

Air Quality Research Shapes Environmental Policy

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Federal Commission for Air Hygiene FCAH
former member of Empa directorate

28th ETH Nanoparticles Conference (NPC-25); 17. 06. 2025

Art proudly shows Prosperity - 1931

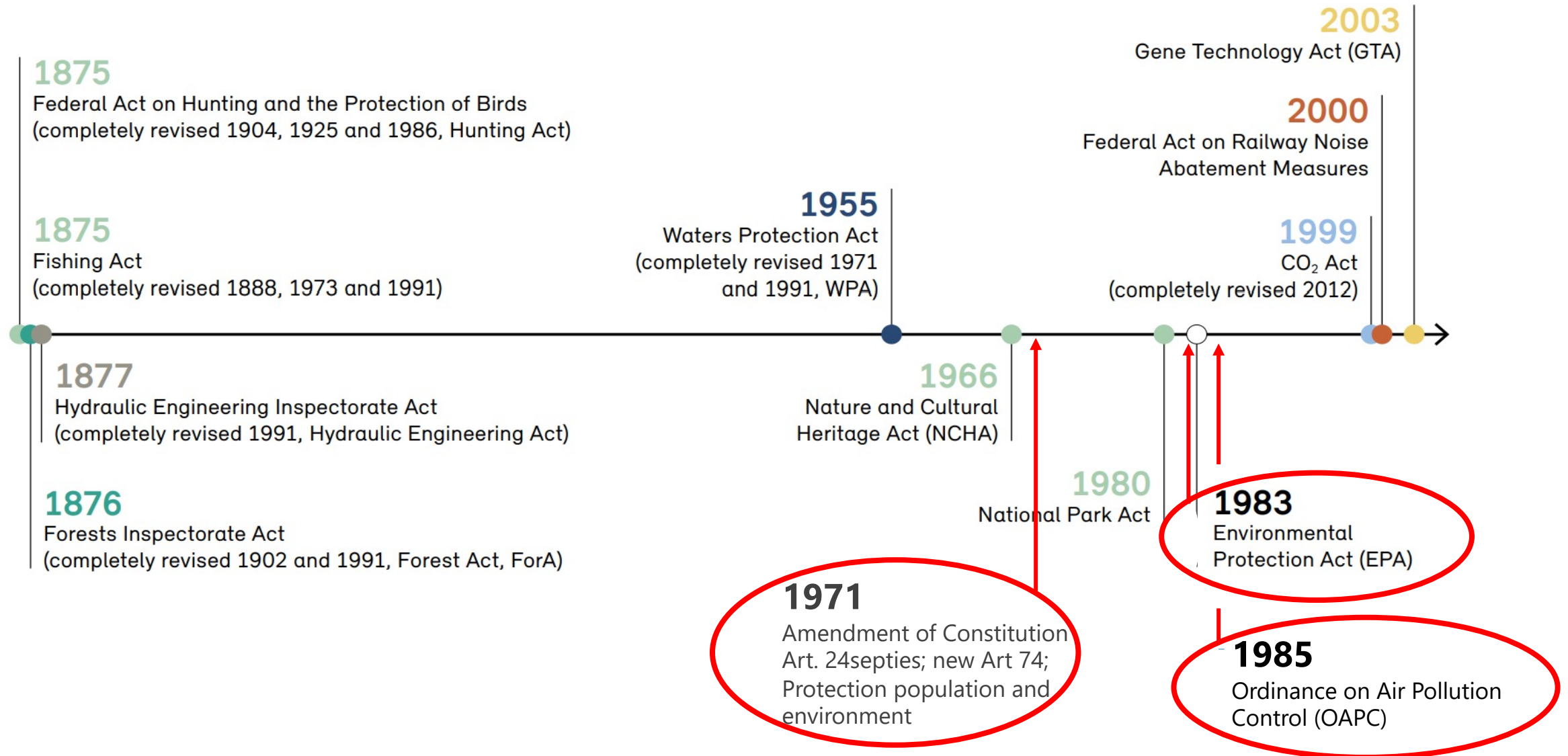


«Arbeit»
Werner L.
Lehmann
1931

**ETHZ HG,
south wing**

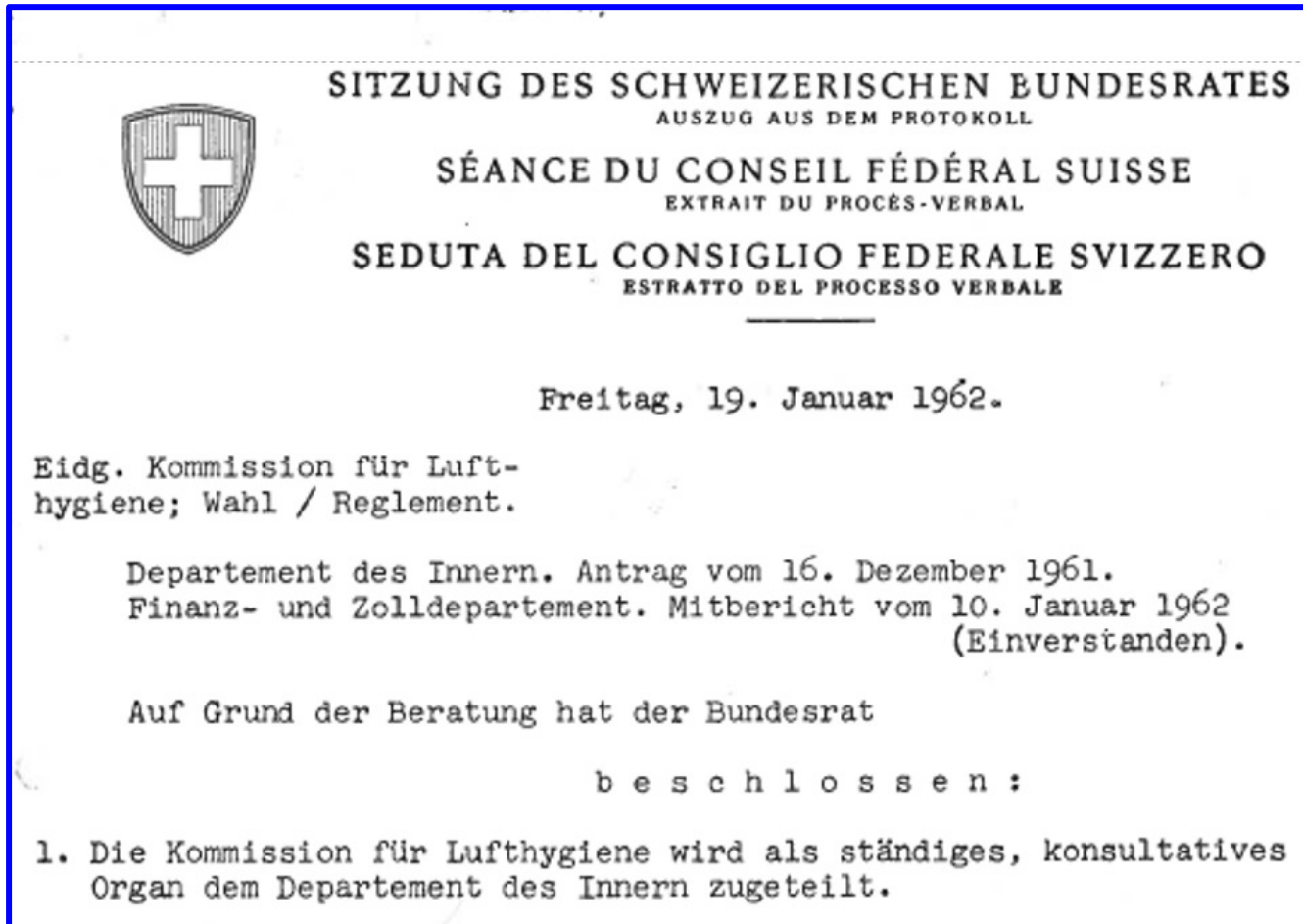
Late Start? – but no less successful

Timeline of the most important pieces of environmental legislation



Early commitment of Switzerland - Air Hygiene

Federal Commission for Air Hygiene (FCAH)



19. Januar 1962

The Federal Council appoints a 'Federal Commission for Air Hygiene' as a consultative body of the Federal Department of Home Affairs (FDHA).

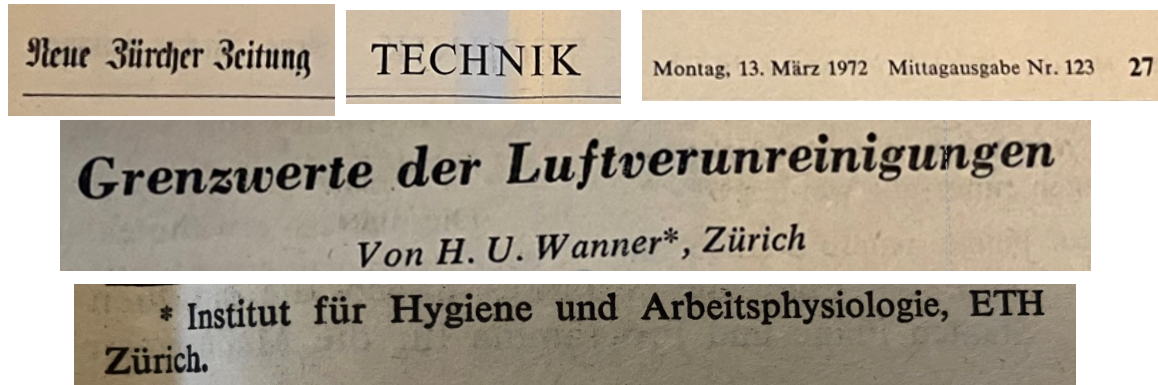
Today: Federal Department of the Environment, Transport, Energy and Communications (DETEC)

***Federal Offices
Research Institutions
Cantons***

Chemistry - Health - Environment - Law

Research supports Environmental Policy – since beginning

1972/3 - *Publications limit values / air hygiene*

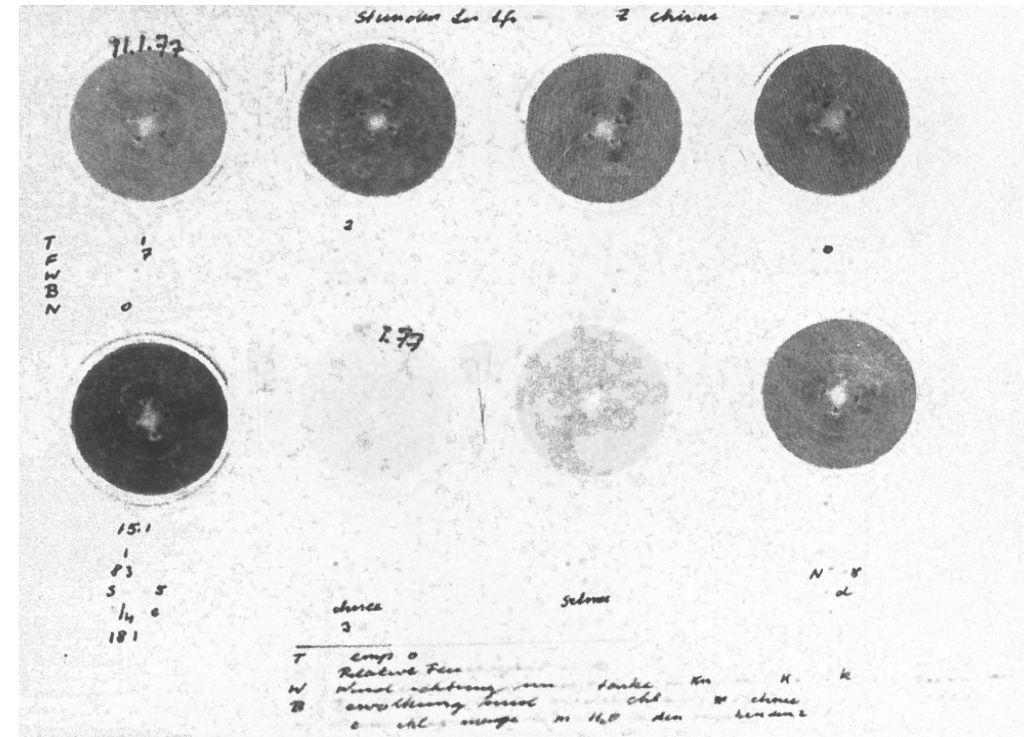


Probleme der Lufthygiene

Unterlagen zur Umweltschutzgesetzgebung,
zusammengestellt von der Eidg. Kommission
für Lufthygiene

Sonderdruck aus der Beilage B, Nr. 6/1973
zum Bulletin des Eidg. Gesundheitsamtes vom 15. Dezember 1973

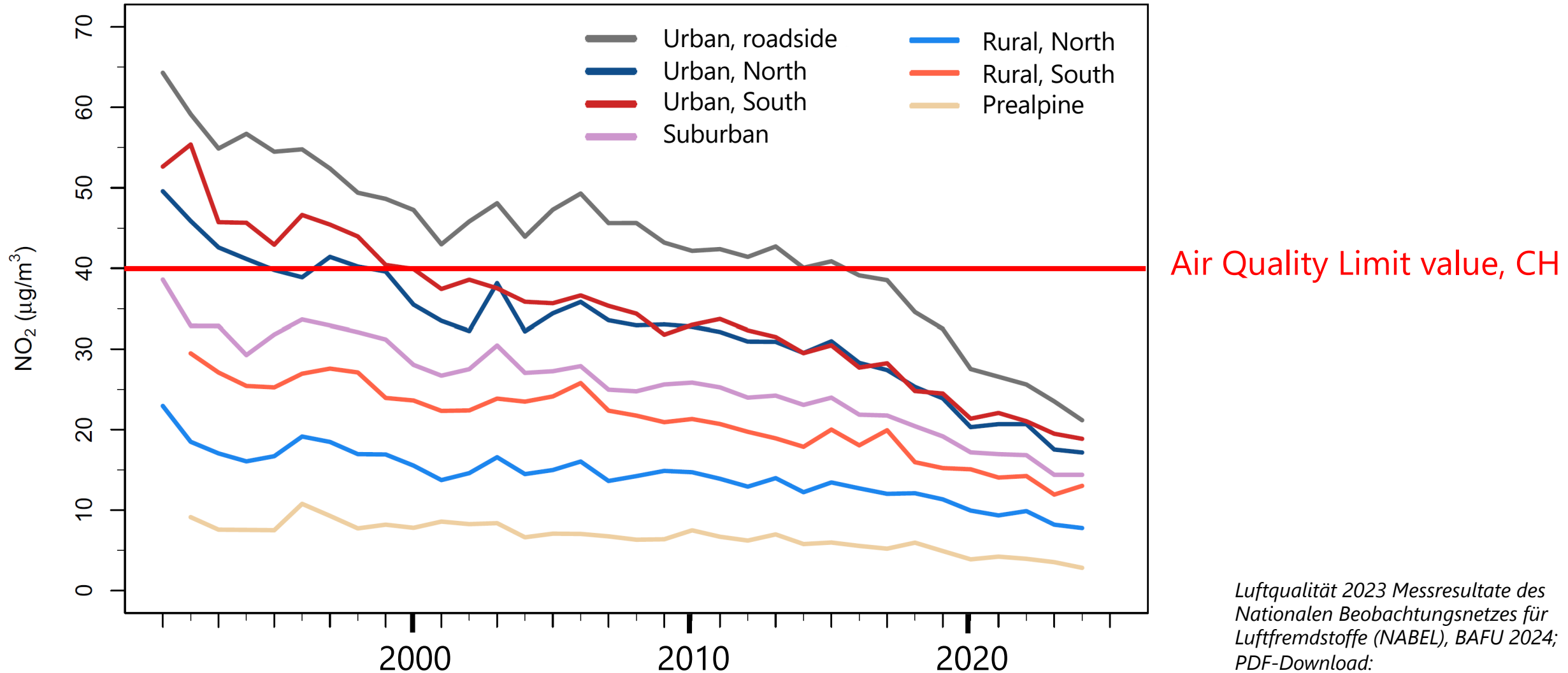
1977 - *smoking quite common*



photos of daily air filters at the cantonal hospital in Zurich taken by Prof Staub, head of the Physics Institute at the University of Zurich.

Swiss clean air policy – a success story

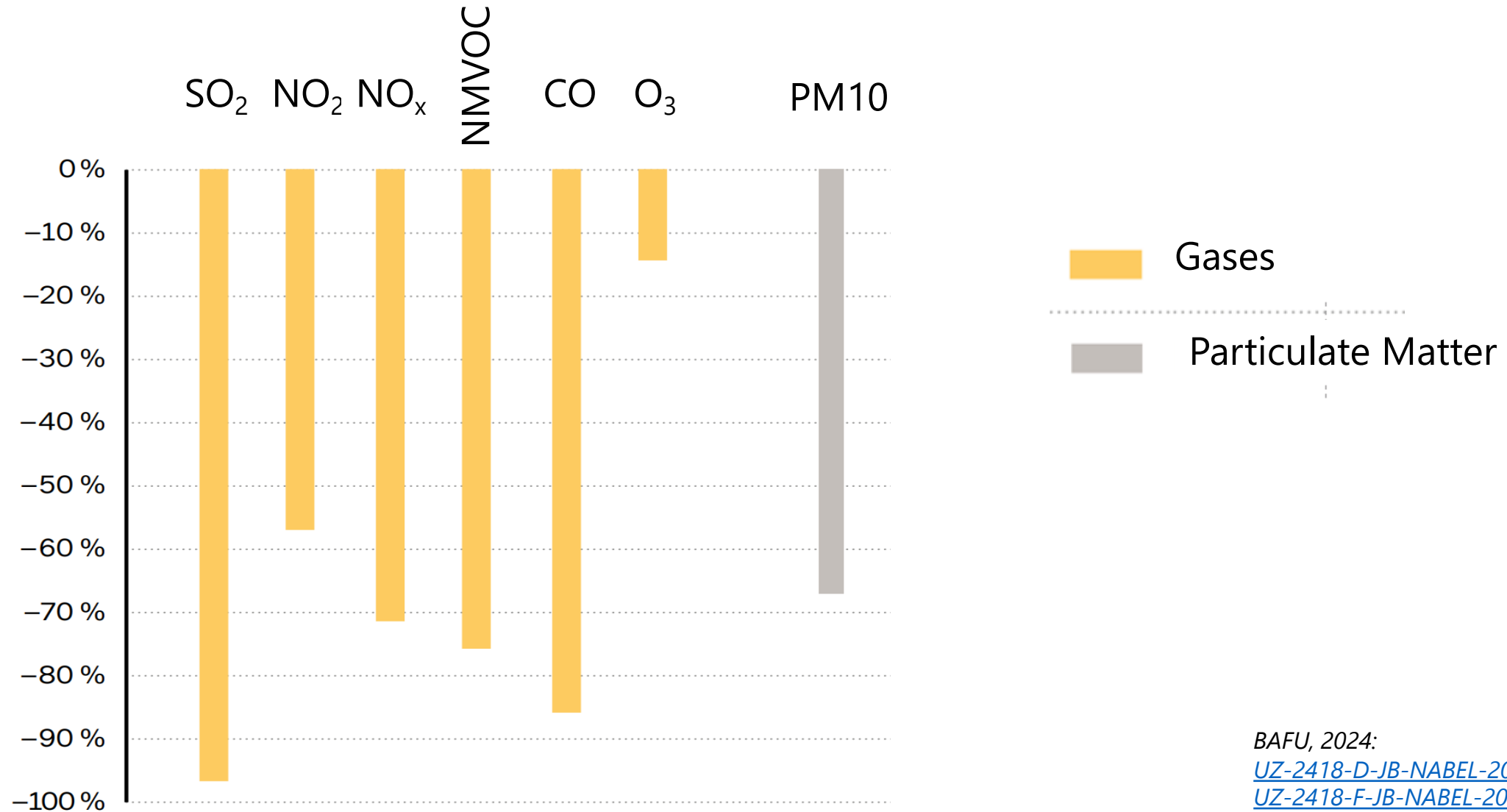
Nitrogen Dioxide (NO₂) annual mean values



Air Quality Limit value, CH

Swiss clean air policy – a success story

Change in ambient air pollution from 1988 – 2023, in %



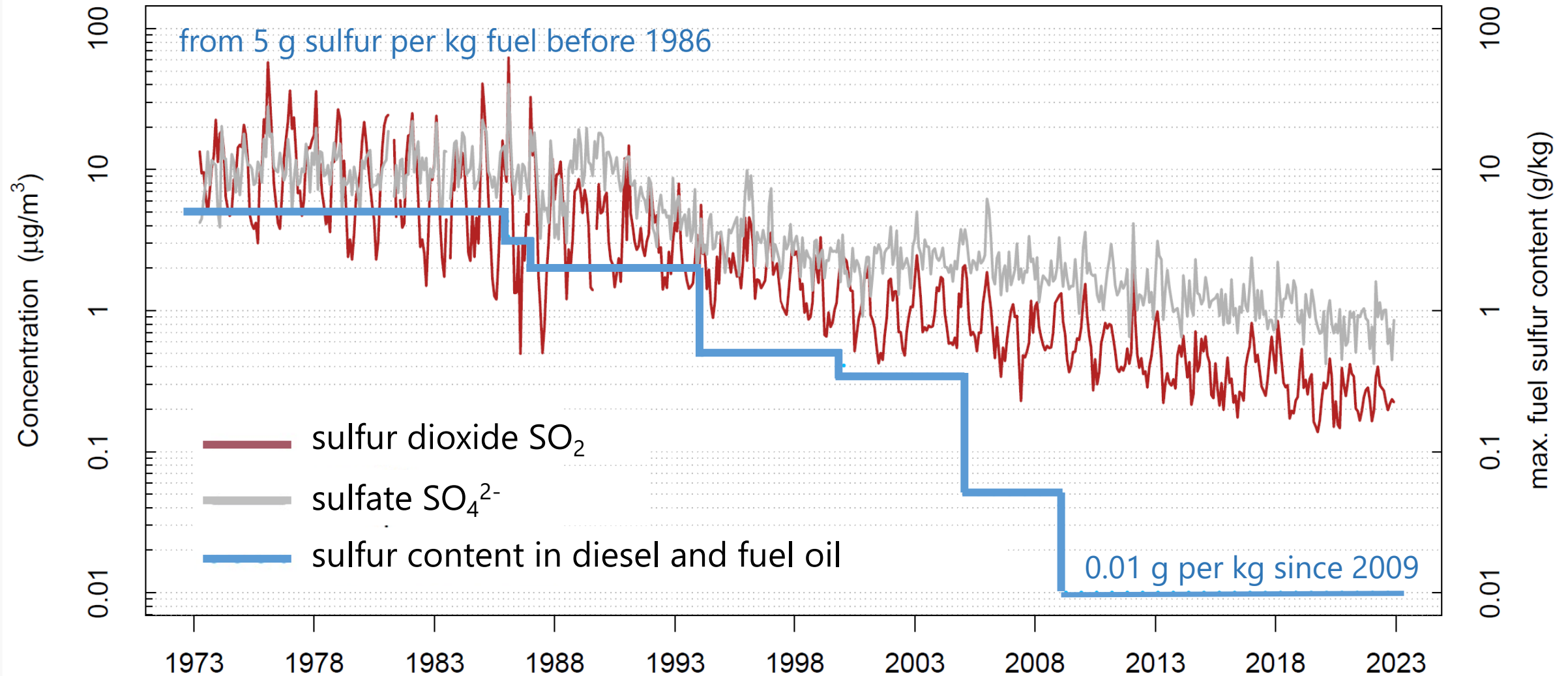
BAFU, 2024:

[UZ-2418-D-JB-NABEL-2023 \(3\).pdf](#)

[UZ-2418-F-JB-NABEL-2023.pdf](#)

Measures lead to Success

Monthly mean sulfur dioxide (SO_2) and particulate sulfate (SO_4^{2-}) concentrations at Payerne (rural)

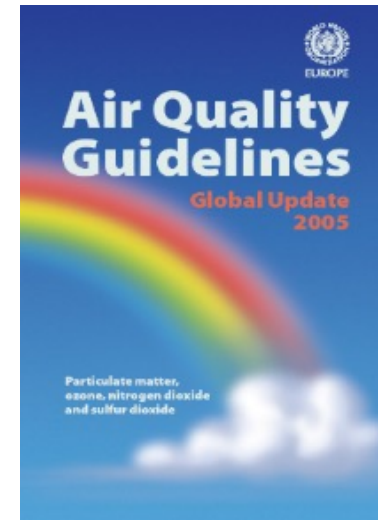
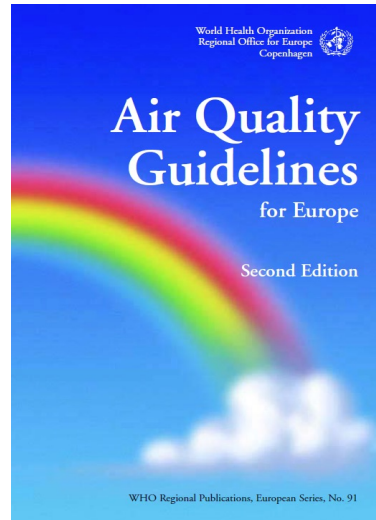
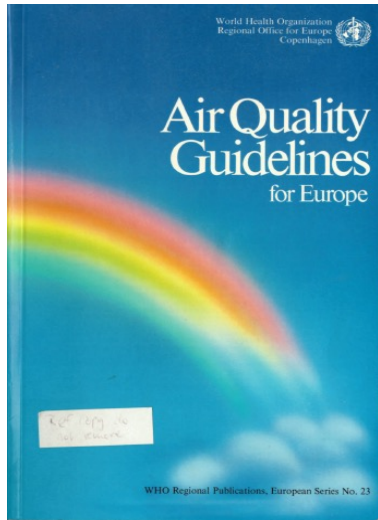


Air Quality Guidelines (AQG)

World Health Organization (WHO)

What are the WHO Air quality guidelines?

[WHO Air Quality Guidelines 2021.pdf](#)



1987

2000

2005

2021

~ 800

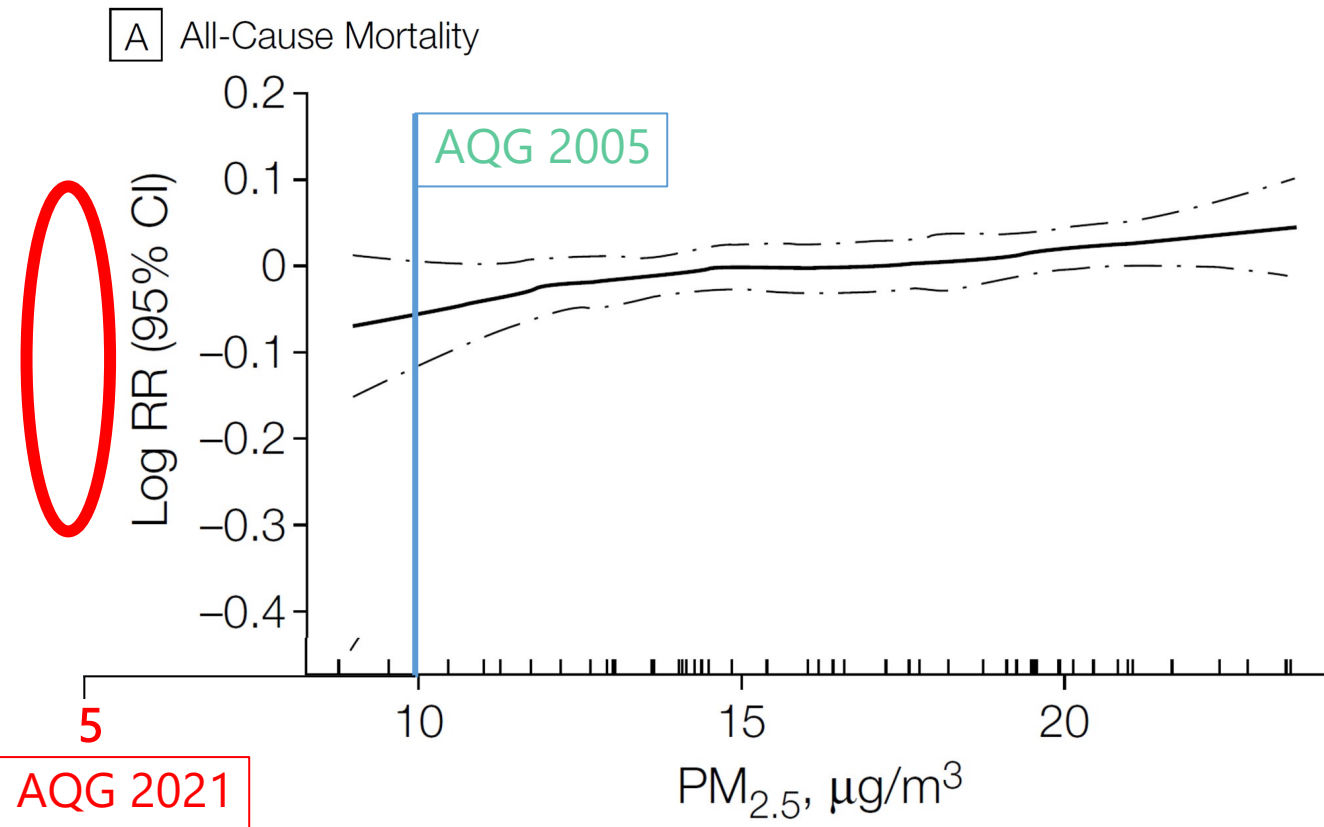
Scientific papers "air pollution" & "health" (web of science)

~ 35'000

Air pollution - effects on health

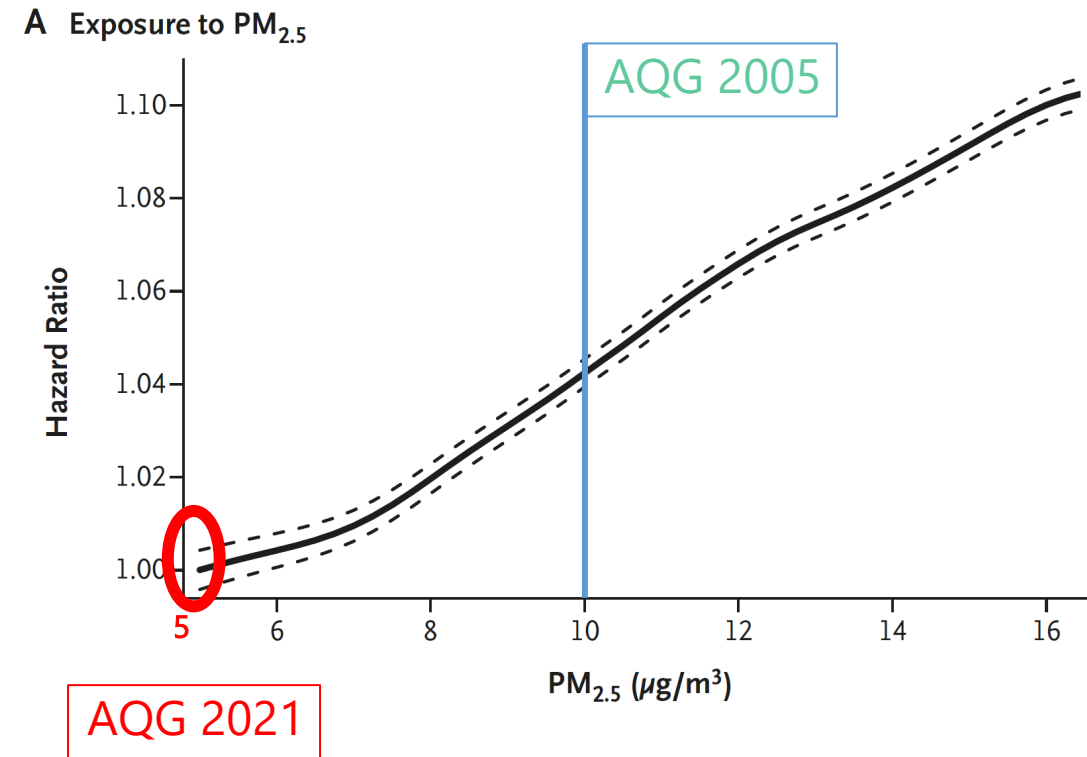
Example PM_{2.5} annual mean value vs. mortality

Datenbasis 1992-1998



Pope et al. JAMA 2002

Datenbasis 2000-2012



Di et al, NEJM 2017

Recommendation - to protect public health

Press releases 23.11.2023

The Federal Commission for Air Hygiene (FCAH) has assessed the revised guideline values issued by the World Health Organization (WHO) in 2021 and their significance for Switzerland's Air Pollution Control Ordinance (OAPC).

**FCAH (EKL) recommends
adapting air quality standards
to protect public health**



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Eidgenössische Kommission für Lufthygiene EKL
Commission fédérale de l'hygiène de l'air CFHA
Commissione federale per l'igiene dell'aria CFIA
Cumissiun federala per l'igiene da l'aria CFIA

Luftqualität 2023

Die neuen WHO-Luftqualitätsrichtwerte 2021 und ihre Bedeutung für die Schweizer Luftreinhalte-Verordnung



[Die neuen WHO-
Luftqualitätsrichtwerte 2021
und ihre Bedeutung für die
Schweizer Luftreinhalte-
Verordnung \(admin.ch\)](#)

[Les nouvelles lignes directrices
OMS relatives à la qualité de
l'air 2021 et leur importance
pour l'ordonnance suisse sur la
protection de l'air \(admin.ch\)](#)

[I nuovi valori indicativi 2021
dell'OMS sulla qualità dell'aria
e il loro significato per
l'ordinanza federale contro
l'inquinamento atmosferico
\(admin.ch\)](#)

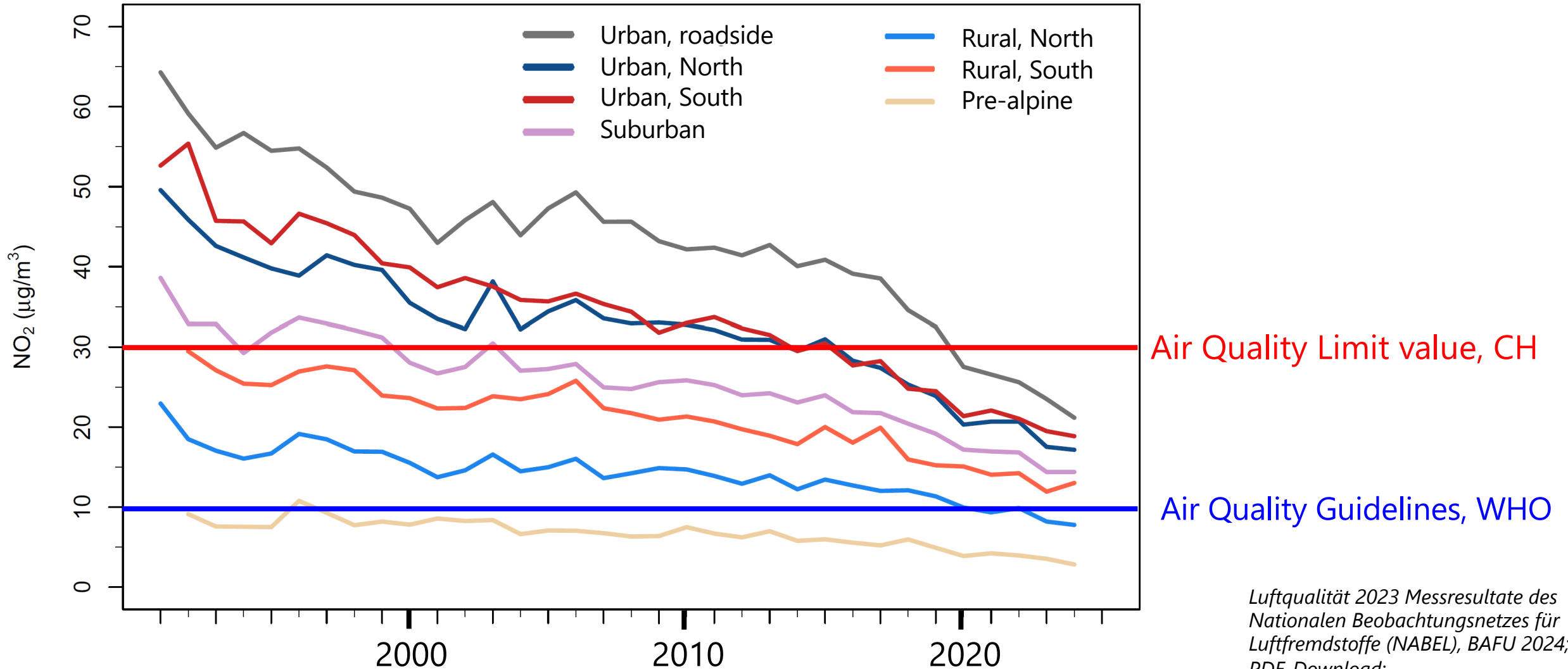
WHO Air Quality Guidelines 2021

AQG WHO 2021 - Recommendations on classical air pollutants EKL 2023 - OPAC in force

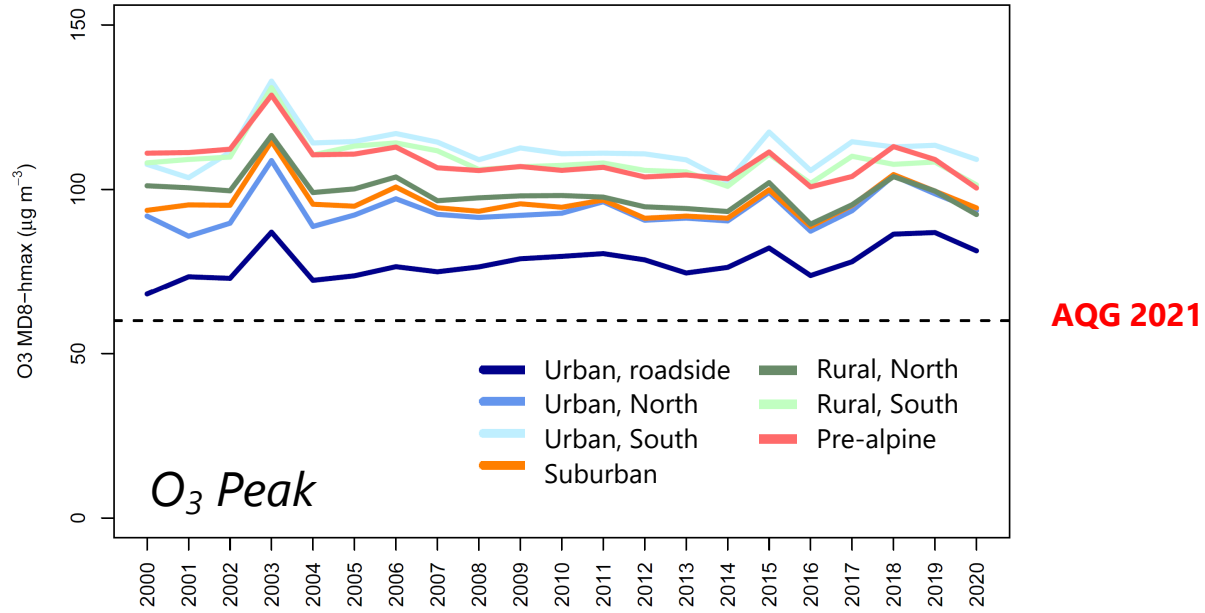
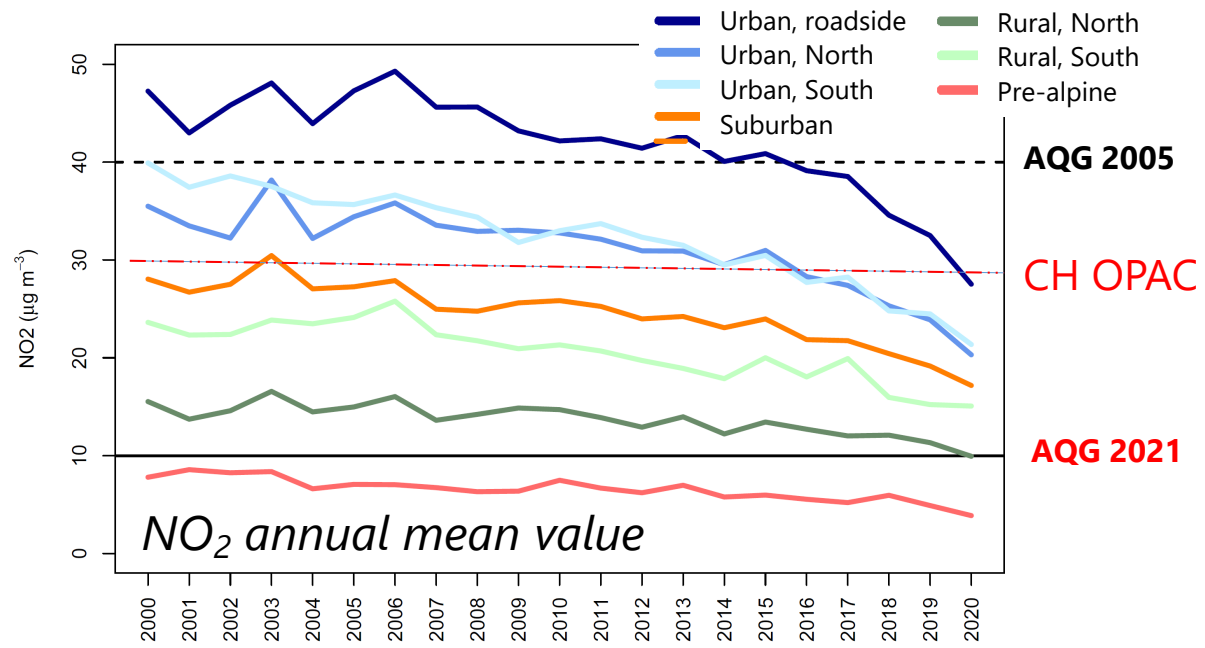
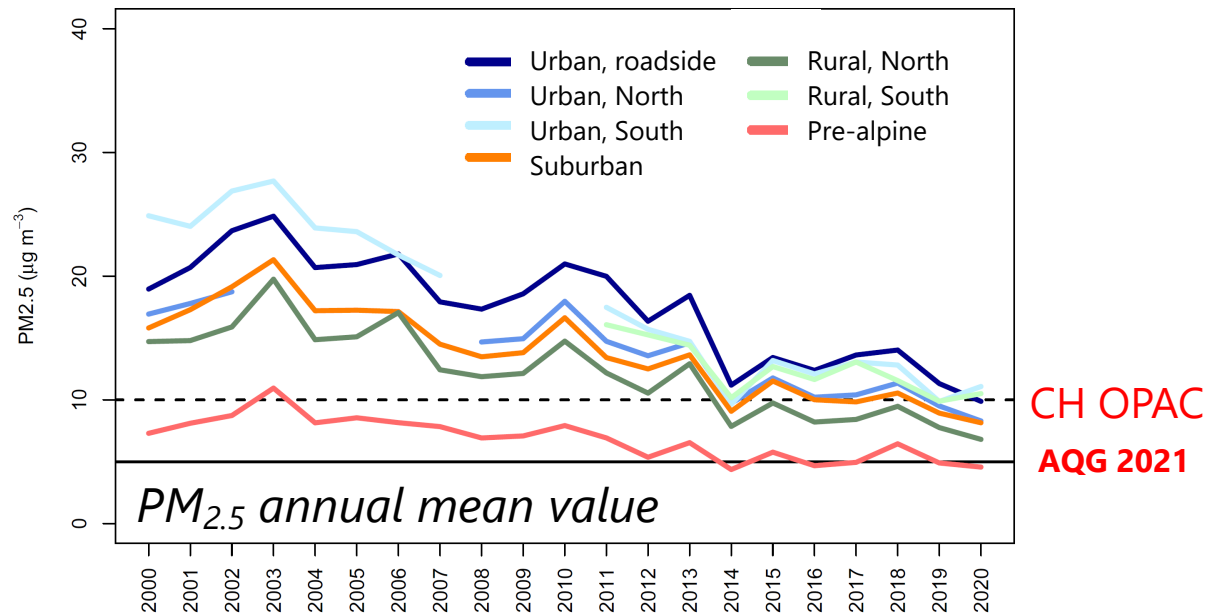
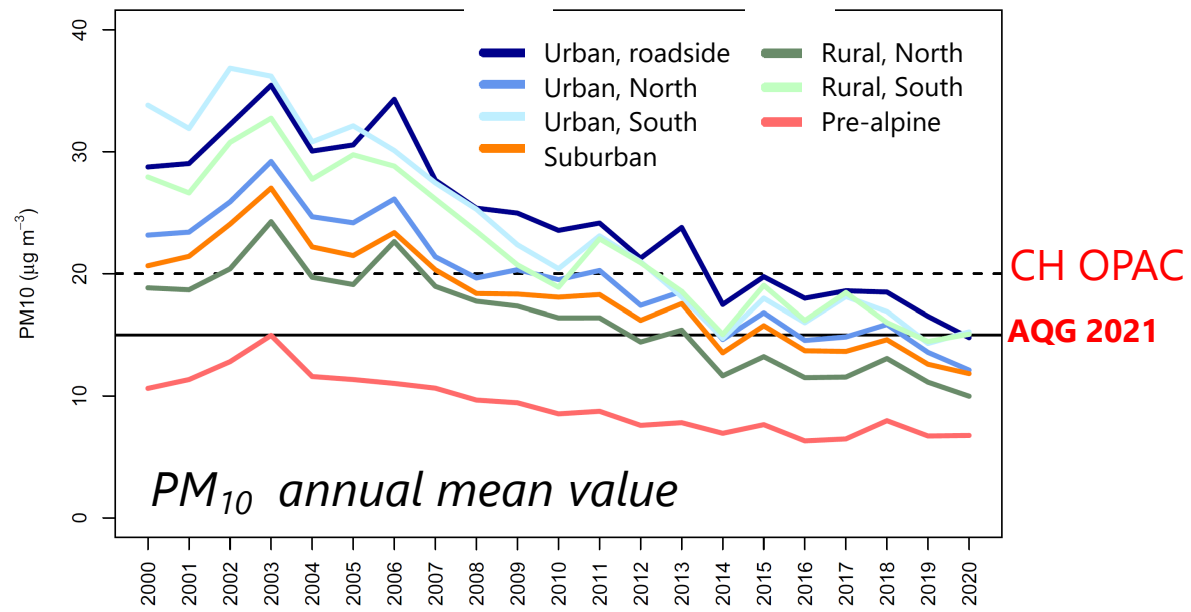
Pollutant	Averaging time	AQG WHO 2021	EKL 2023 Recommendations	OPAC (LRV) Ordinance on Air Pollution Control
PM _{2.5} , µg/m ³	Annual	5	5	10
	24-hour ^a	15	15	
PM ₁₀ , µg/m ³	Annual	15	15	20
	24-hour ^a	45	45	50
NO ₂ , µg/m ³	Annual	10	10	30
	24-hour ^a	25	25	80
SO ₂ , µg/m ³	24-hour ^a	40	40	100

Swiss clean air policy – a success story

Nitrogen Dioxide (NO₂) annual mean values



WHO Air Quality Guidelines 2021



(SR 101) Federal Constitution of the Swiss Confederation

of 18 April 1999 (Status as of 3 March 2024)

Art. 74 Protection of the environment

1 The Confederation shall legislate on the **protection of the population and its natural environment** against damage or nuisance.

2 It shall ensure that such damage or nuisance is avoided. The costs of avoiding or eliminating such damage or nuisance are borne by those responsible for causing it.

3 The Cantons are responsible for the implementation of the relevant federal regulations, except where the law reserves this duty for the Confederation.

SR 101 Bundesverfassung der Schweizerischen Eidgenossenschaft

vom 18. April 1999 (Stand am 3. März 2024)

Art. 74 Umweltschutz

1 Der Bund erlässt Vorschriften über den **Schutz des Menschen und seiner natürlichen Umwelt** vor schädlichen oder lästigen Einwirkungen.

2 Er sorgt dafür, dass solche Einwirkungen vermieden werden. Die Kosten der Vermeidung und Beseitigung tragen die Verursacher.

3 Für den Vollzug der Vorschriften sind die Kantone zuständig, soweit das Gesetz ihn nicht dem Bund vorbehält.

Limit values – current scientific Knowledge

SR 814.01

**Federal Act of 7 October 1983 on the Protection of the Environment
(Environmental Protection Act, EPA)**

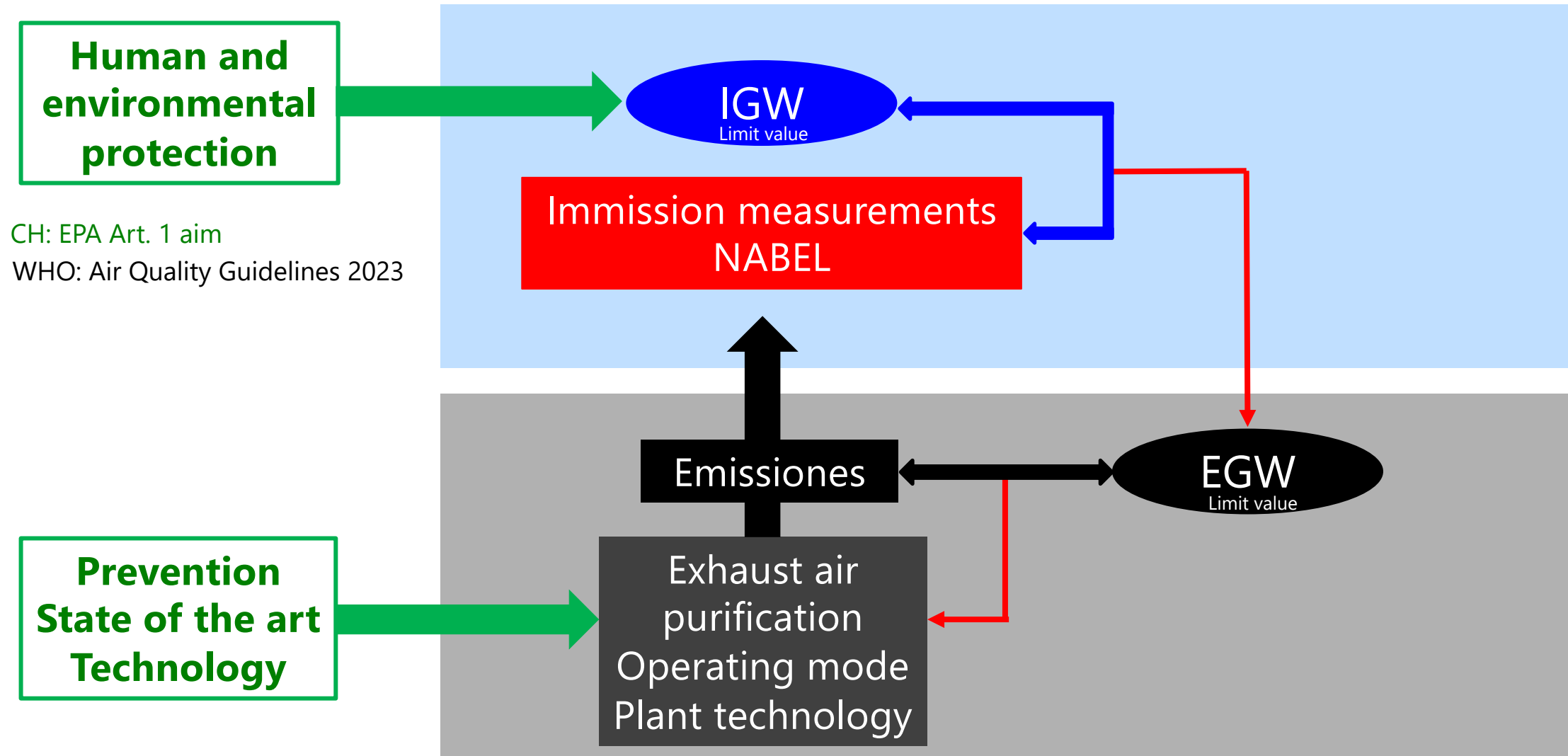
of 7 October 1983 (Status as of 1 April 2025)

Art. 14 Ambient limit values for air pollution

The ambient **limit values** for air pollution **must be set so that, in the light of current scientific knowledge and experience**, ambient air pollution below these levels:

- a. does not endanger people, animals or plants, their biological communities and habitats;
- b. does not seriously affect the **well-being of the population**;
- c. does not damage buildings;
- d. does not harm soil fertility, vegetation or waters.

Regulatory mechanisms of Swiss clean air policy



Developments and Wind Fall Profits - support

- Electrification of the transport and energy system
- EU:
 - NEC Directive → Emission reduction commitments 2030
 - Zero Pollution Action Plan, reduction of air quality benchmarks
 - Euro 7 with limits on brake and tyre wear

Challenges - conflict

- Biomass combustion
- traffic growth

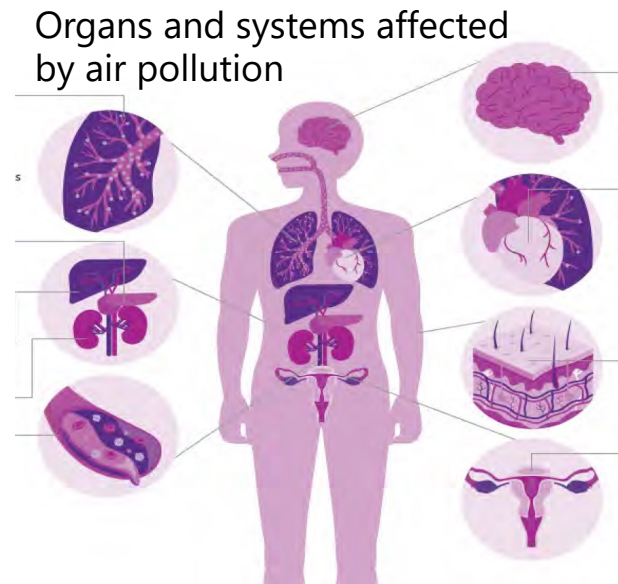
What next?

- **Careful examination** of possible adjustment of the immission limit values in the Ordinance on Air Pollution Control (OAPC; SR 814.318.142.1) by the Federal Department of the Environment, Transport, Energy and Communications (DETEC).
- **Assessment** with regard to the expected impact on the environment and health, society, the economy and the authorities.
- Based on **scenario analyses** on the development of air quality up to **2050** and in-depth clarifications of the available technical options for further reducing air pollutant emissions, a possible revision of the OPAC (LRV) could be submitted for consultation in 2027."

answer of the federal council 14.05.2025 to the [Interpellation](#) 25.313 Wyss, submitted 18.03.2025

Relevant Research findings

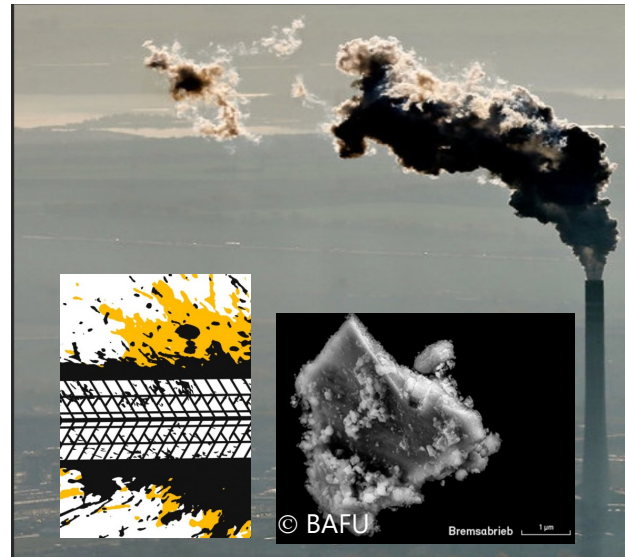
Air Pollution – Health



Based on Thurston GD et al., A joint ERS/ATS policy statement: what constitutes an adverse health effect of air pollution? An analytical framework. Eur Respir J. 2017;49(1) (DOI: 10.1183/13993003.00419-2016).

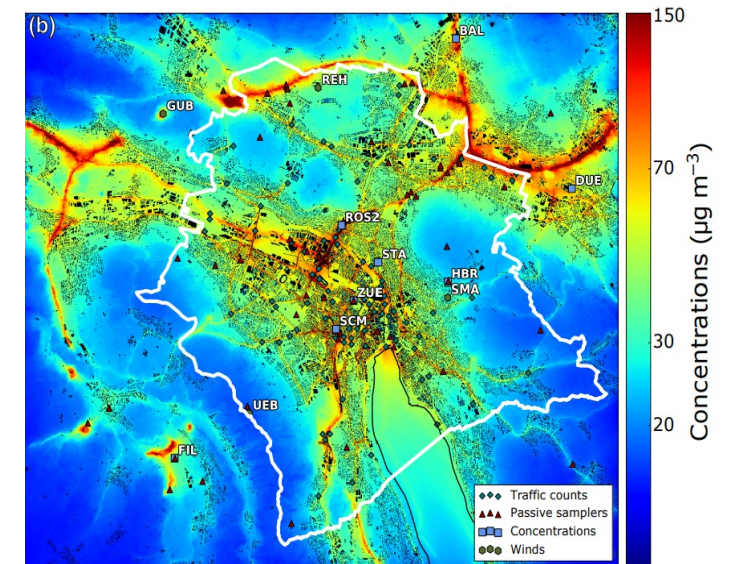
Emission Estimation

Estimating development of emissions



Modelling ambient air

Estimating air pollution development



Bernet A. et al, Evaluation of high-resolution GRAMM-GRAL (v15.12/v14.8) NO_x simulations over the city of Zürich, Switzerland, Geosci. Model Dev., 10, 3441–3459, 2017, doi.org/10.5194/gmd-10-3441-2017

Handshake

Research – Environmental policy



led to a success story

