

Air quality data

Improvements in air quality data collection and dissemination over time in the Western Balkans

Content of SwEPA/SMHI program

Main outcome: improved fulfilment of EU requirements on air quality in

Chapter 27

4 components:

1. Increased processing capacity of emission data
2. Increased capacity for guidance towards LSGs
- 3. Increased public accessibility to AQ-measurements**
4. Regional dialogue on availability, acquisition and usage of AQ-data established

Purpose

An overview of the AQ data collection and data dissemination in the Western Balkans but from the outside.

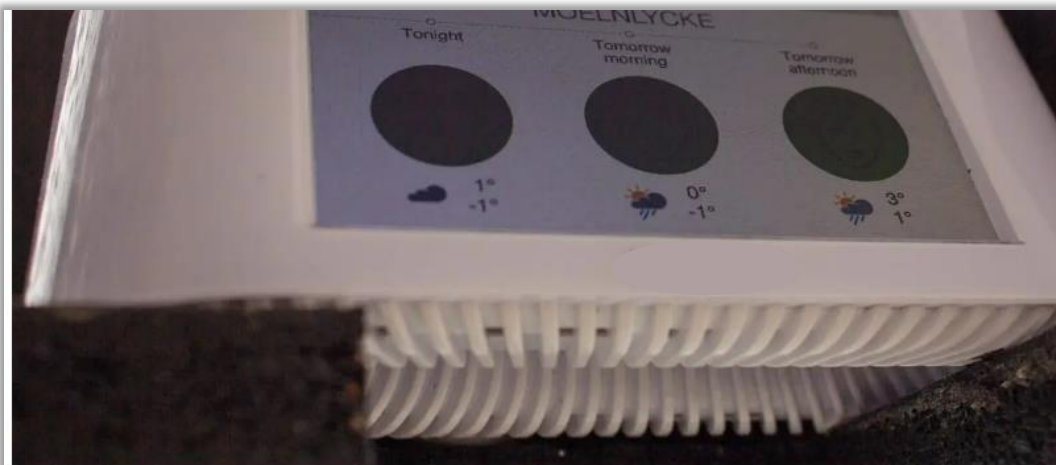
1. Through the EEA's AQ data portal, for AQ informed visitors, huge database on reported data, under last 10 years
 - tighter monitoring network along the years, (and yes, still in progress).
 - different monitoring strategies.
 - accumulated data shows some AQ improvements.
2. Through the national websites, for AQ interested visitors, with main focus on near real time data, and periodic reports.

Anecdote from Sweden – March 2023

TV4 profile Marcus Oscarsson reported that Mölnlycke has Sweden's second worst air pollution - expert dismisses the data

News • On TV 4 profile Marcus Oscarsson's blog, it is claimed that Mölnlycke has the second most air pollution in Sweden. Härryda-Posten has reviewed the information - and can today tell you how it really is.

- I would say that you can actually just dismiss these results, says Karin Söderlund, air quality



The particle mass for particles with a diameter of up to 2.5 micrometers is called PM2.5. These particles are mainly formed during combustion and when gases from the combustion condense, according to the Swedish Environmental Protection Agency. Picture: Malte Justm

Mölnlycke was singled out as the worst air polluter – Janne thinks she knows why

News • Janne Mehtola, 54, raised her eyebrows in surprise when TV4 profiler Marcus Oscarsson's claimed on his blog that Mölnlycke had the second most air pollution in Sweden. He was able to quickly reject the journalist's information as it was his measuring station that was given as the source.



Janne syndade TV4-profilens faktatabbe
I centrum för dramat: en ciggande granne

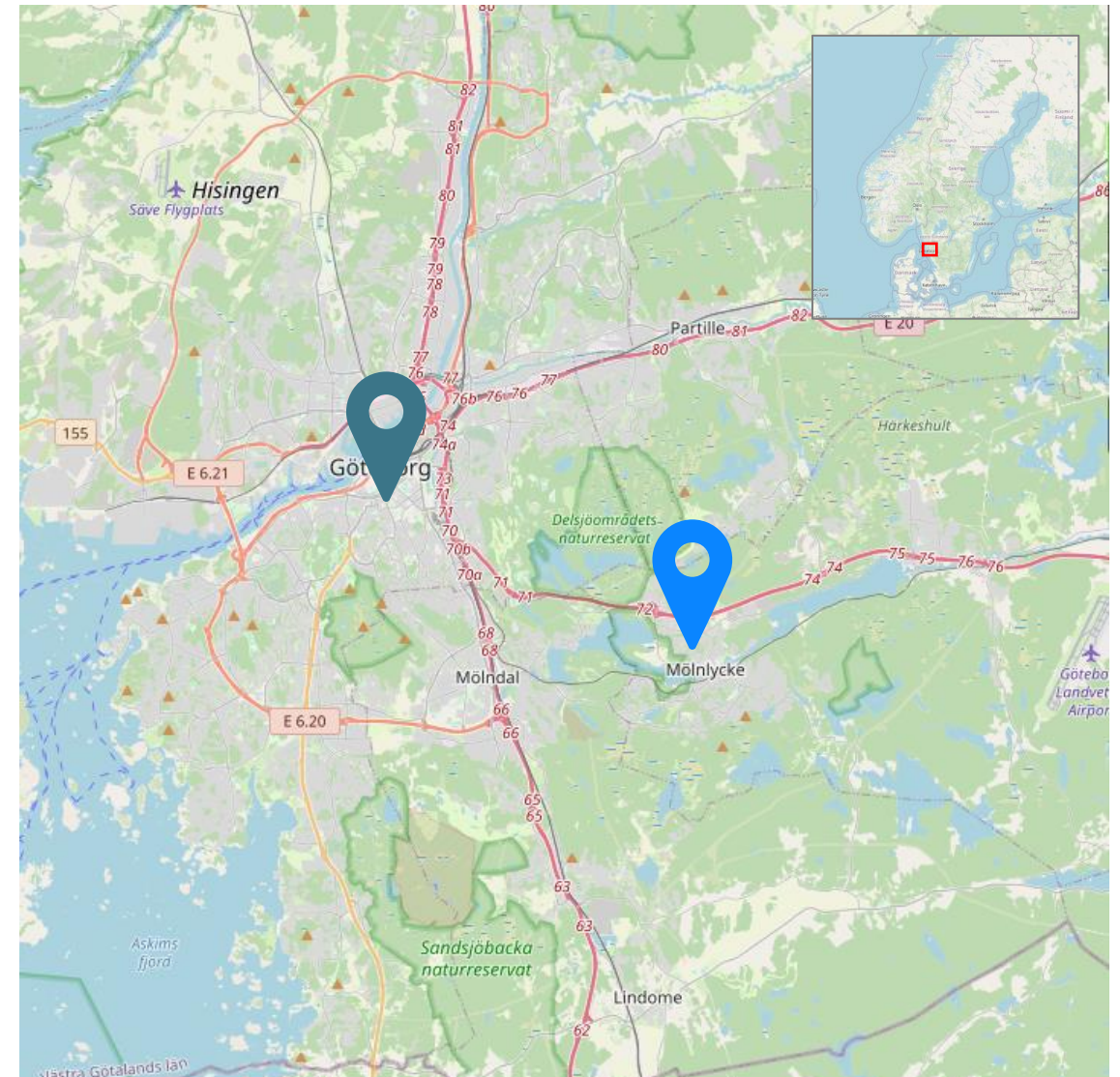
på ögonbrynen när TV4-profilen Marcus Oscarsson hade näst mest luftföroreningar i Mölnlycke. Janne Mehtola är en av de många journalister som gör journalistens uppgifter – då det var en källa.

Lesson learn 1

World-wide classification of polluted places based on :

- One pollutant the PM_{2,5}
- Some time only 1 low-cost station
- Without any maintenance nor calibration
- Unverified location

Huge communication scheme to support a business model.

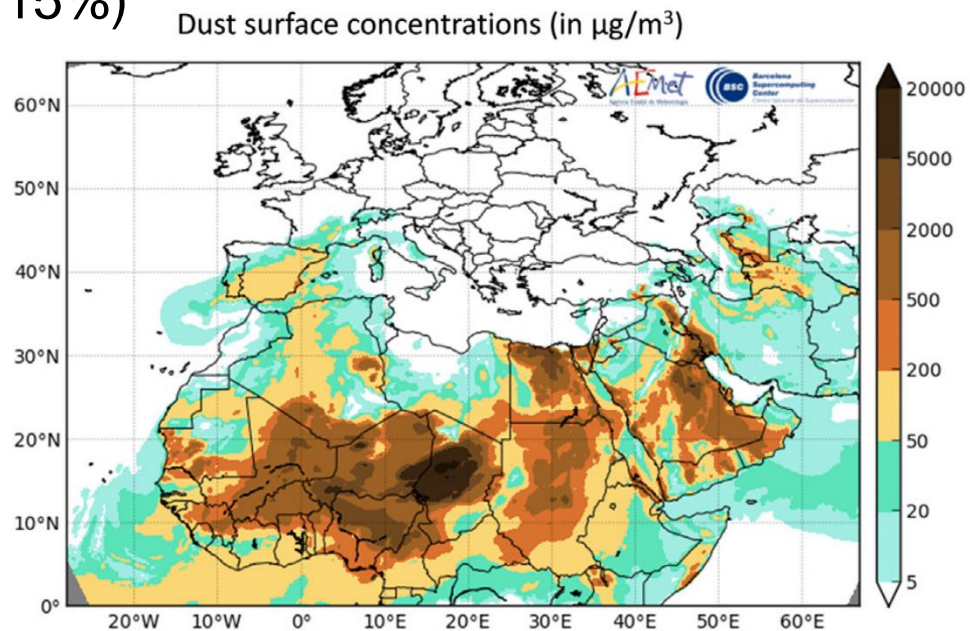


Lesson learn 2

X. Querol et al. 2019

Monitoring the impact of desert dust outbreaks for air quality for health studies,

illustration : peak 22/02/2016 up to 20 000 $\mu\text{g}/\text{m}^3$ (pm 2.5 ~ 15%)



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Environment



2 minute read · March 14, 2023 5:49 PM GMT+1 · Last Updated 21 days ago



Lahore is most polluted city, Chad worst among countries - survey

Reuters



NEW DELHI, March 14 - Lahore in Pakistan jumped more than 10 places to become the city with the worst air in the world in 2022, according to an annual global survey by a Swiss maker of air purifiers.

1 - Data dissemination - EEA's Database

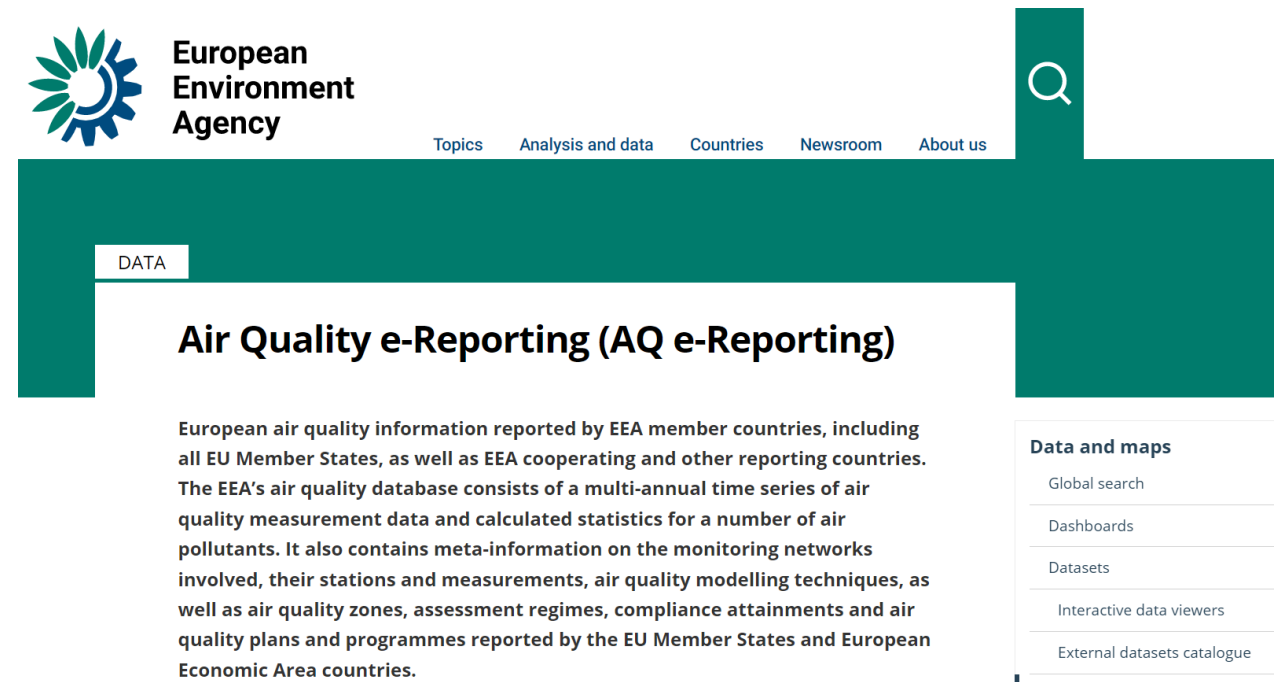
A copy of all the validated and verified data reported now through the Raven system.

Questions was:

- How much longstanding data?
- Would it be worthy to disseminate?

Yearly statistical data in:

<https://www.eea.europa.eu/data-and-maps/data/aqereporting-9>



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DATA

Air Quality e-Reporting (AQ e-Reporting)

European air quality information reported by EEA member countries, including all EU Member States, as well as EEA cooperating and other reporting countries. The EEA's air quality database consists of a multi-annual time series of air quality measurement data and calculated statistics for a number of air pollutants. It also contains meta-information on the monitoring networks involved, their stations and measurements, air quality modelling techniques, as well as air quality zones, assessment regimes, compliance attainments and air quality plans and programmes reported by the EU Member States and European Economic Area countries.

Data and maps

- Global search
- Dashboards
- Datasets
- Interactive data viewers
- External datasets catalogue

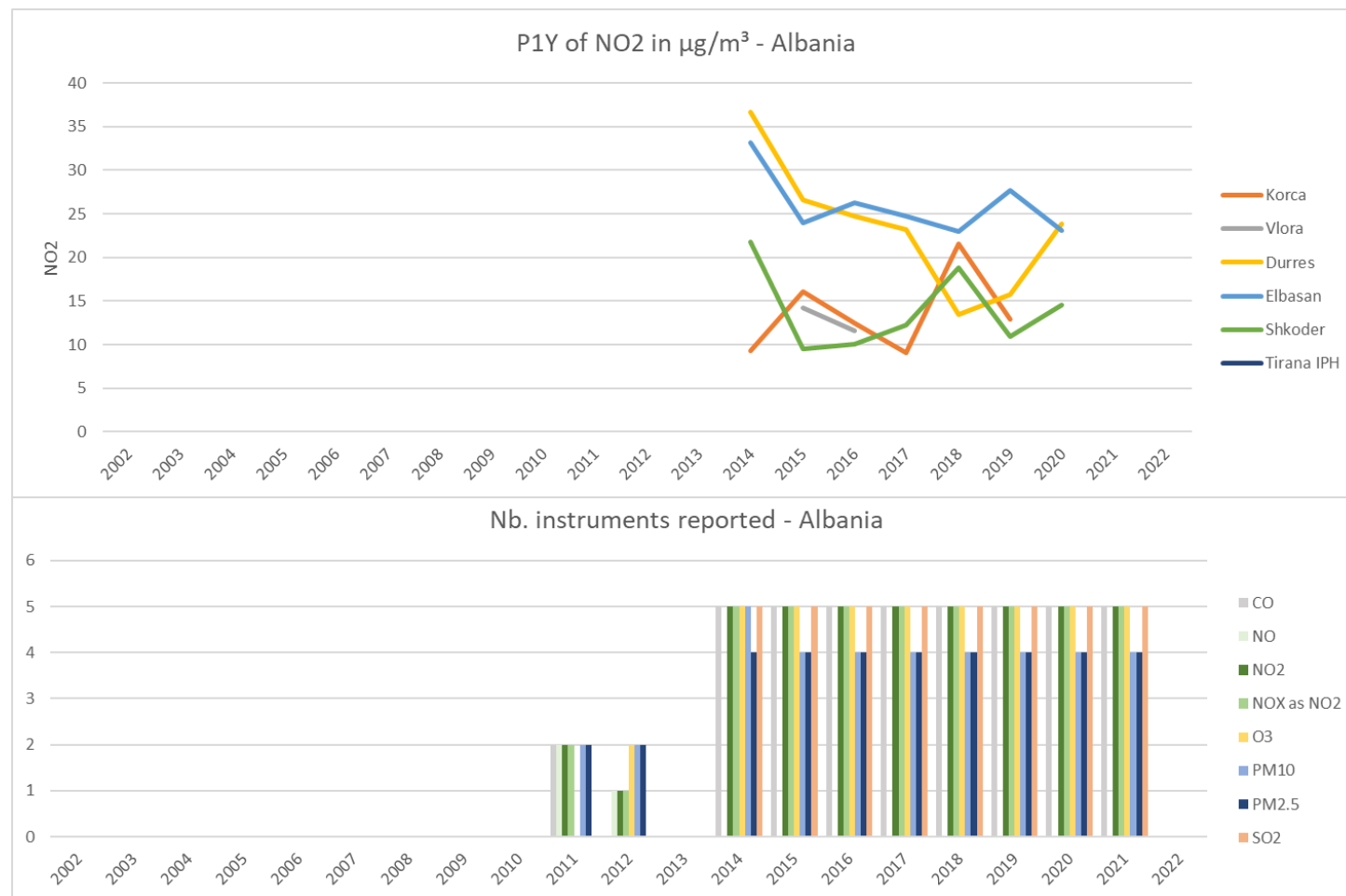
Albania

Yearly means (P1Y) showing interesting trends on NO2

Modest monitoring network in the way to be expended

Monitoring strategy :

Full panel of instruments in each stations since 2014

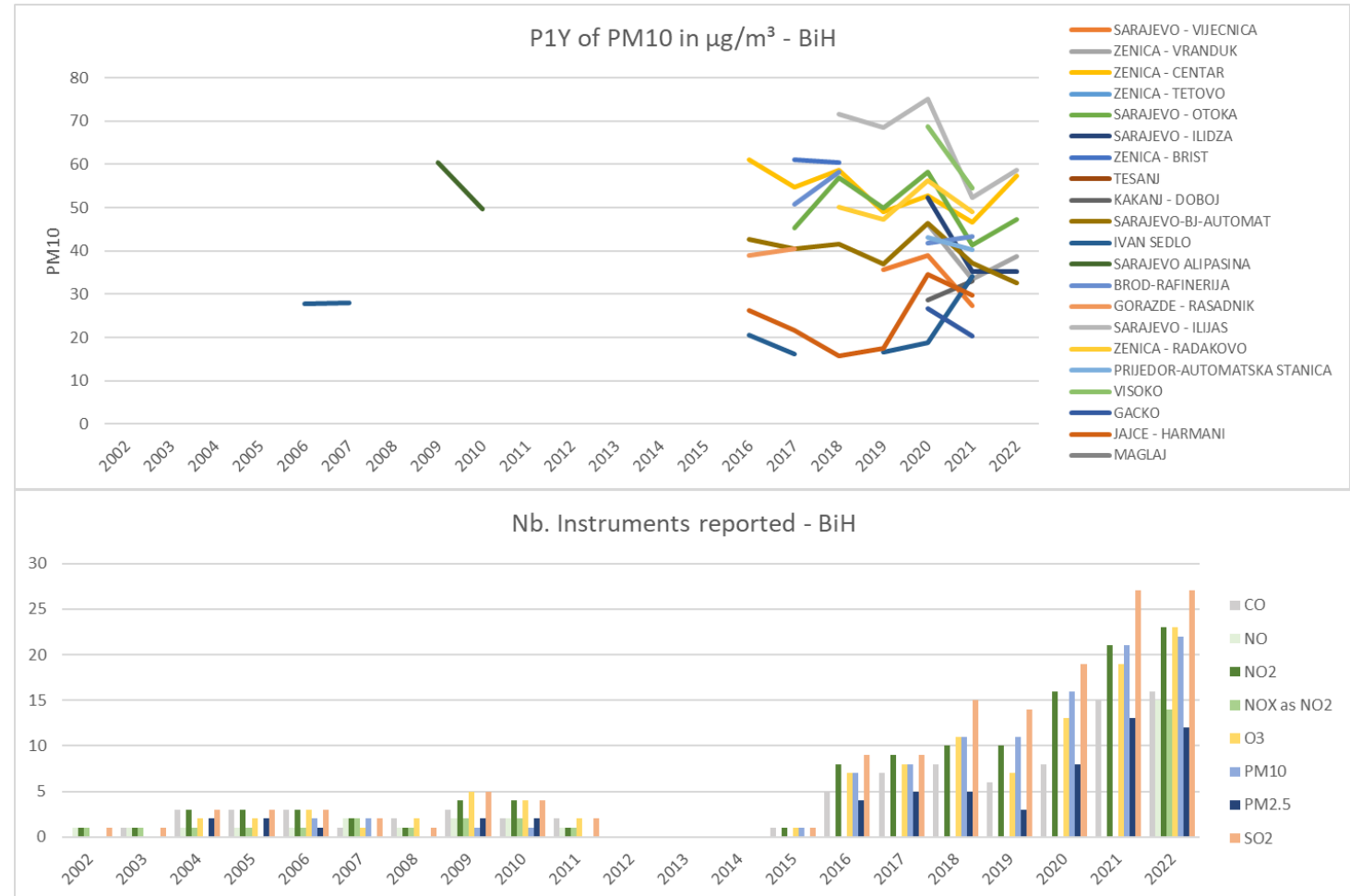


Bosnia and Hercegovina

Yearly means (P1Y) showing interesting trends on PM10

Undergoing expansion of Monitoring network.

Increase of PM2.5 instruments

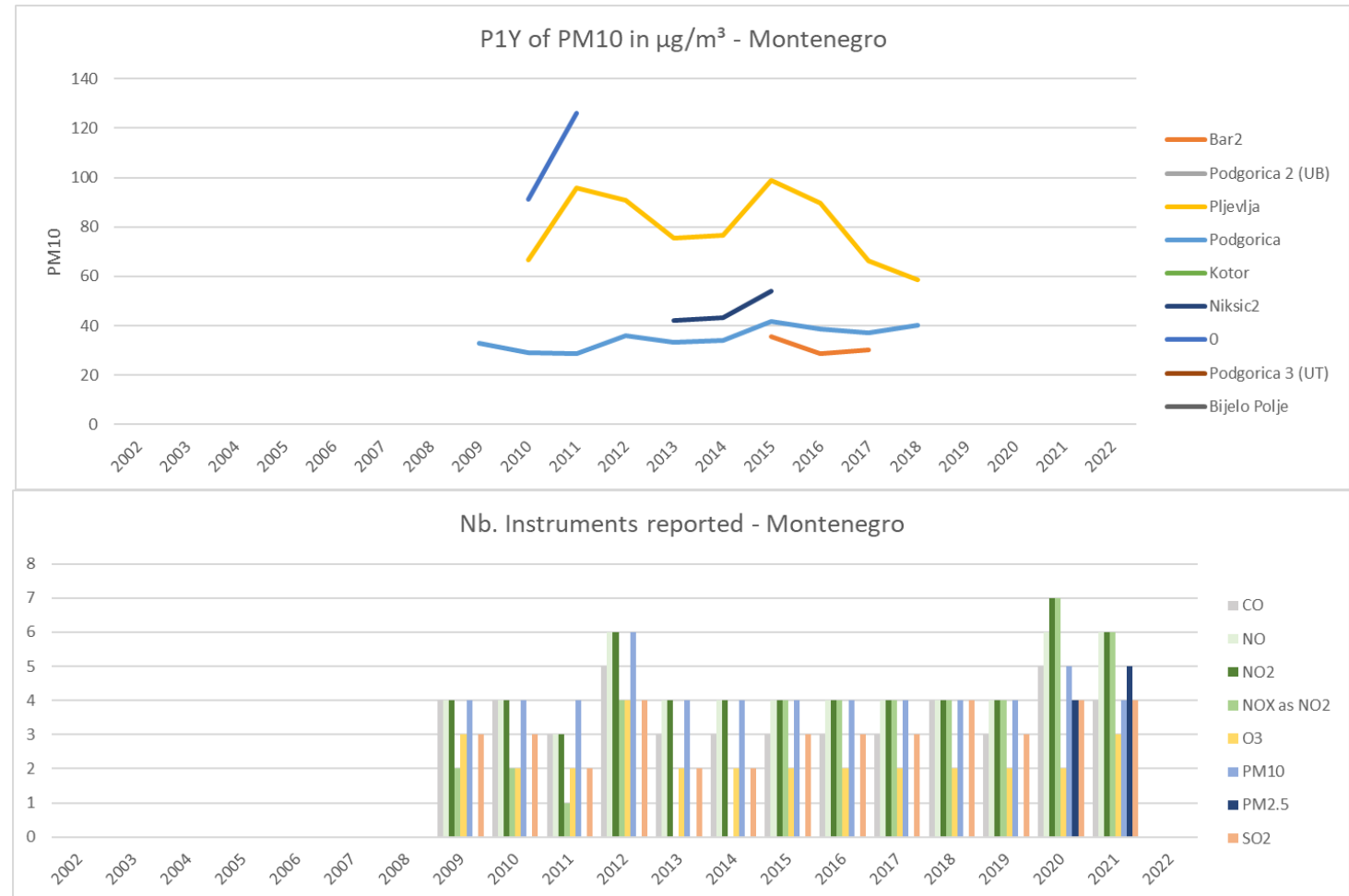


Montenegro

Yearly means (P1Y) showing interesting trends on PM10

Long and continuous time-series (gap related to a data coverage under 70%)

Consistent network with recent effort on PM 2.5

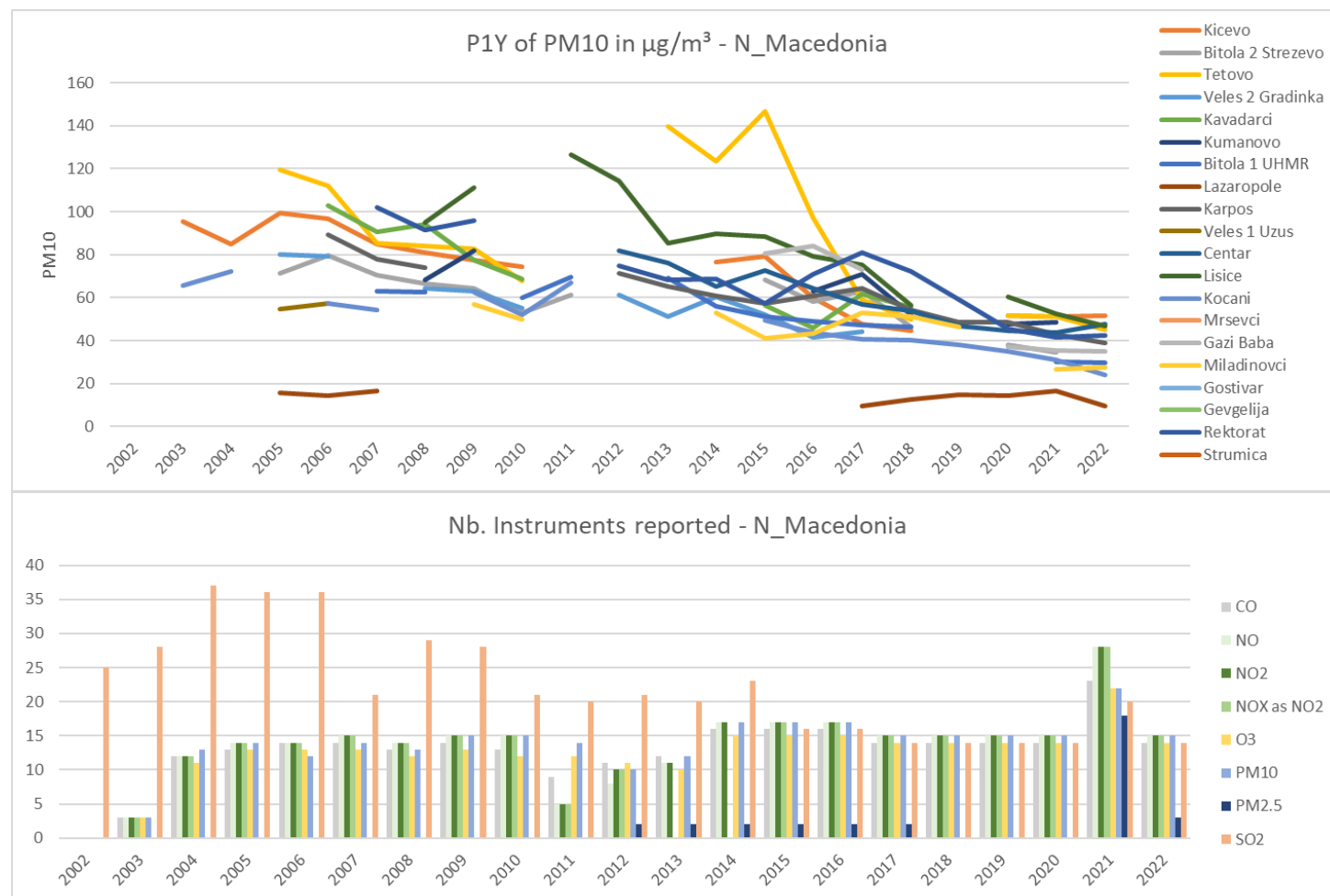


Nort Macedonia

Long standing reporting
and continuous time-series

Yearly means (P1Y) showing
long term decrease of PM10

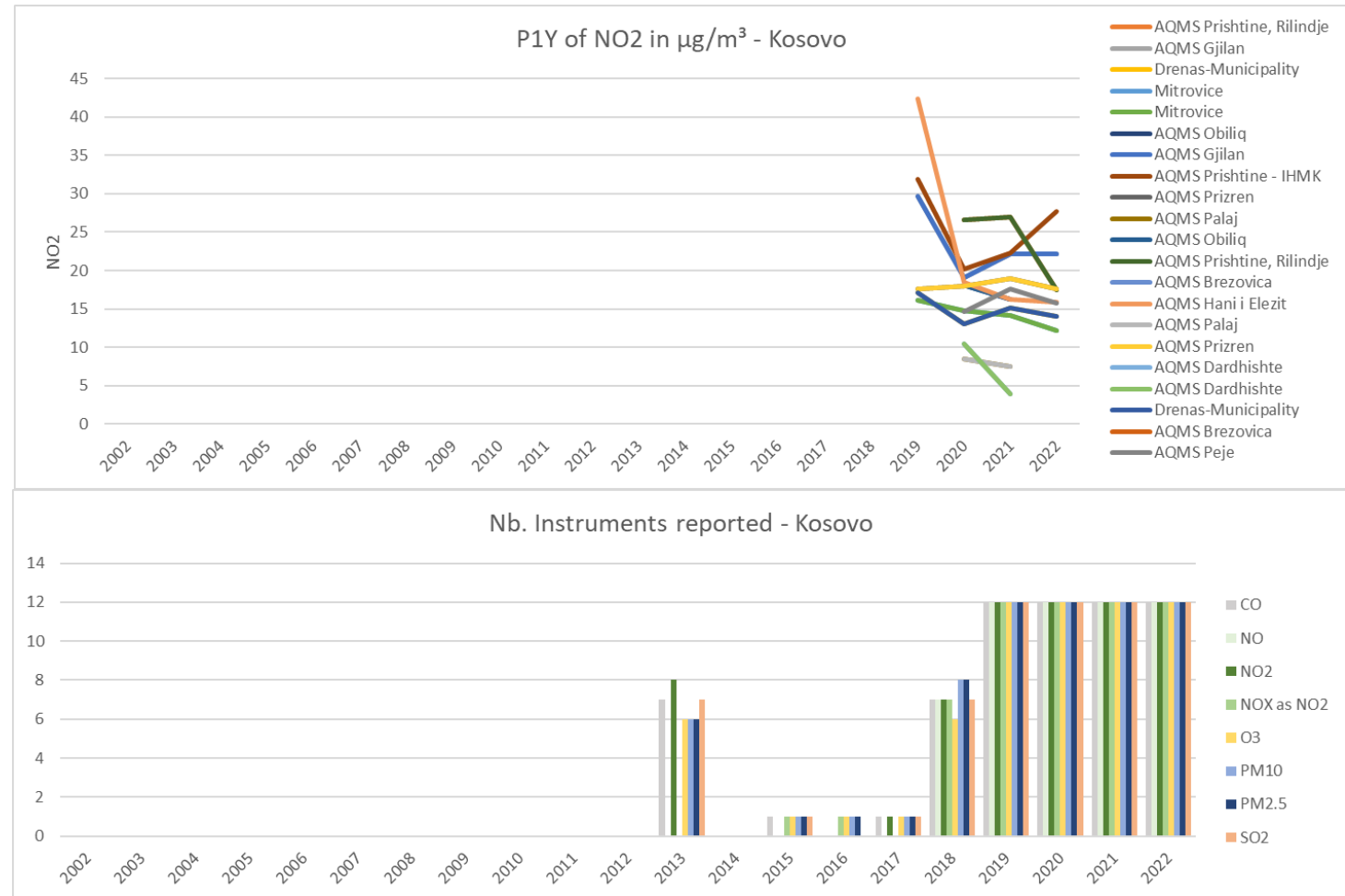
Monitoring strategy change over
the time from SO2 to other
relevant substances and
recent effort on PM 2.5



Kosovo

Yearly means (P1Y) showing interesting decrease on NO2 even considering the short period

Monitoring strategy of full panel of instruments in each stations since 2014



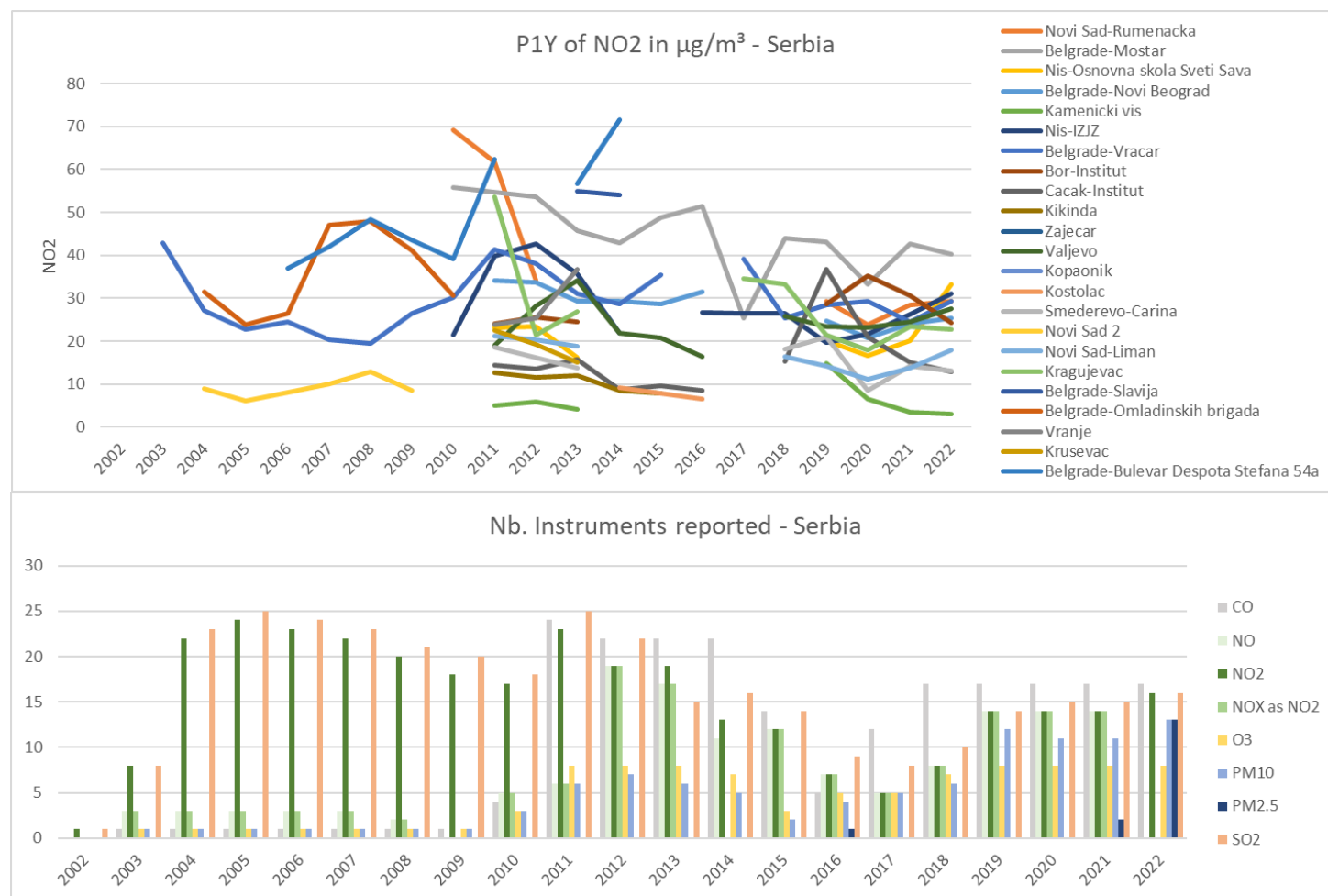
Serbia

Long standing reporting
and continuous time-series

(reshuffling of some stations?)

Yearly means (P1Y) showing
long term decrease of NO₂

Monitoring strategy change over
the time from SO₂ to other
relevant substances, among
others PM 2.5



All the Western Balkans

- More instruments are being to be installed,
- Nearly all the countries expressed a need for more stations to be compliant with assessment strategy,
- The historic data shows some progress as well as some anomalies that worth to be highlight and understood,
- This long term effort of data collection deserves dissemination for the interest of the public, the civil society, the research community, the duty bearers,
- Such reliable, sustainable, high quality, monitoring infrastructure and expertise driven by governmental agencies deserve to be valued by the communities.

2 - Data dissemination - National websites

Few examples as an attempt of screening of:

- Near Real Time measurements,
- Recent NRT measurements,
- Historical and validated measurements,
- Statistic on exceedances.

Montenegro

- Near real time visualisation,
- Graph 7 days back,
- Graph preliminary data with several pollutant in a graph,
- Statistics about exceedances in reports.



North Macedonia

- Near real time visualisation,
- Graph historical data up to one year with one pollutant in a graph (or all),
- Statistics about exceedances on line.

The screenshot displays the Air Quality Portal interface. At the top, it identifies the Ministry of environment and physical planning – Republic of North Macedonia. The main navigation bar includes links for 'Air quality now', 'Background information', 'Exceedances', 'Reports', 'News', and 'Contact us'. A dropdown menu shows 'North Macedonia' and 'Pollutant with the highest concentration'. Below this is a map of North Macedonia with several monitoring stations marked with green pins. A smaller inset window shows a table of 'NO₂ hourly exceedances' and a line graph titled 'Hourly NO₂ concentrations for Rektorat'. The graph shows concentration in µg/m³ over time from August 5th to August 31st, 2022. The y-axis ranges from 0 to 100 µg/m³. The graph shows significant fluctuations, with peaks reaching approximately 90 µg/m³. A control panel on the right allows users to select the station (Rektorat), parameter (Nitrogen Dioxide (NO₂)), start and end dates (2022-08-04 to 2022-08-31), time interval (1h, 8h, 24h), and presentation (Graph, Table).

NO₂ hourly exceedances

Below are the latest dates of the NO₂ number of exceedances during the current period.

Alert threshold of NO₂ is 400 µg/m³. Let

Exceedances through: 19-04-2023

Station	Latest Exceedance
Gazi Baba	-
Karpos	-
Lisice	2023-01-04 16:00
Mobile Station-Gjorce Petrov	-
Miladinovci	-
Bitola 1	-
Bitola 2	-

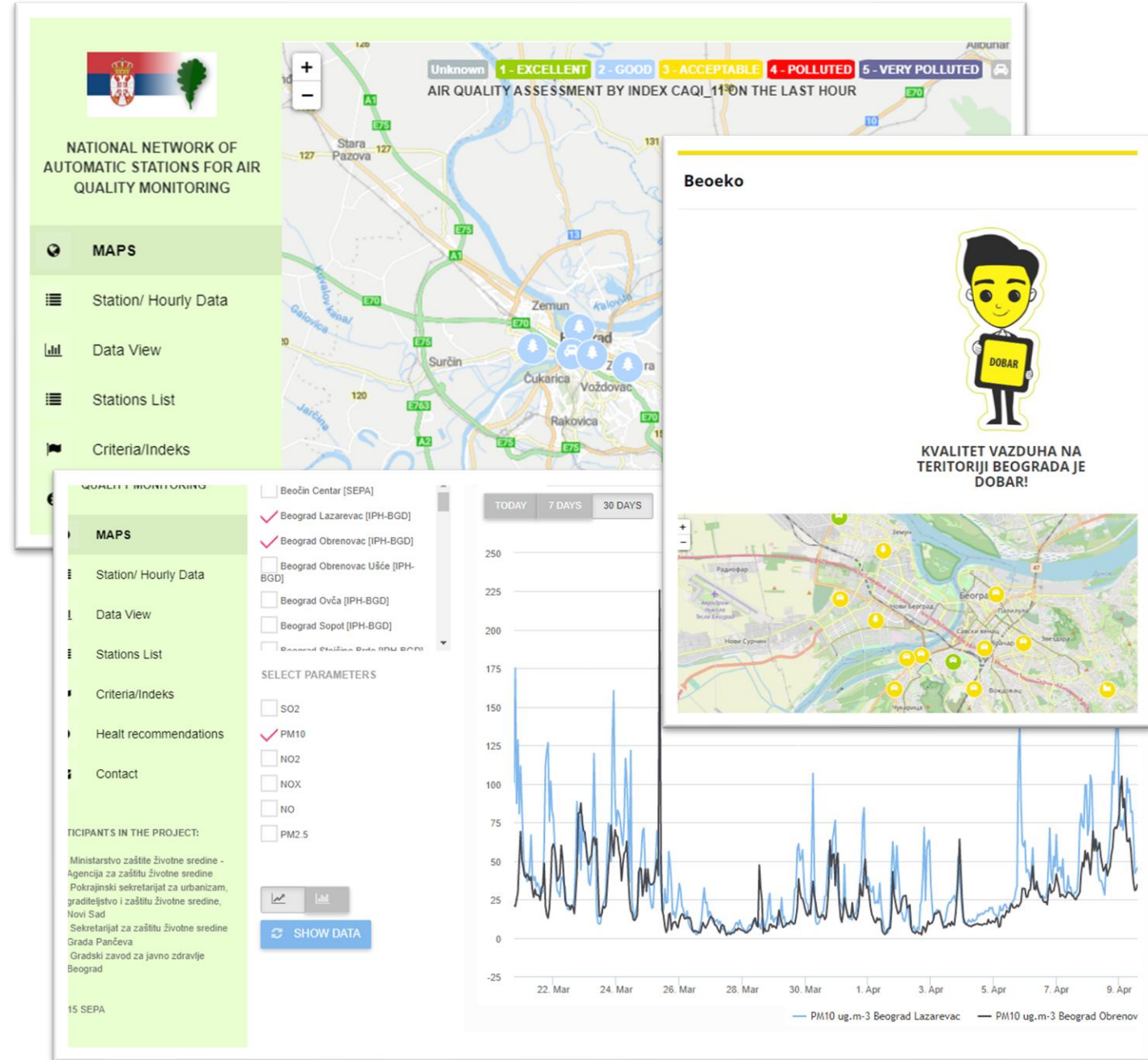
Hourly NO₂ concentrations for Rektorat

µg/m³

Station: Rektorat
Parameter: Nitrogen Dioxide (NO₂)
Start date: 2022-08-04 18:00
End date: 2022-08-31 18:00
Time interval: 1h (selected)
Presentation: Graph (selected)

Serbia

- Near real time visualisation,
- Graph near real time data with several pollutants in a graph,
- Graph up to one month back,
- Statistics about exceedances in reports.



Part of the project : Data portal free to install

What are we looking for with such data portal:

- Make more straight forward the navigation in AQ data, directly from the map,
- Highlights the quality of such equipment and maintenance team,
- Make possible to share the costs for maintenance of such data portal in a community of Raven users,
- Gather a critical mass of users to ensure technical and financial support,
- Lead to furthermore users.

Data dissemination in Sweden

Air quality portal since 2021

Important work with user friendliness

The three stars:

- National Emission database,
- Environmental monitoring database,
- Air quality data collection,

About 14 000 visitors before launching the last:

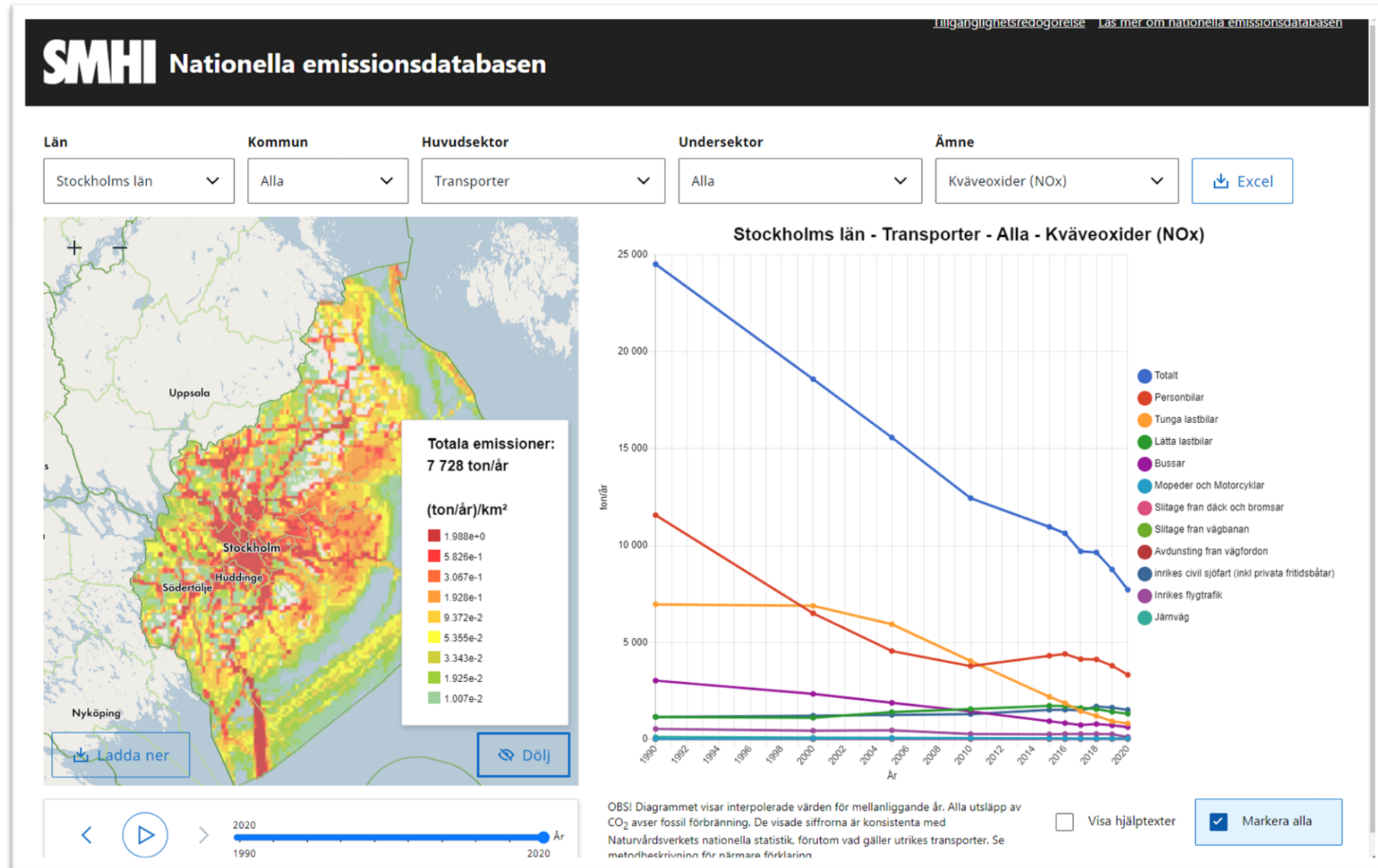
- near real time dissemination web site.

More visitors expected in 2023 on luftwebb.se ([link](#))

National Emission database

Example:

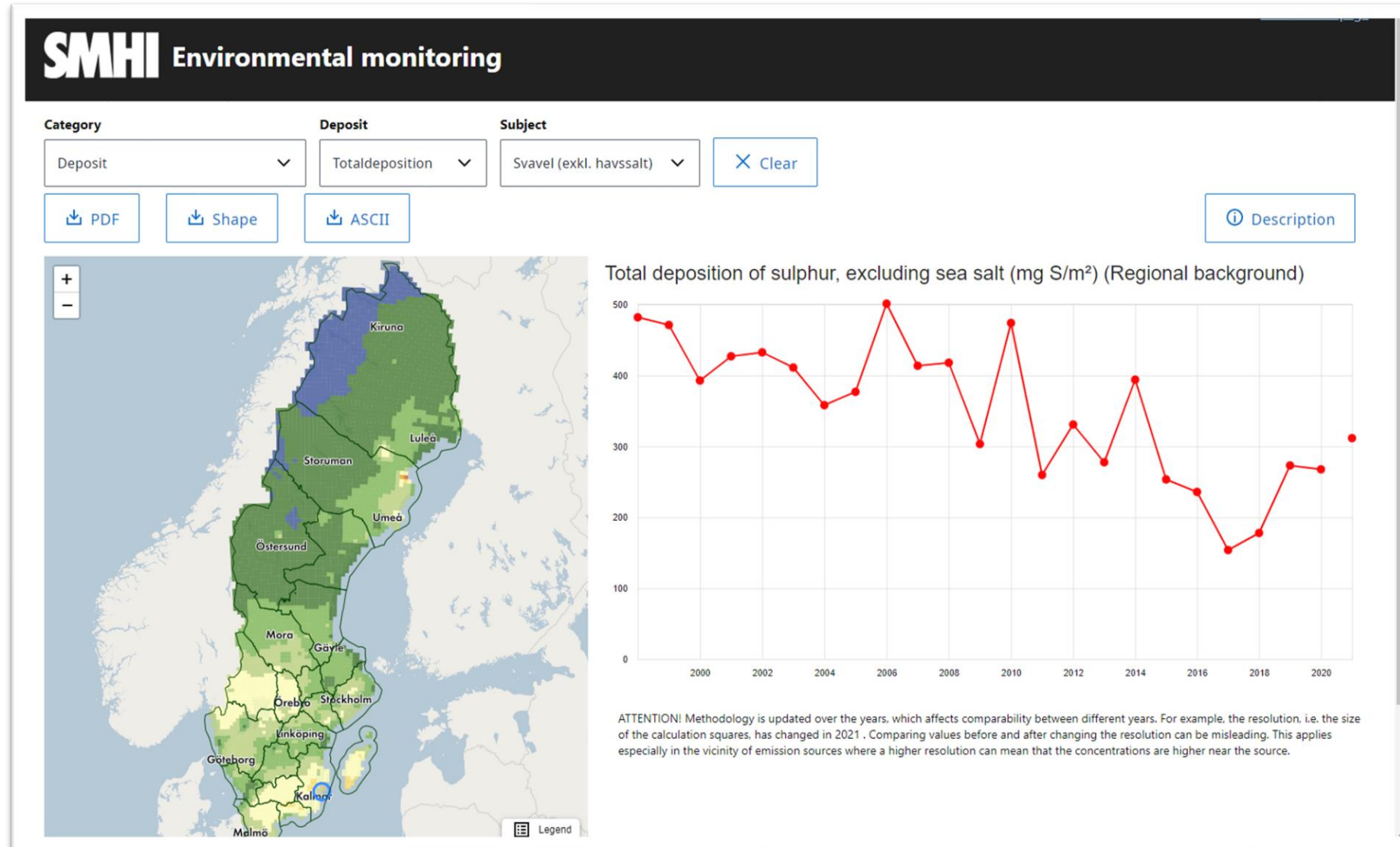
- Region Stockholm
- Transport sector
- NOx
- 1990 – 2020
- Animated map



Environmental Monitoring

Example:

- Deposition
- Total
- Sulfure
(without seasalt)
- Specific graph
1998 - 2021
in Kalmar region



Air quality data collection

Example:

- 2 stations
- NO2
- 2021 & 2022
- Lower assessment threshold overwritten (yellow)
- Higher AT
- Limit Value

The screenshot shows a web interface for air quality data collection. It features several filter panels at the top: County (Västra Götaland county), Municipality (Gothenburg), Station (Gothenburg Farm and Gothenburg Haga), Subject (NO2, PM10, PM2.5), Year (2021, 2022), Area classification (Urban), and Classification (Traffic). Below the filters is a 'Results' section with a 'Download all' button. The main content is a table titled 'NO2 (Nitrogen dioxide)' with various filters like 'All', 'Exceeds MKN', and 'Exceeds the Environmental Target'. The table has columns for Year, Station, National station code, Classification, Inlet ID, Average NO2 (µg/m³), and various metrics for days and hours exceeding thresholds. The table shows data for 2021 and 2022 for two stations: Gothenburg Farm and Gothenburg Haga. The 'Average NO2' column is highlighted in yellow for the 2021 data points, indicating that the assessment threshold has been overwritten.

Year	Station	National station code	Classification	Inlet ID	Average NO2 µg/m³ (NUT=26, ÖUT=32, MKN=40, target=20)	Number of days NO2 > 60 µg/m³ (MKN=7)	Number of days NO2 > 48 µg/m³ (ÖUT=7)	Number of days NO2 > 36 µg/m³ (NUT=7)	98% daily NO2 µg/m³ (MKN=60)	Max hourly NO2 µg/m³	Number of hours NO2 > 54 µg/m³ (NUT=175)	Number of hours NO2 > 72 µg/m³ (ÖUT=175)	Number of hours NO2 > 90 µg/m³ (MKN=175)	Number of hours NO2 > 100 µg/m³ (NUT=18)	Number of hours NO2 > 140 µg/m³ (ÖUT=18)	Number of hours NO2 > 200 µg/m³ (MKN=18)	Number of hours NO2 > 60 µg/m³ (Environmental target=175)	98% hourly NO2 µg/m³	Max hourly NO2 µg/m³	Time resolution		
2022	Gothenburg Farm	9028	Urban Traffic	167	21.19	364	0.00	11 a.m	29.00	50.07	54.53	8737	380.00	107.00	27.00	10.00	0.00	0.00	260.00	65.14	111.87	Hourly
2022	Gothenburg Haga	11636	Urban Traffic	298	12.93	364	0.00	1.00	6.00 a.m	34.90	53.52	8733	95.00	17.00	4.00 a.m	0.00	0.00	0.00	50.00	47.54	96.27	minute
2021	Gothenburg Farm	9028	Urban Traffic	167	24.46	364	6.00 a.m	23.00	61.00	57.14	91.50	8744	656.00	261.00	96.00	43.00	0.00	0.00	488.00	78.12	134.65	Hourly
2021	Gothenburg Haga	11636	Urban Traffic	298	13.98	364	0.00	3.00 a.m	3 p.m	40.47	58.09	8727	168.00	31.00	5.00	2.00 a.m	0.00	0.00	111.00	53.78	131.58	minute



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