



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of the Environment,
Transport, Energy and Communications DETEC

Federal Office for the Environment FOEN
Air Pollution Control and Chemicals Division

Update on ICP M&M activities in Switzerland

Reto Meier

ICP M&M TF Meeting

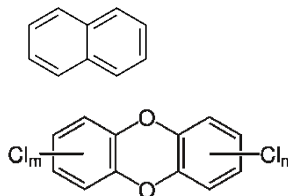
Madrid, 3 April 2019



Overview



Soil solution measurements
in Swiss forests



POPs biomonitoring with lichens



Recent policy developments



Mapping N-deposition 2015

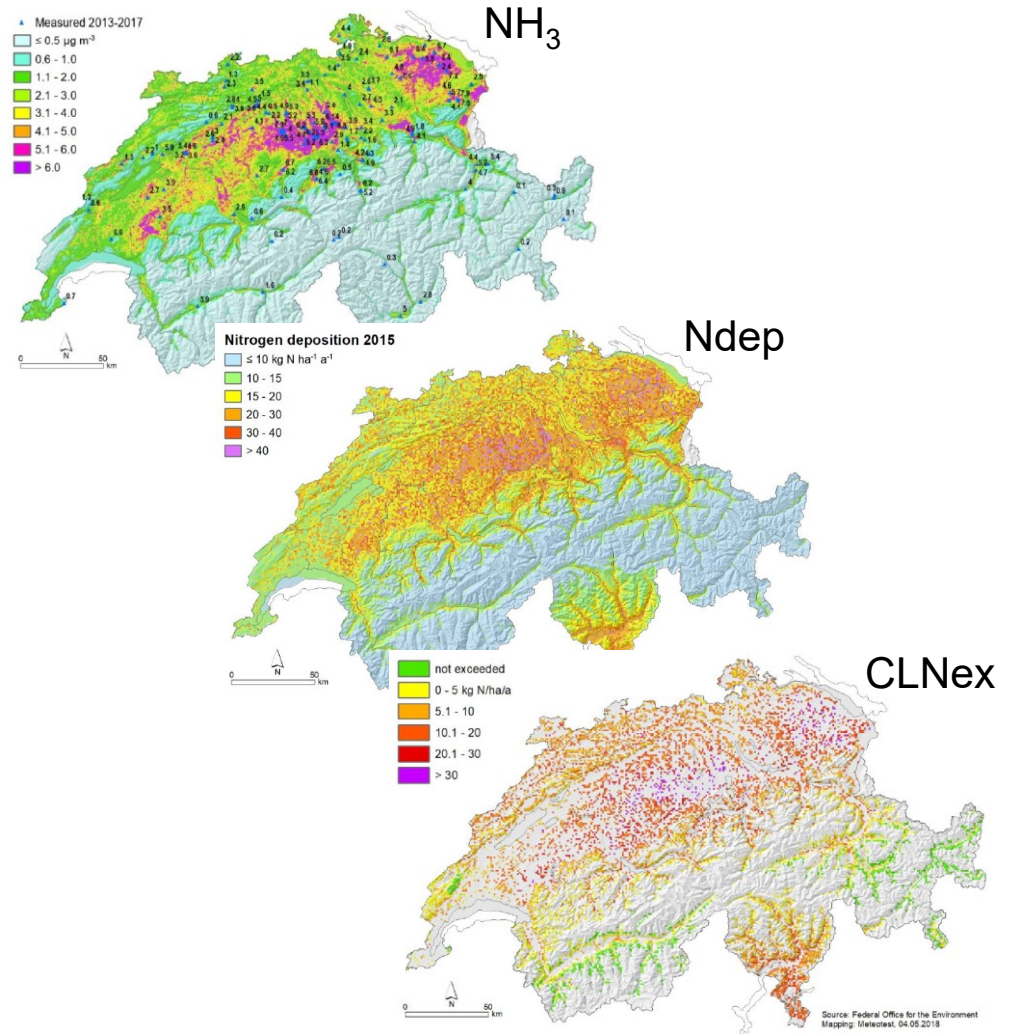


Mapping Nitrogen Deposition 2015 for Switzerland

Technical Report on the Update of Critical Loads and
Exceedance, including the years 1990, 2000, 2005 and
2010

Commissioned by: Federal Office for the Environment (FOEN)

Meteotest AG Fabrikstrasse 14 ☎ +41 31 307 26 20 ✉ office@meteotest.ch
3012 Bern, Switzerland 📠 +41 31 307 26 10 🌐 www.meteotest.ch

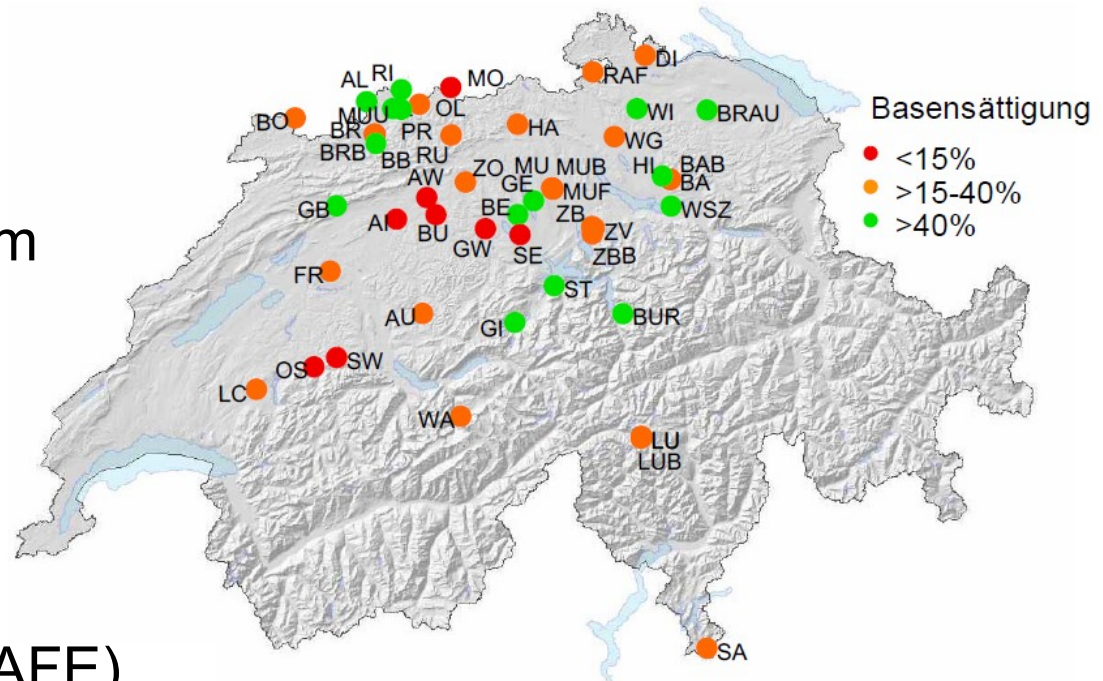


Download report [here](#)



Plots with sampling in 2016

- Altitude 290-1870 m a.s.l.
- Precipitation 900-1800 mm
- Leaching 140-1100 mm
- pH(CaCl₂) 3.4-6.5
- Base saturation 3-100%
- C:N 12.4-29.3
- Weathering rate 0-60cm
0.15-28.3 keq ha⁻¹ a⁻¹ (SAFE)

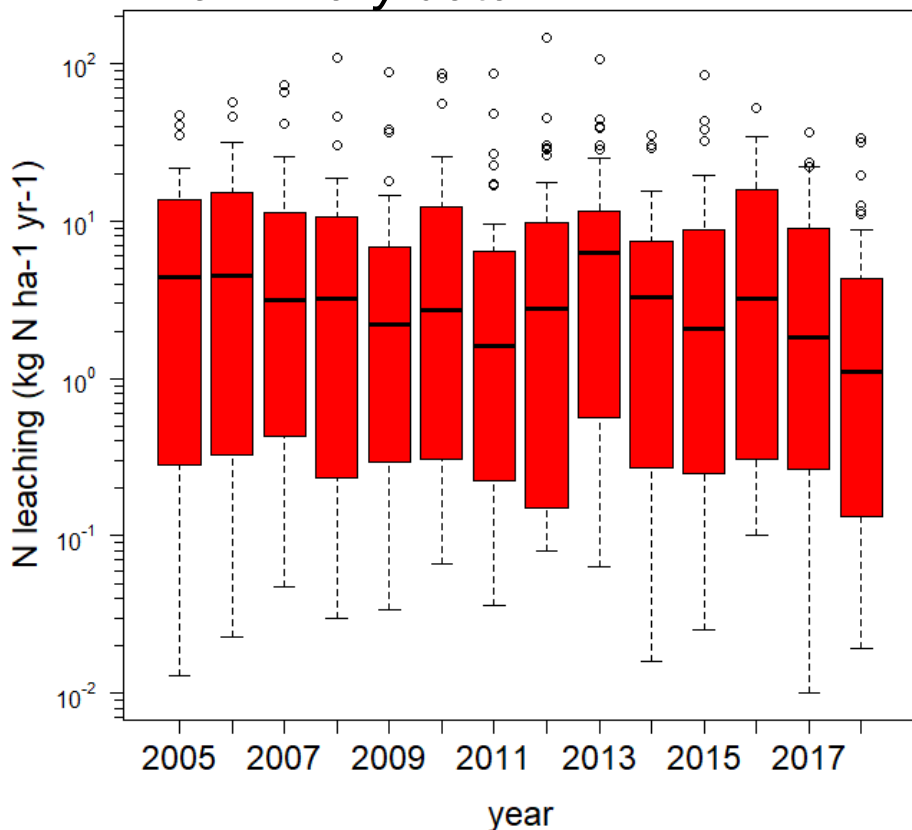


Braun et al., in preparation

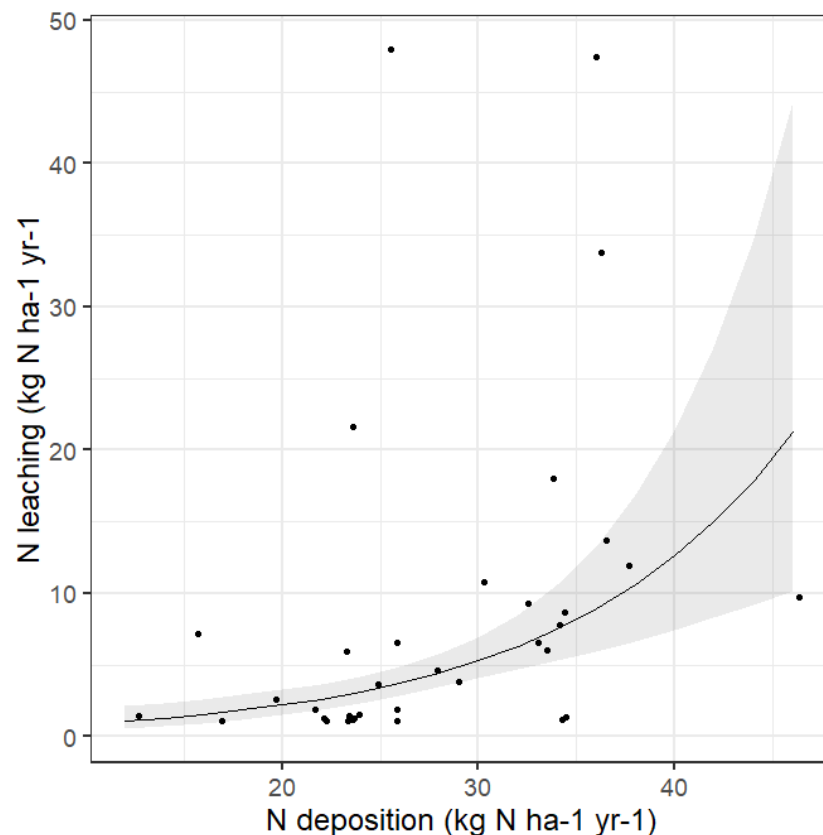


N-deposition and N-leaching 2005-2018

Preliminary data



Decrease in N-leaching – due to decrease in N deposition and increase in drought (contribute in equal parts)



Averages 2005-2018:

N-dep: 29.9 kg N ha⁻¹ yr⁻¹ (range 12.7-60.9)

N-leach: 9.4 kg N ha⁻¹ yr⁻¹ (range 0.1-55.2)

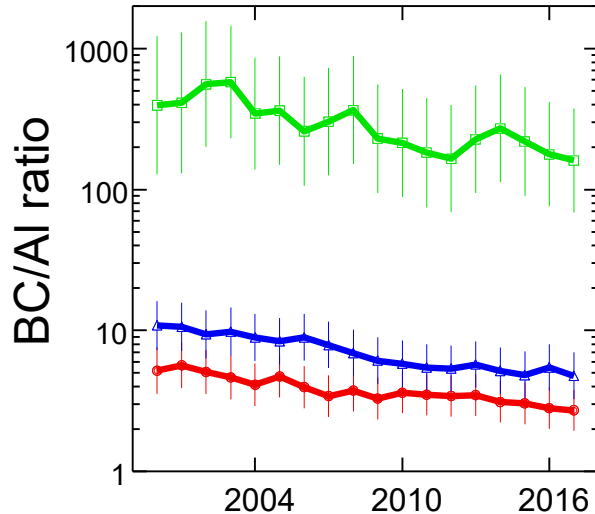
Braun et al., in preparation



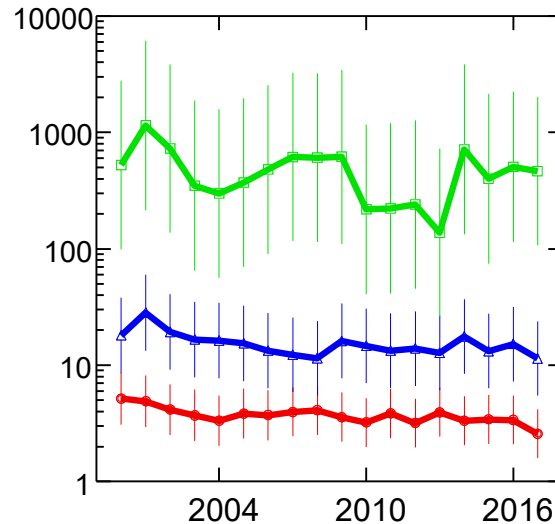
Development of acidification

Preliminary data

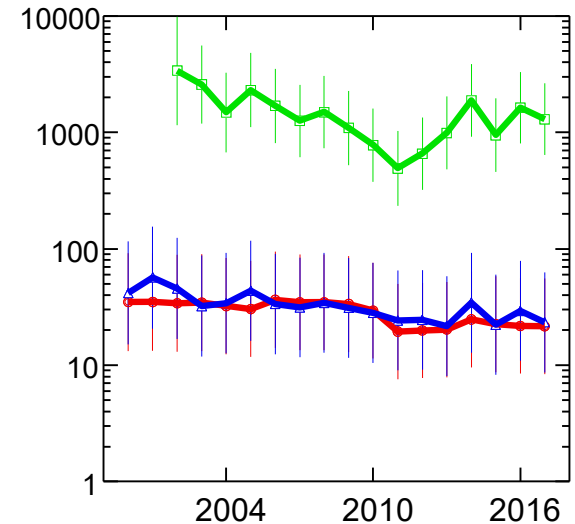
Depth <30 cm



Depth 30-60 cm



Depth >60 cm



Base saturation (0-40 cm)

— <15% — >15-40% — >40%

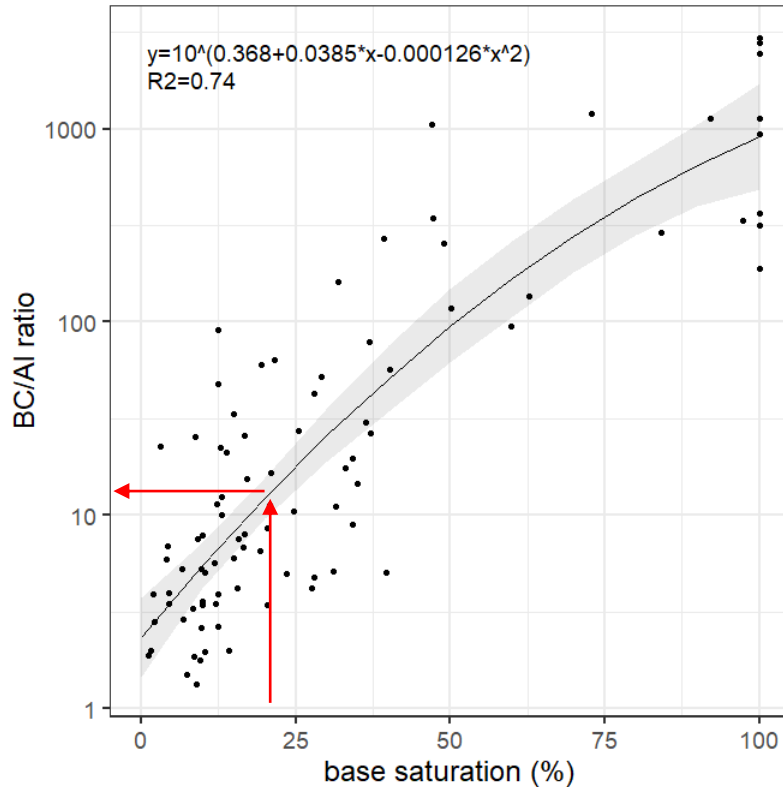
- Decrease in BC/Al strongest in the uppermost soil
- Further progress of acidification is weaker in more acidified soils

Braun et al., in preparation

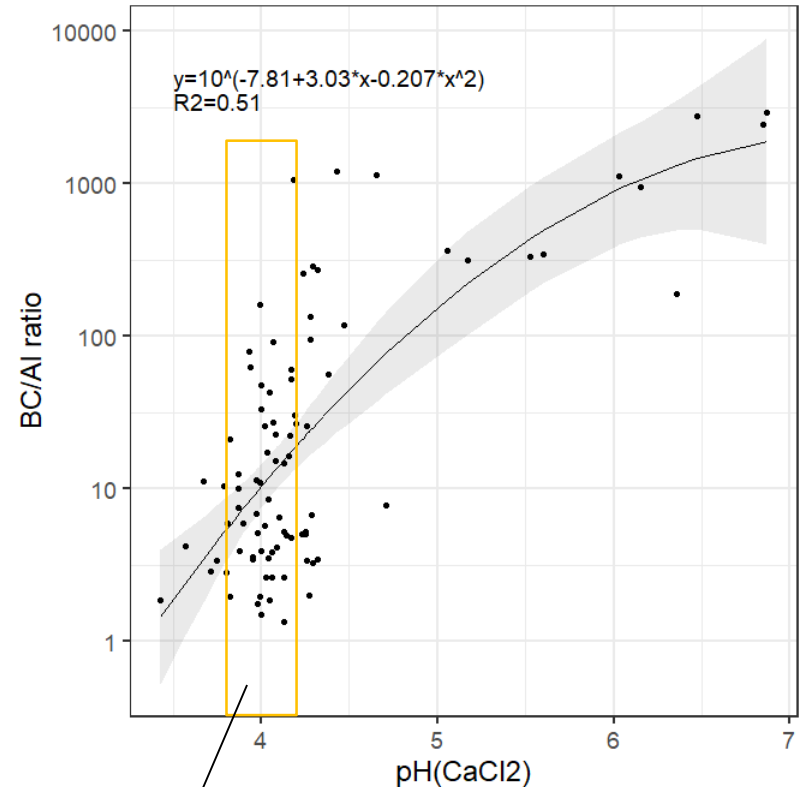


Acidification parameters

Preliminary data



BS of 20% $\triangleq$ BC/Al of 12



Al buffer range - very high buffer capacity

Braun et al., in preparation



POPs Biomonitoring with lichens



Success monitoring of regulated compounds (CLRTAP POPs Protocol and/or Stockholm Convention) for documenting their decrease in the environment.

➤ Biomonitoring from 1995 repeated in 2014

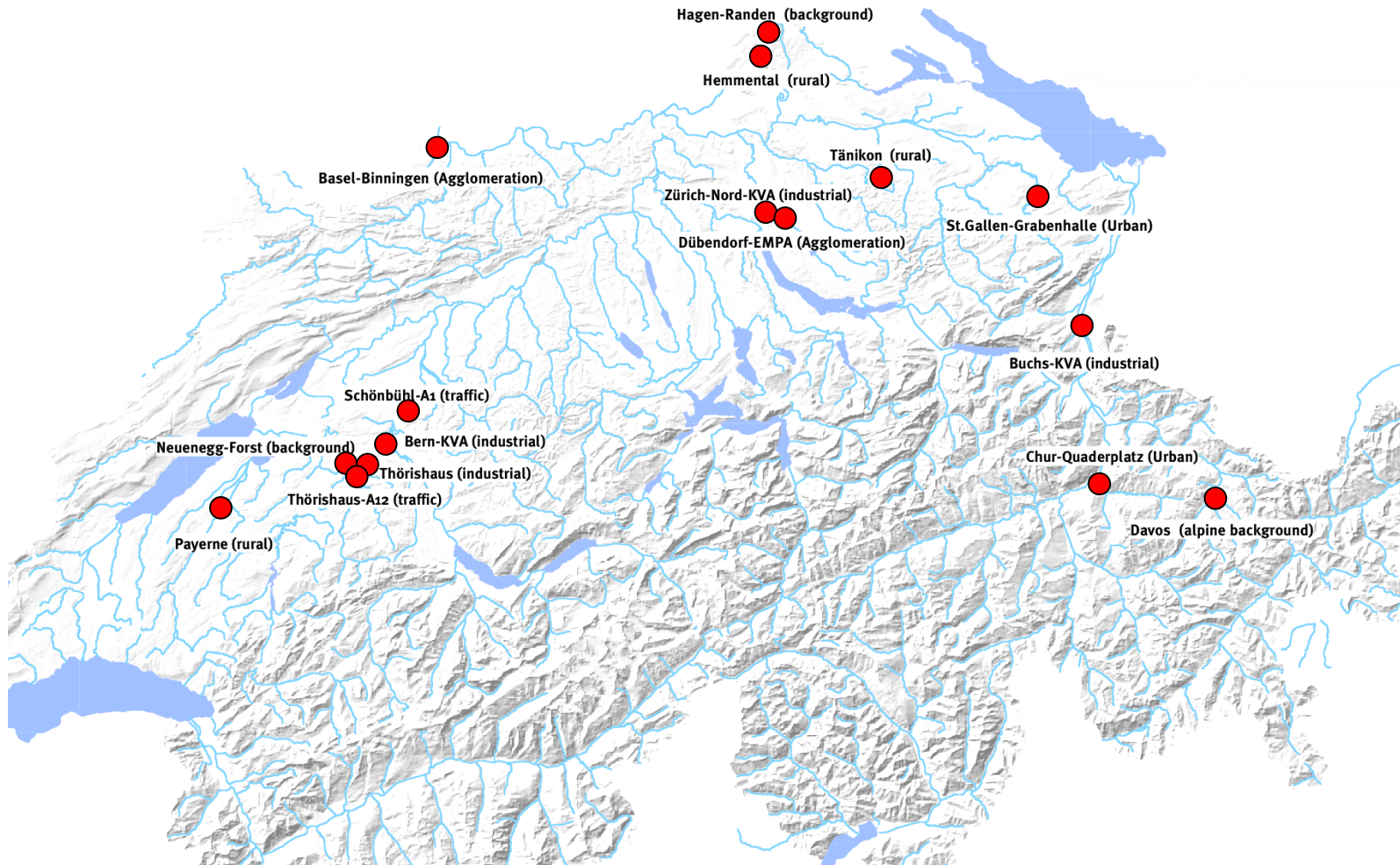
Studied substances:

- Polychlorinated dibenzo-p-dioxins/furans (PCDD/PCDFs)
- Organochlorine pesticides/insecticides (OCPs) i.e. DDT, Lindane
- Polychlorinated biphenyls, i.e., dioxin-like and nondioxin-like PCBs
- Polybrominated biphenyl ethers (PBDEs)
- Polycyclic aromatic hydrocarbons (PAHs)

Herzig et al. 2019; doi:10.1007/s11356-019-04236-9



16 sampling sites accross Switzerland: *background, rural, cities, traffic, industrial*



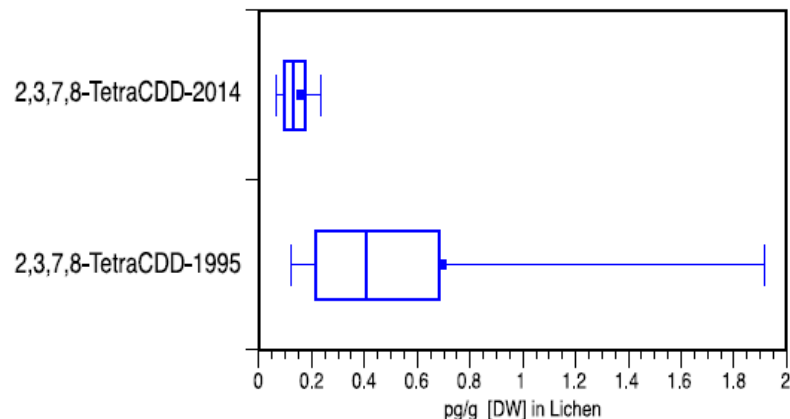
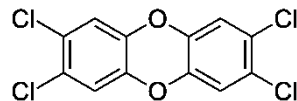
Herzig et al. 2019



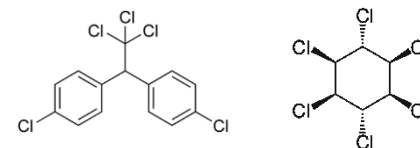
Decrease of 40-80% (medians) for most of the studied substances

2,3,7,8-TetraCDD

(Seveso Dioxin)



DDT, Lindane

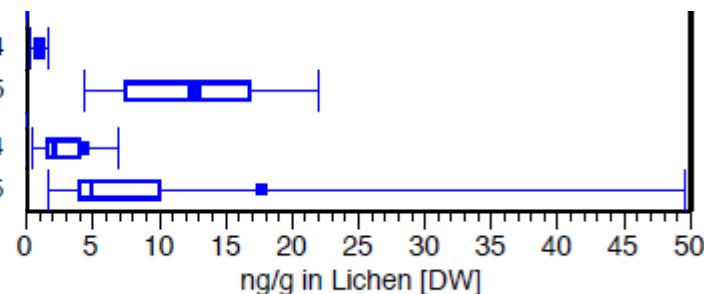


gamma-HCH (Lindan) -2014

gamma-HCH (Lindan) -1995

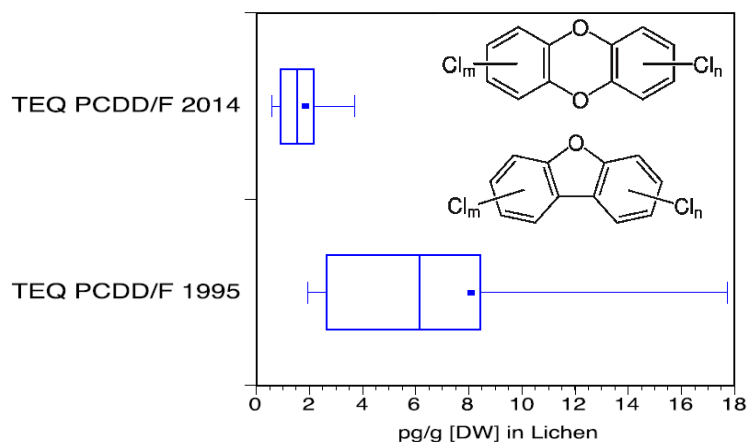
p,p'-DDT-2014

p,p'-DDT-1995

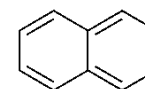


TEQ PCDD/PCDFs WHO(2005)

b



PAH sum parameters

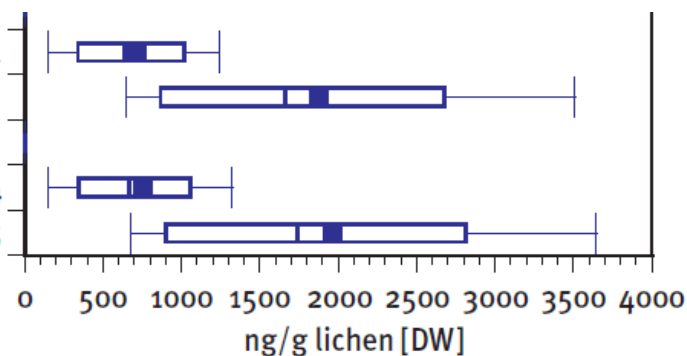


$\Sigma 16$ EPA-PAHs-2014

$\Sigma 16$ EPA-PAHs-1995

$\Sigma 20$ PAHs-2014

$\Sigma 20$ PAHs-1995

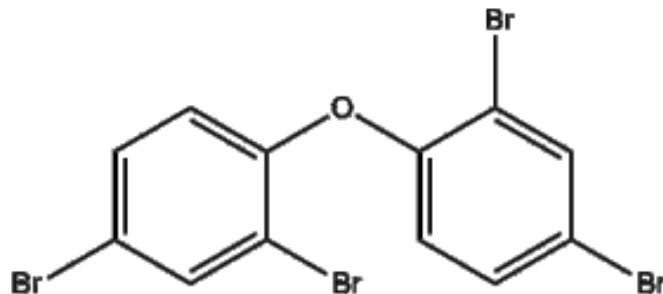




Increase of PBDE at industrial and road traffic sites

Polybrominated diphenyl ethers (PBDE) are used as flame retardants

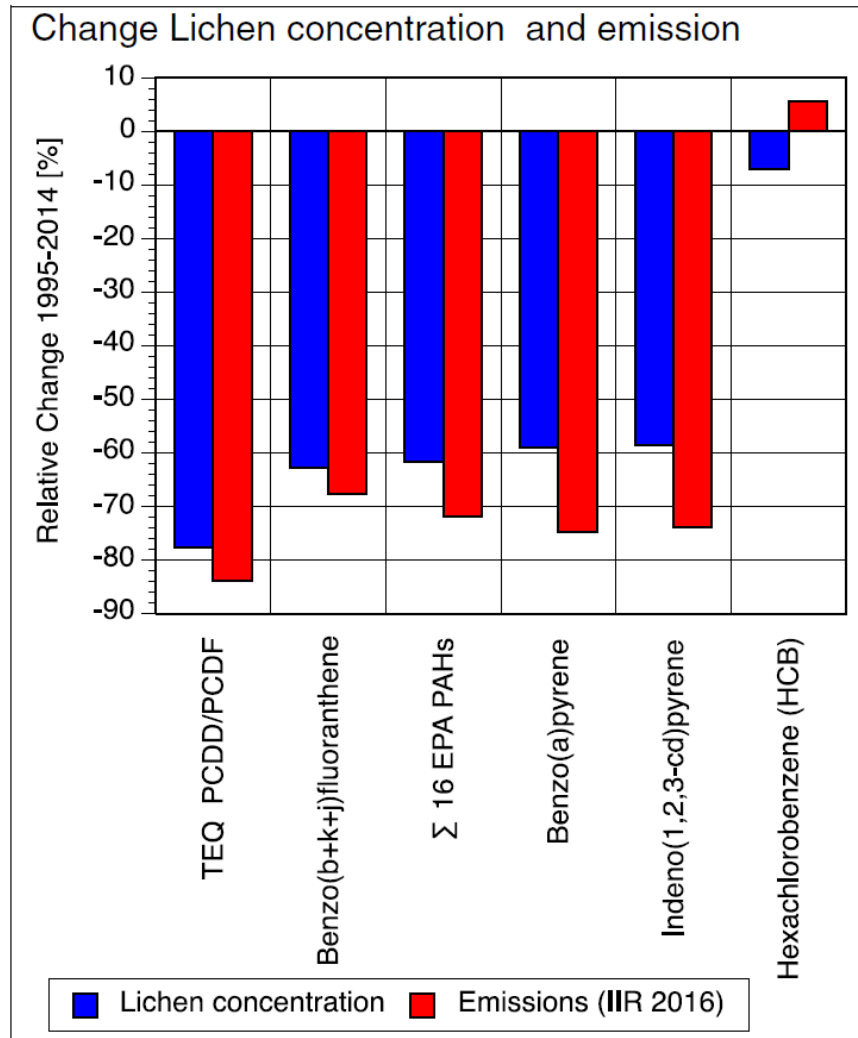
- Increased lichen concentrations found at road traffic sites and an industrial site in proximity to a scrap vehicle recycling facility
- reduced concentrations in lichens at rural and background sites



Herzig et al. 2019



Comparison with emission data



Comparison of percentage changes in lichen concentrations with percentage changes in emissions according to Switzerland's IIR 2016

Herzig et al. 2019



Amended Gothenburg Protocol

Swiss Parliament agreed to the 2012 amendments to the Gothenburg Protocol

27.11.2018	Council of States 34:0
05.02.2019	National Council 156:0





Abatement of ammonia emissions

Two ammonia emission abatement measures are currently in national consultation process:



Mandatory low emission slurry application

- today >40% applied with trailing shoe (economic incentives)
- potential ~70% (limited due to topography)



Mandatory cover of slurry storage

- today about 90% of storage covered