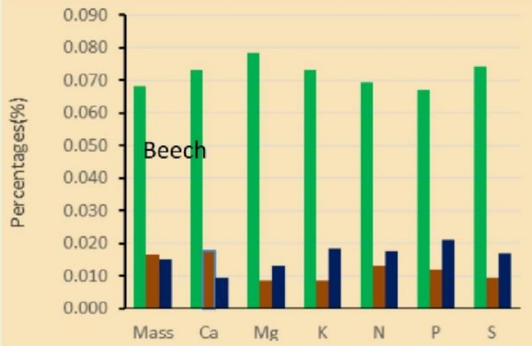
1. On litterfall and its various fractions
2. On the nutrient stocks of L soil horizon
3. On the nutrient stocks of the FH horizon



Amounts of nutrients (kg/ha) in the FH horizons

	Ca	Mg	K	N	P	S
Oak	323a	158a	81.2a	164a	15.8a	14.6a
Beech	706b	267b	163b	632b	44.5b	49.8b

It was found that the differences in litterfall were not great. The great difference were found in the FH soil horizons because the beech stand had high amounts of organic C. The high amounts of organic C could be a result from both the microclimate (low temperatures in the beech plot) and high acidity of the soil in the under beech (species effect).



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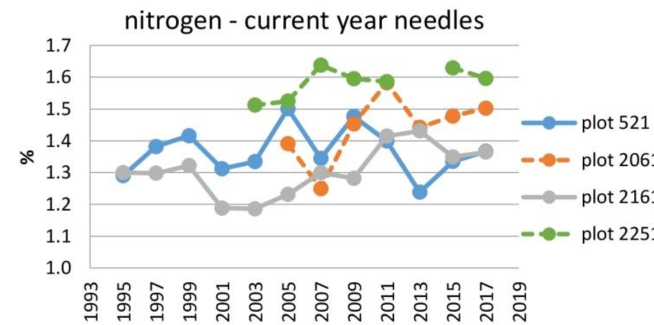
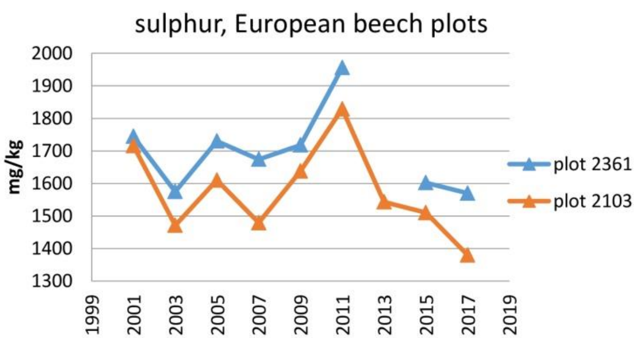
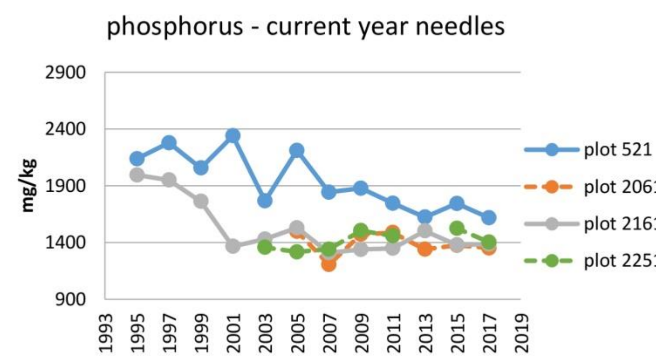
Trends in tree nutrition within the ICP Forests level II plots in the Czech Republic

Radek Novotný – Bohumír Lomský – Vít Šrámek | Forestry and Game Management Research Institute

- Nutrition level is slightly changing, we often observe imbalance in ratio between nitrogen and other important nutrients, especially between N and P.
- Concentration of magnesium decreased on two sampled broadleaves plots (European beech) as well as on Scots pine plot. The decrease within the beech plots is about 20 % and about 25 % within the pine plot
- Sulphur nowadays could be call as a nutrient instead of load or stress element







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Critical Nitrogen Loads for N sensitive Forest Communities

Heike Puhlmann[1], Carina Sucker[2], Andrea Hölscher[1], Marina Roth[1], Hans-Gerd Michiels[1]

[1]Forest Research Institute Baden-Württemberg, Freiburg, Germany

[2]Chair of Hydrology, Albert Ludwigs University Freiburg, Germany

Background

Continuously high nitrogen deposition imperils the functionality of forest ecosystems (e.g., suppression of N sensitive plant species).

Aim

Provide improved estimates for critical N loads for forests as an improved basis for the immission control legislation in Germany to protect sensitive forest communities from further degradation.

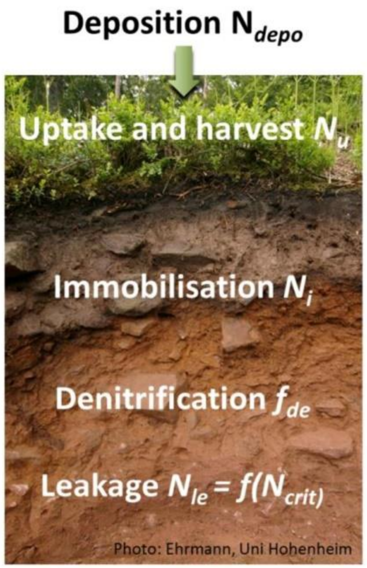
Spatial scale

Data availability

1. ICP-Forest Level II core plots
2. Intensely investigated Flora-Fauna-Habitat (FFH) areas of ten N sensitive forest communities
3. Further unobserved N sensitive forest communities

Poster shows concept, methods and first results of the project.

Method



Simple Mass Balance for N at all spatial scales

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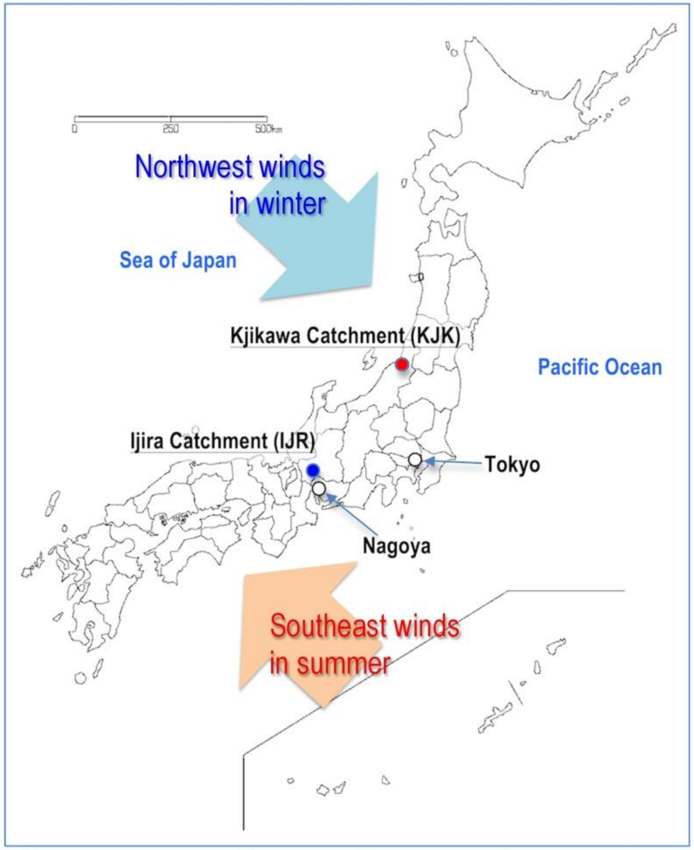
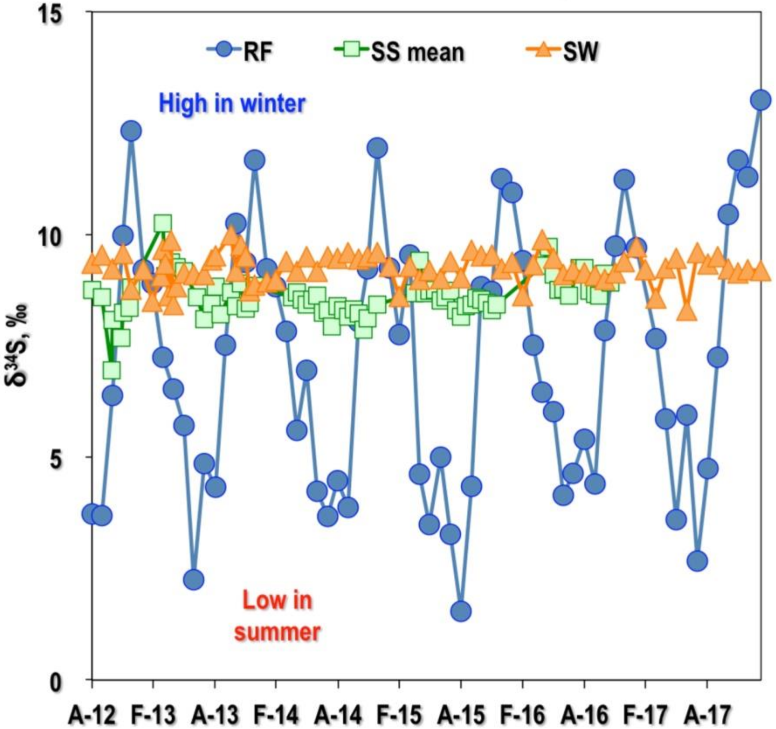
Multi-isotopic approach for monitoring on atmospheric deposition in forests in Japan

by Sase, H. (Asia Center for Air Pollution Research) et al.



The poster introduces the cases at two forested catchments.



Ex.) Seasonal changes in S isotopic ratio of rainwater (RF), soil solution (SS) and stream water at KJK site.

Poster Pitching – 12 to 22

ICP Forests SILAVA THÜNEN

12 **Vita Kreslina *et al.***: Changes in vascular plant communities in the third to fifth year in an experimental tree trial on arable land

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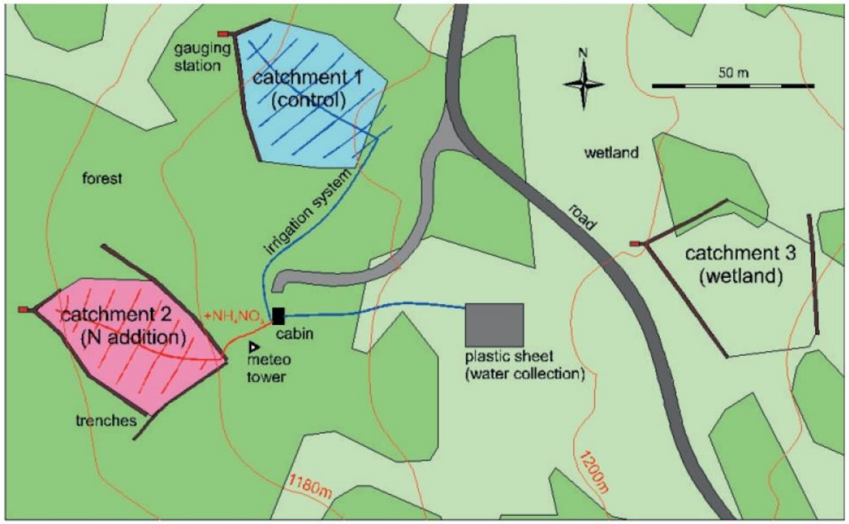
Nitrate leaching and soil acidification in a long-term N-addition experiment to a sub-alpine forested catchment on Gleysol

Patrick Schleppi , Thomas Bär

Swiss Fed. Inst. for Forest, Snow and Landscape Research (WSL), Birmensdorf, Switzerland



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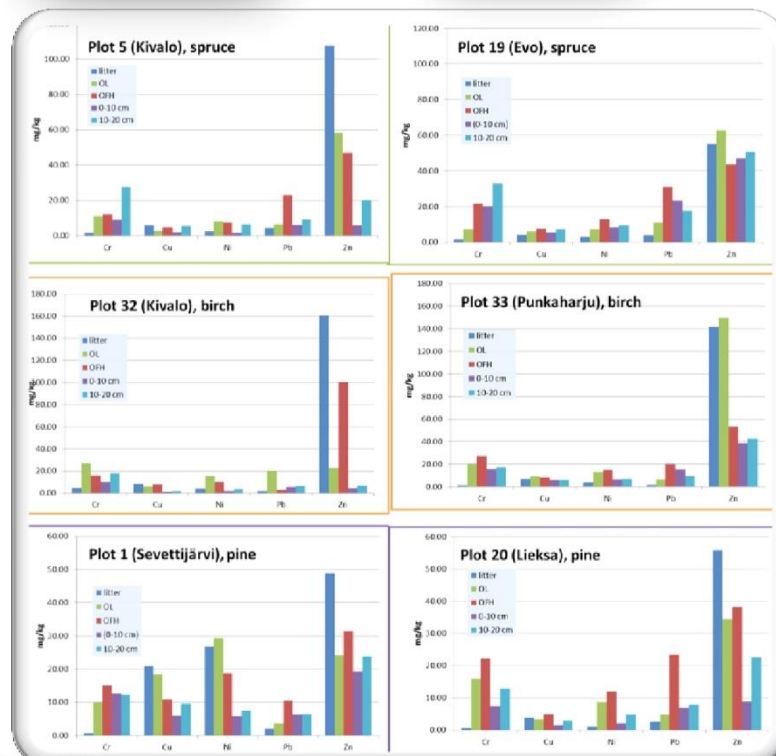
Heavy metal concentrations in litterfall and soil in boreal forest

Ukonmaanaho, L., Lindroos A-J., Merilä, P. & Nieminen T.M.

- Litterfall (LF) is a key pathway for elements return to the soil in forests
- Too high heavy metal concentrations in LF and soil can strongly impact the functioning of forest ecosystems due to their toxicity to organisms
- We studied Cr, Cu, Ni, Pb and Zn concentrations in LF and soil in six ICP Forests sites in Finland.

Results

- Heavy metal concentrations in LF and soil layer correlated well
- Highest heavy metal concentrations in LF were on the birch plot, with the exception of Cu and Ni, which concentrations were highest in the Sevettijärvi, pine dominated plot near the Cu and Ni smelters in Russia.
- Heavy metal concentrations in soil were higher in the organic soil layer than in the mineral soil layer



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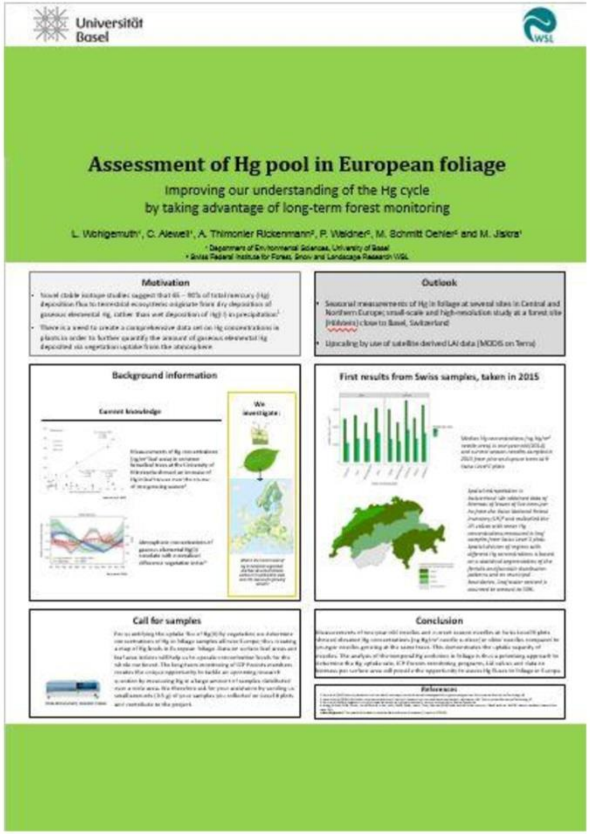
What is a great benefit from long-term forest monitoring?

→ Possibilities for addressing upcoming research questions

Call for samples for an assessment of mercury fluxes to European foliage



Lena Wohlgemuth et al.: Assessment of Hg pool in European foliage

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