INZRAK

Enhanced environmental protection inspection for efficient control of air quality monitoring and of all entities under obligation within system of greenhouse gas emission allowance trading, in order to achieve better quality of air in Republic of Croatia

REPUBLIKA HRVATSKA
MINISTARSTVO ZAŠTITE OKOLIŠA I ENERGETIKE

EKONERG

safu SREDIŠNJA AGENCIJA ZA FINANCIRANJE I UGOVARANJE

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EKONERG Energy research and Environmental Protection Institute

INZRAK

TOPIC 15: Web reporting (benefits for target groups)

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15.1 REASONS FOR WEB REPORTING

CAFE Directive 2008/50/EC, chapter INFORMING AND REPORTING, Articles 26. – 28.

Public informing- Article 26.

Member States shall ensure that **the public**, as well as relevant organizations such as environmental protection organizations, consumer protection organizations, organizations representing the interests of vulnerable groups of the population, other relevant health protection authorities and industrial associations are informed **in an appropriate and timely manner on air quality and air quality improvement plans and programs**.

Information must be made **available free of charge through all easily available media, including the Internet** or any other telecommunication medium.

Member States must **allow public access to annual reports** for all pollutants covered by the Directive. These reports represent **a summary of levels** that exceed limit values, target values, long-term goals, informing thresholds, and alert thresholds for relevant averaging periods.

15.1 REASONS FOR WEB REPORTING

CAFE Directive 2008/50/EC, chapter INFORMING AND REPORTING, Articles 26. – 28.

Transmission of information and reporting - Article 27.

Member States shall ensure that **information on air quality is available to the Commission within the prescribed time**, as determined by **implementing measures.** For the purposes of assessing compliance with the limit values and critical levels and achieving the target values, such information shall be submitted to the Commission not later than nine months after the end of each year.

Implementing measures - Article 28

The Commission also finds ways to streamline the dana submission and mutual exchange of information and data from networks and individual monitoring stations for the measurement of air pollution within Member States.

15.1 REASONS FOR WEB REPORTING

PUBLIC INFORMING- Annex 16 of CAFE Directive

Member States shall ensure that **updated information on concentrations of air pollutants covered by the CAFE Directive is regularly available to the public**.

Information includes all levels that exceed the air quality targets, including limit values, target values, alert thresholds, informing thresholds, or long-term goals for pollutants defined by regulations. They also include a brief assessment of the air quality objectives and appropriate information on the effects on health or, where appropriate, vegetation.

Information on concentrations of sulfur dioxide, nitrogen dioxide, particulate matter (at least PM10), ground ozone and carbon monoxide in the air are updated at least once a day, and whenever possible every hour.

Information on concentrations of lead and benzene in the air, expressed as the average values for the last 12 months, is updated every three months, and whenever possible, every month.

15.1 REASONS FOR WEB REPORTING

Commission Implementing Decision IPR (2011/850/EU) - sets out the rules for Directives 2004/107 / EC and 2008/50 / EC with regard to mutual exchange of information and reporting on air quality.

The scope of this Decision covers annual reporting on air quality assessment and delivery of information on plans and programs.

The Decision also stipulates that the Commission, with the assistance of the European Environment Agency, should establish an Internet interface called the **Air Quality Portal**, where Member States should make available information on air quality and where the public will have access to environmental information published by Member States.Member States and the Commission must collect, exchange and evaluate the latest information on air quality to better understand the effects of air pollution and develop appropriate policies. In order to facilitate the processing and comparison of the latest air quality information, the most recent information should be made available to the Commission in the same standardized form as verified data, within a reasonable time after being made available to the public.

15.1 REASONS FOR WEB REPORTING

The Ordinance on Air Quality Monitoring (OG 79/17) - also prescribes the manner of regular public informing.

PUBLIC INFORMING- Article 25

The Ministry, the Meteorological and Hydrological Service, the local and regional self-government units and the Agency shall ensure that the public as well as relevant organizations such as environmental protection organizations, consumer protection organizations, organizations representing the interests of vulnerable population groups, other relevant health protection authorities and industrial associations, are informed in an appropriate and timely manner on the available information as follows:

– concentrations of **sulfur dioxide, nitrogen dioxide and particulate matter** in the air are published daily, and in the case of hourly values for sulfur dioxide and nitrogen dioxide, **every hour**

15.1 REASONS FOR WEB REPORTING

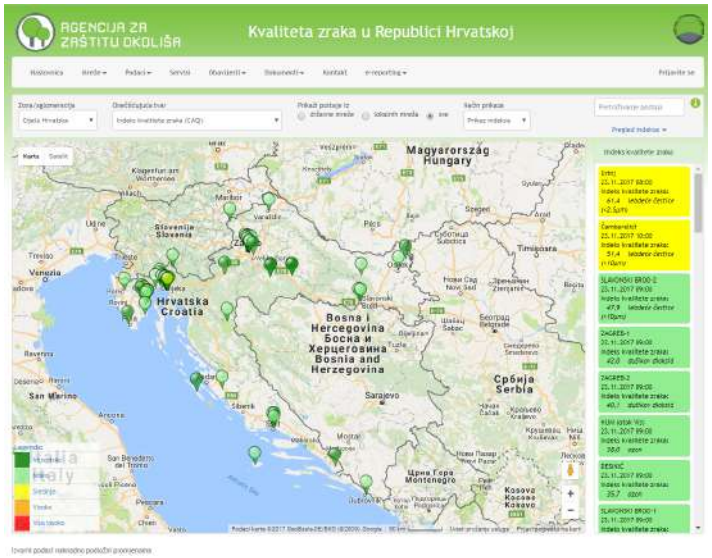
– **benzene** concentrations in the air, **as the average values of the last 12 months**, are published at least every three months and, if possible, **every month**

- concentrations of **carbon monoxide** in the air, as the highest **eight-hour average**, are published daily and, if possible, **every hour**
- concentrations of **hydrogen sulphide** in the air, are published **every hour**
- concentrations of **ammonia** in the air are published **daily and / or every hour**
- concentrations of **ground-level ozone** in air are reported daily as the **highest eight-hour average**, and if possible, **every hour**
- **action plans for improving air quality, short-term action plans and the Air Protection Plan** in accordance with the Air Protection Act..

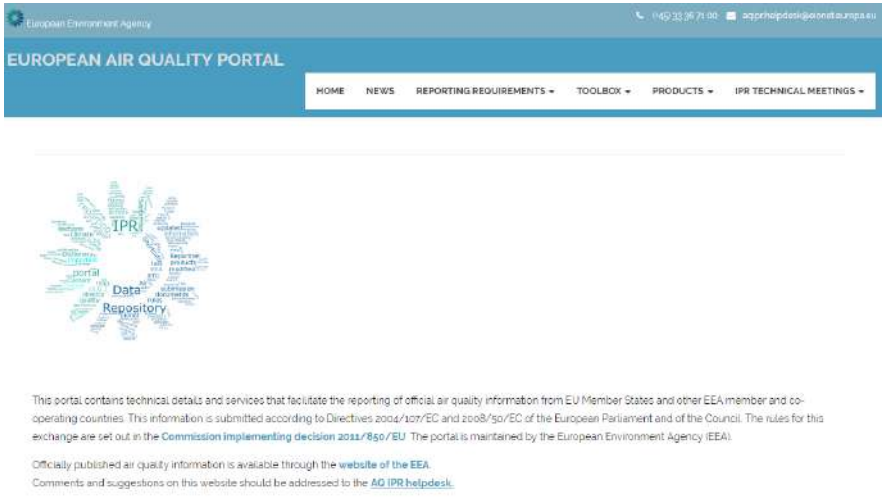
This information is also published in a **machine - readable form**, together with other general information on air quality, on the Agency's website.

15.2 „NEAR REAL TIME" REPORTING

Reporting "Near Real Time" (**NRT**) data (former name) or Up To Date (**UTD)** of data (new name) takes place every hour by transferring the .xml file with the air quality data from the portal "**Air quality in the Republic of Croatia"** to the **European Air Quality Portal.**



.xml

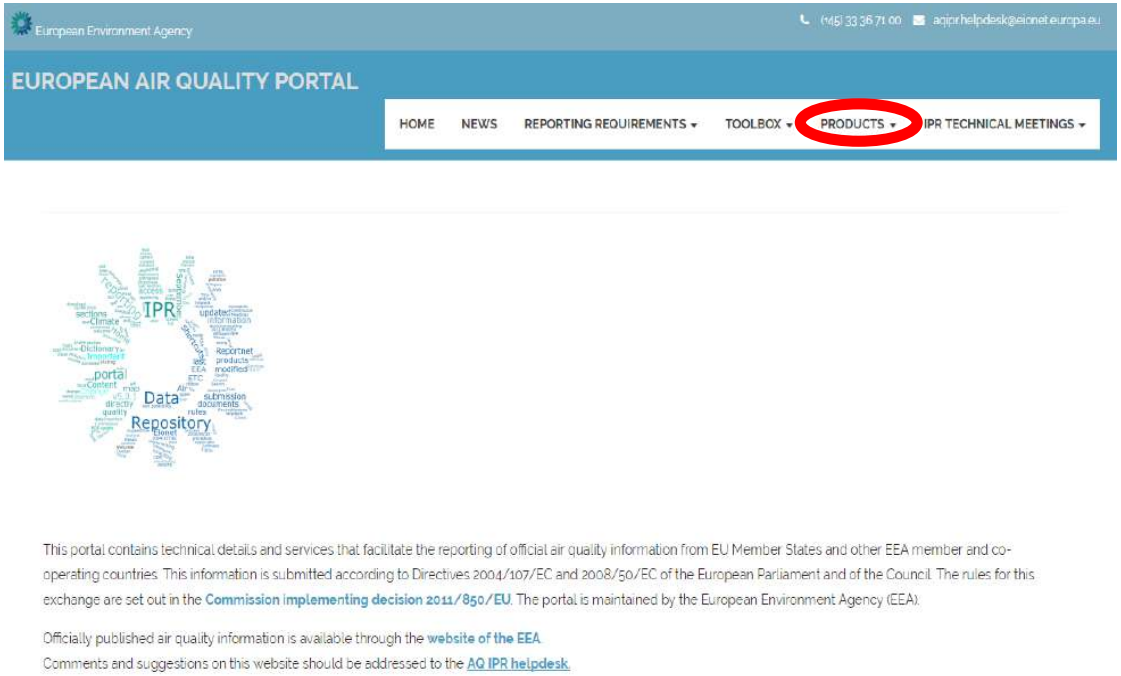


15.2 „NEAR REAL TIME" REPORTING

Europen Air Quality Portal

The display of submitted **UTD** data is enabled via the browser / tool on the **European Air Quality Portal**, developed, maintained and managed by EEA

The portal contains browsers / tools that allow you to track the data delivery process and can be accessed through the menu bar in the PRODUCTS tab.



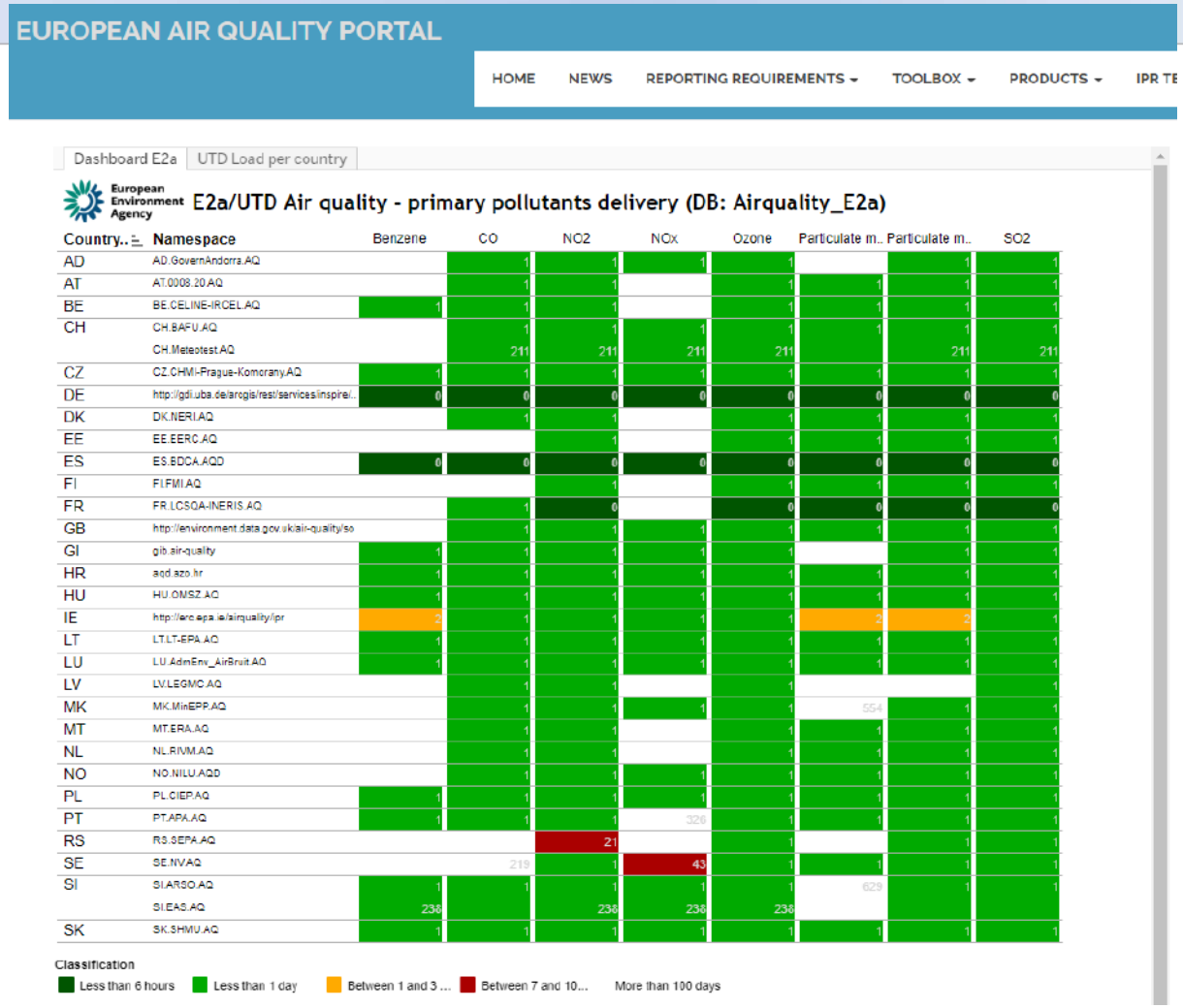
http://eeadmz1-cws-wp-air.azurewebsites.net/

15.2 „NEAR REAL TIME" REPORTING

UTD data delivery status

- For each country time of UTD data submission is shown for each pollutant in the tab: PRODUCTS / SUBMISSION MONITORING / DATA MONITOR-E2A (UTD)

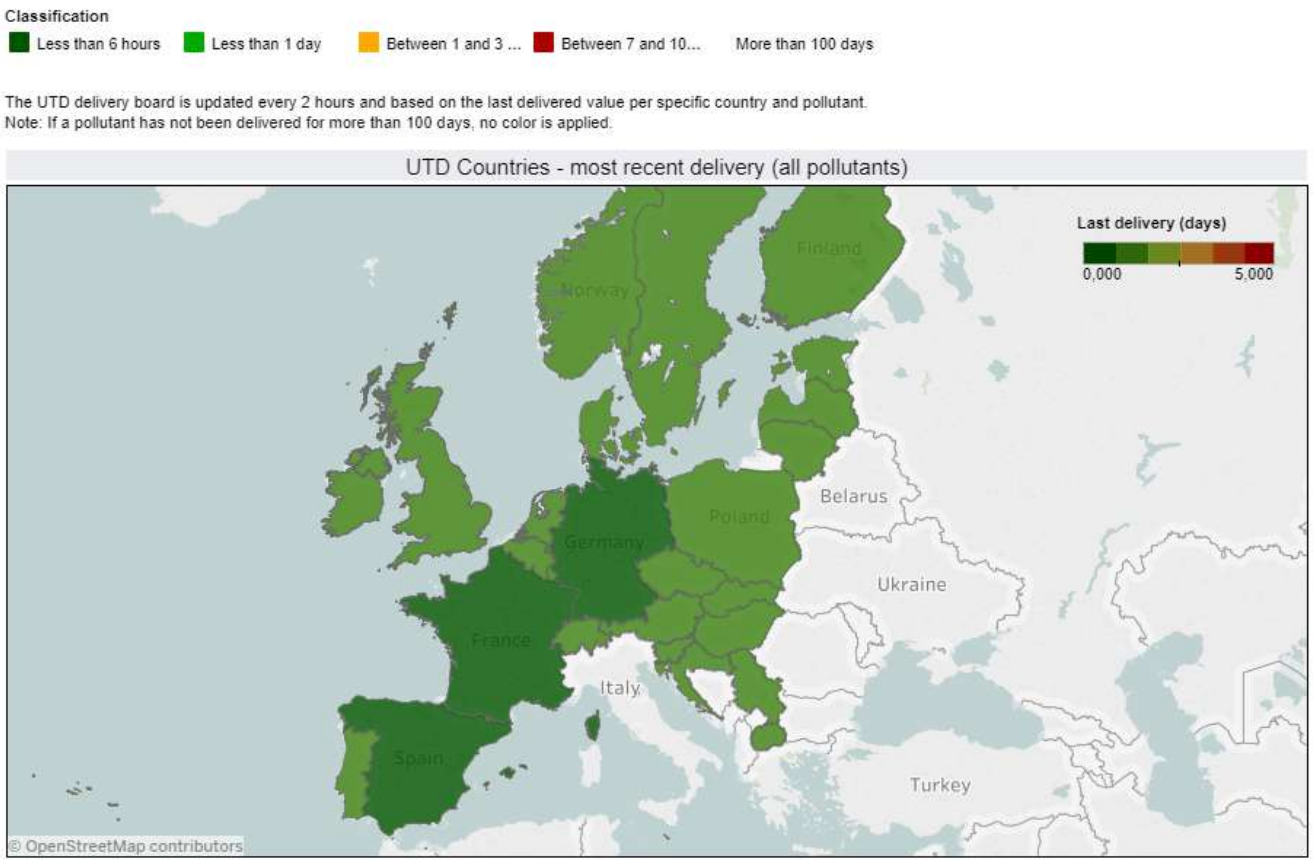
http://eeadmz1-cws-wp-air.azurewebsites.net/products/submission-monitoring/data-submission-e2a-utd/



15.2 „NEAR REAL TIME" REPORTING

UTD data delivery status

The same is shown on the map - for all pollutants

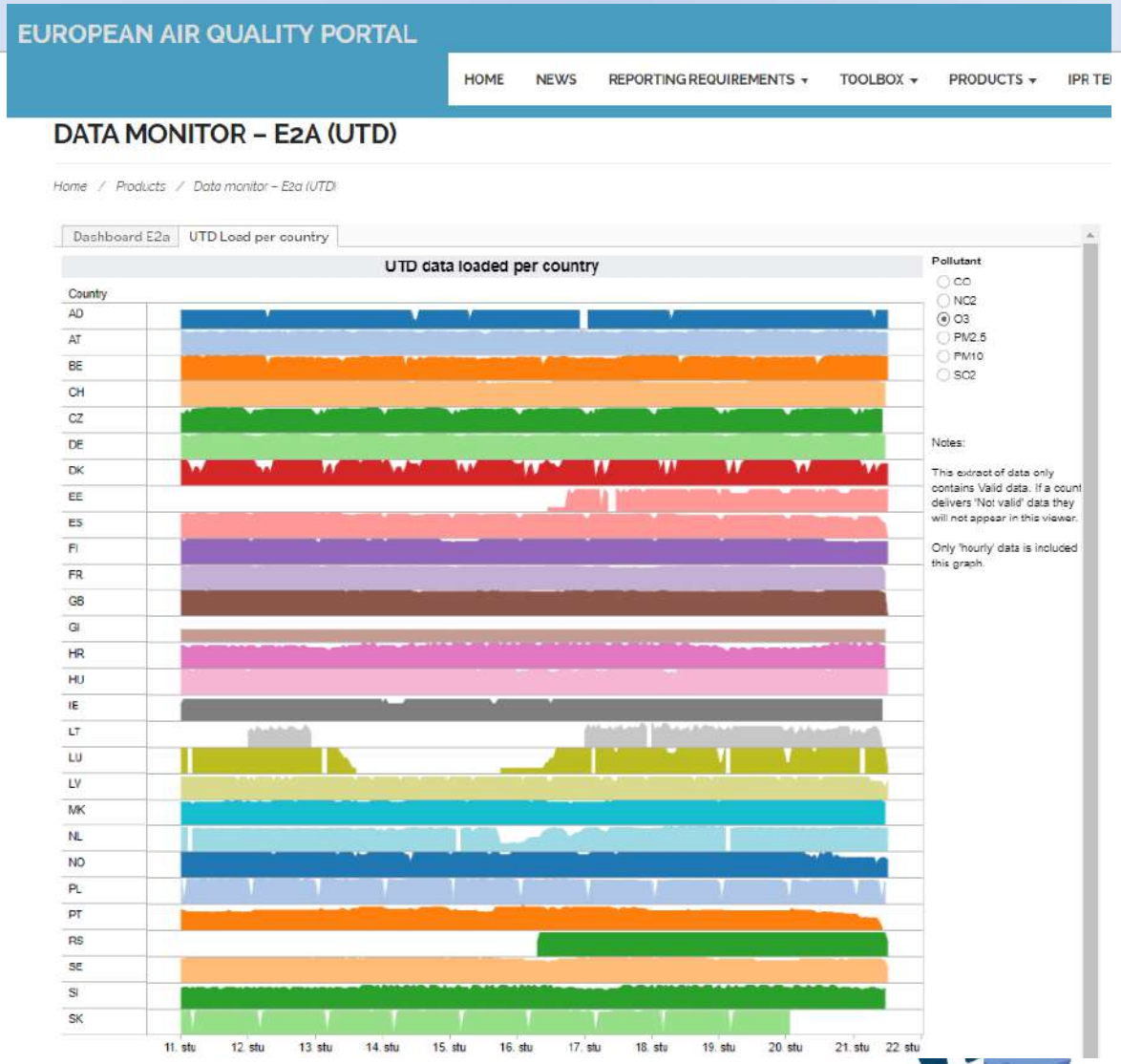


http://eeadmz1-cws-wp-air.azurewebsites.net/products/submission-monitoring/data-submission-e2a-utd/

15.2 „NEAR REAL TIME" REPORTING

UTD data delivery status

The quantity of submitted UTD data is also graphically displayed - for each country for each pollutant



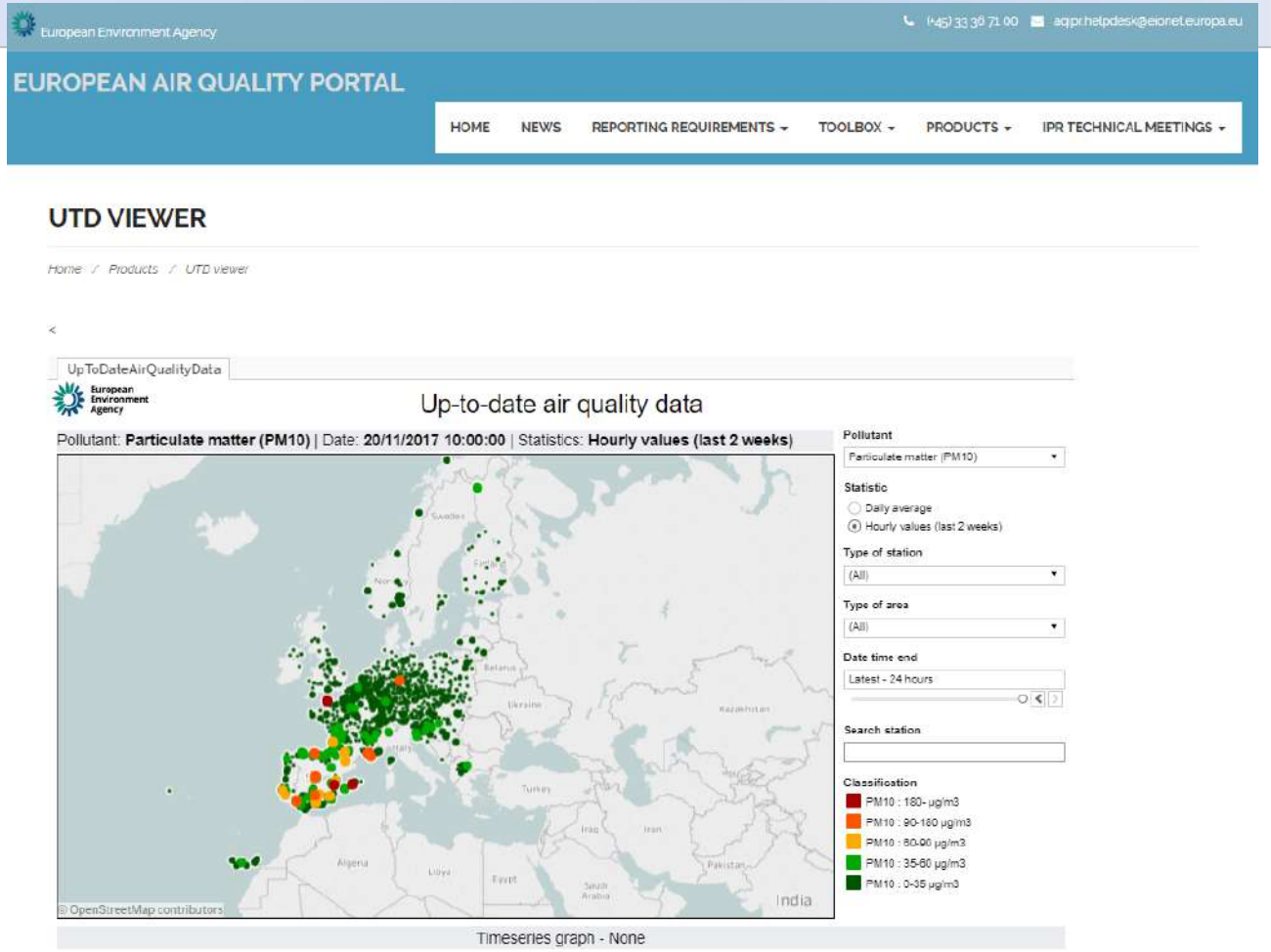
http://eeadmz1-cws-wp-air.azurewebsites.net/products/submission-monitoring/data-submission-e2a-utd/

15.2 „NEAR REAL TIME" REPORTING

UTD data

can be viewed on the browser in the tab: PRODUCTS / DATA VIEWERS / UTD VIEWERS :

The UTD data can be browsed by pollutant, averaging time and type of station and area



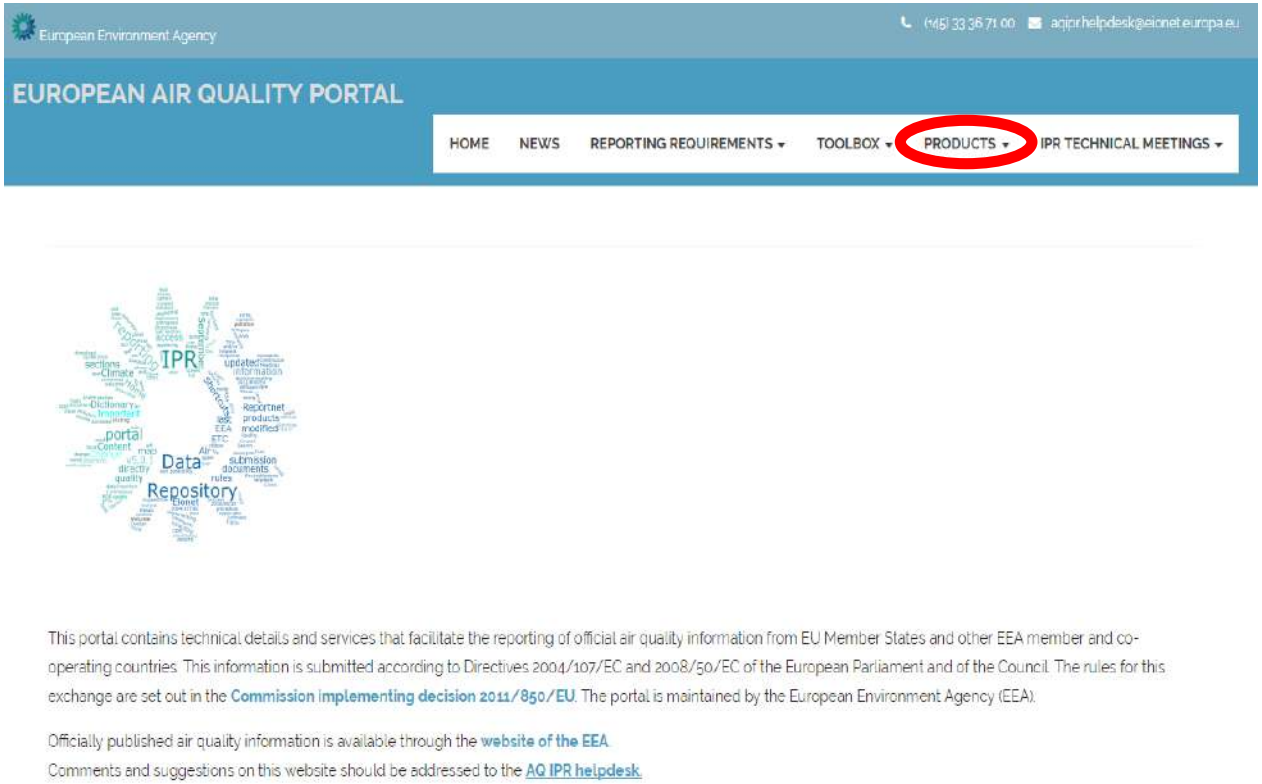
http://eeadmz1-cws-wp-air.azurewebsites.net/products/data-viewers/utd-viewer/

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Data viewing via the Internet (web) is enabled via the browser / tool on the **European Air Quality Portal**, which is developed, maintained and managed by EEA

http://eeadmz1-cws-wp-air.azurewebsites.net/

The available browsers / tools allow you tracking the data submission process and can be accessed through the menu bar in the PRODUCTS tab.



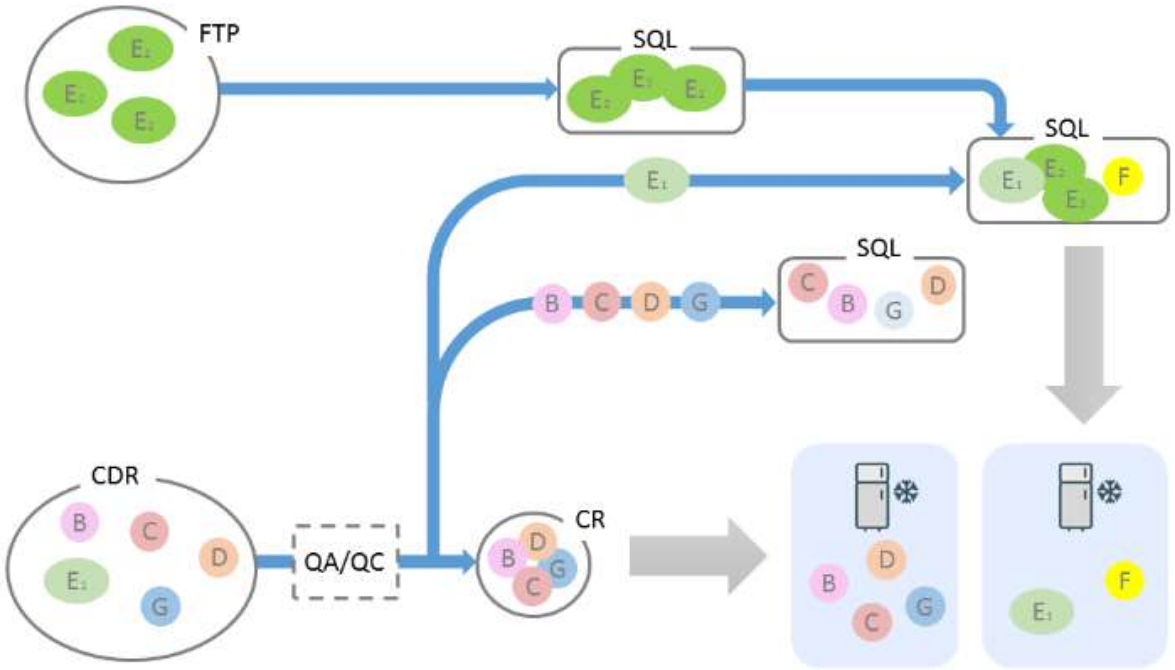
15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Europen Air Quality Portal

Different streams of data are shown in the picture. Submitted data is used as a data source in browsers

E2a data (UTD) – are submitted via FTP server every hour

Other data (B-G) are delivered to CDR after they have passed QA/QC checks



15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Browsers / Tools can be divided into four categories (available from the menu bar):

- Browsers that enable **monitoring the data submission status in the EEA.**
- **AIDE tables - Display the submitted** data B to G and information supplied with data B to G.
- **Data Browsers** – Allow data and statistical data viewing contained in the EEA databases and their **display on maps, charts, or tables**.
- **Data download** - special tools allow data download contained in EEA databases. It mainly relates to E1a and E2a data plus a part of meta-data and geometry of zones and agglomerations. Data can be downloaded using the download button that appears at the bottom of the dashboard.

In each browser, different data sets can be selected using filters that are usually displayed on the right side of the dashboard displayed. Some data can also be selected directly from maps.

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

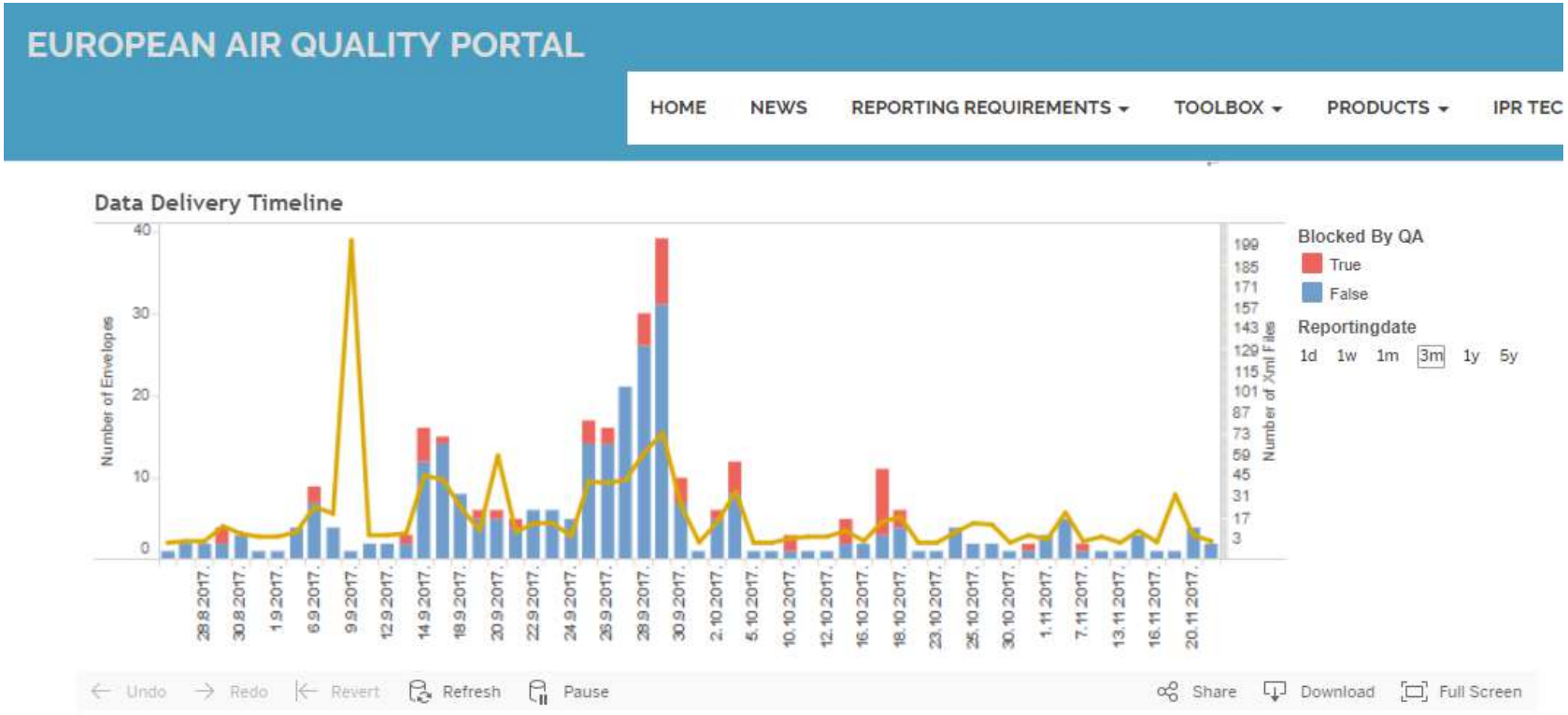
Submitted data browser

This browser shows how much data is delivered (B-G)
- excluding E2a data (UTD) - the status of UTD data is displayed on another browser

http://eeadmz1-cws-wp-air.azurewebsites.net/products/submission-monitoring/data-monitor-all-except-e2a/

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Submitted data browser– shows the amount and submission time of data



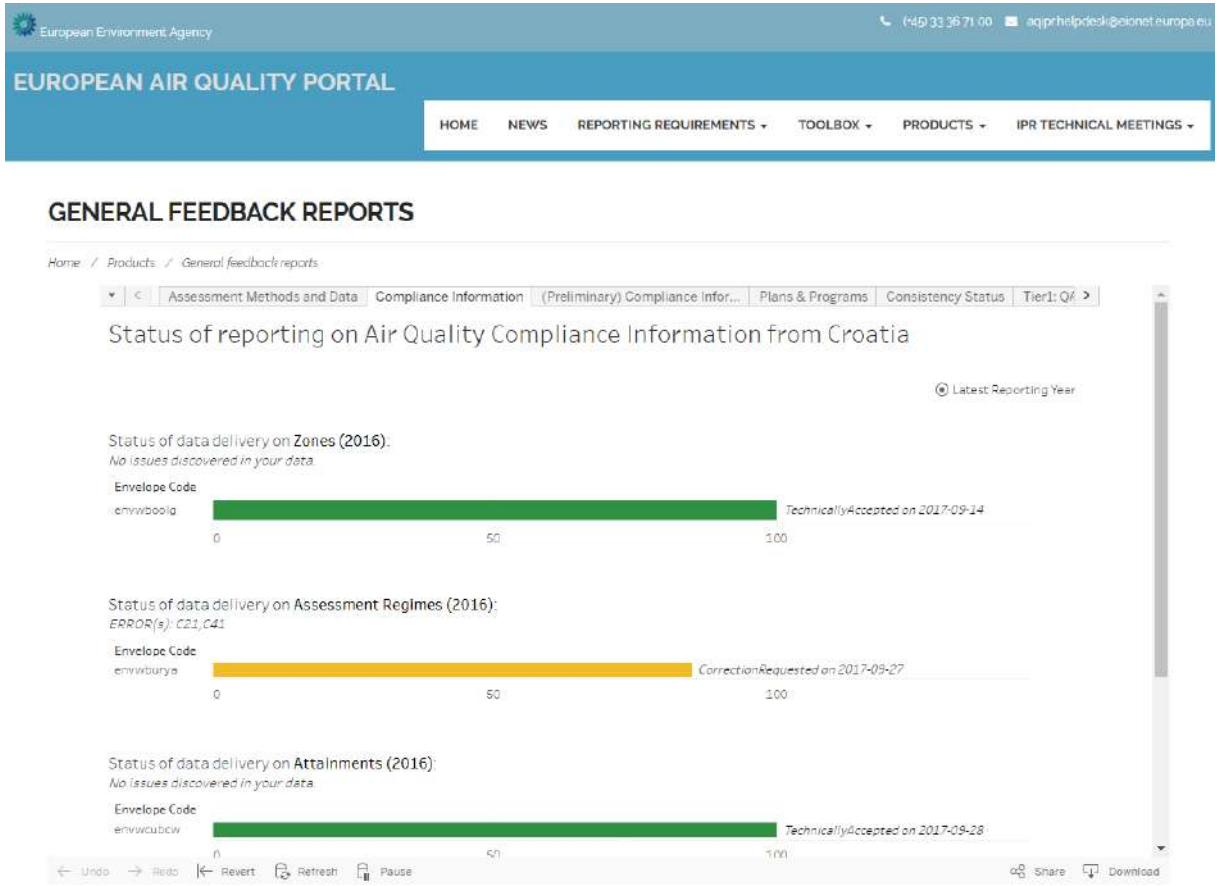
http://eeadmz1-cws-wp-air.azurewebsites.net/products/submission-monitoring/data-monitor-all-except-e2a/

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Feedback on data submission

These browsers / tools provide a quick overview of the most recent data submission: envelope status, QA / QC master messages in CDR (Tier 1 checks), and additional information on data quality check after and outside CDR (Tier 2 checks).

Reports are still in trial beta versions



http://eeadmz1-cws-wp-air.azurewebsites.net/products/feedback-on-submissions/general-feedback/feedback-reports/?CountryNameParameter=Croatia

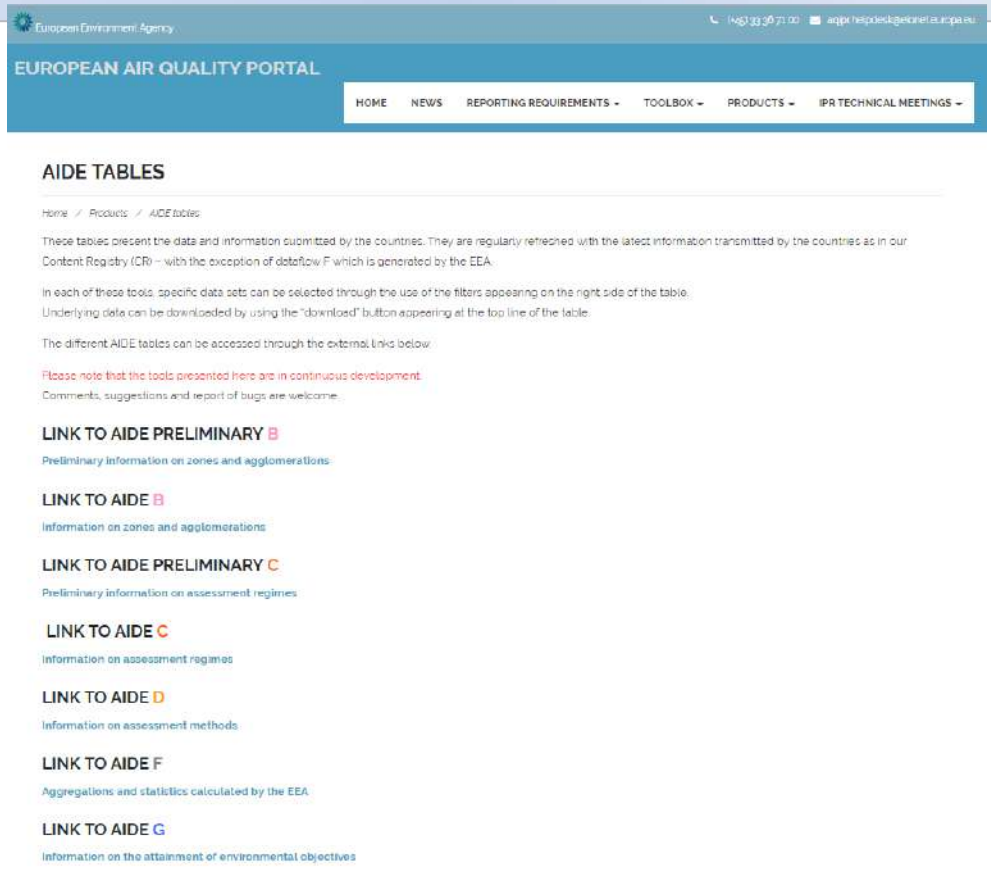
15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

AIDE tables

display the data and information provided by countries and are regularly refreshed with the latest information.

Each of these tables alllow selection of specific data sets with filters that appear on the right of the table

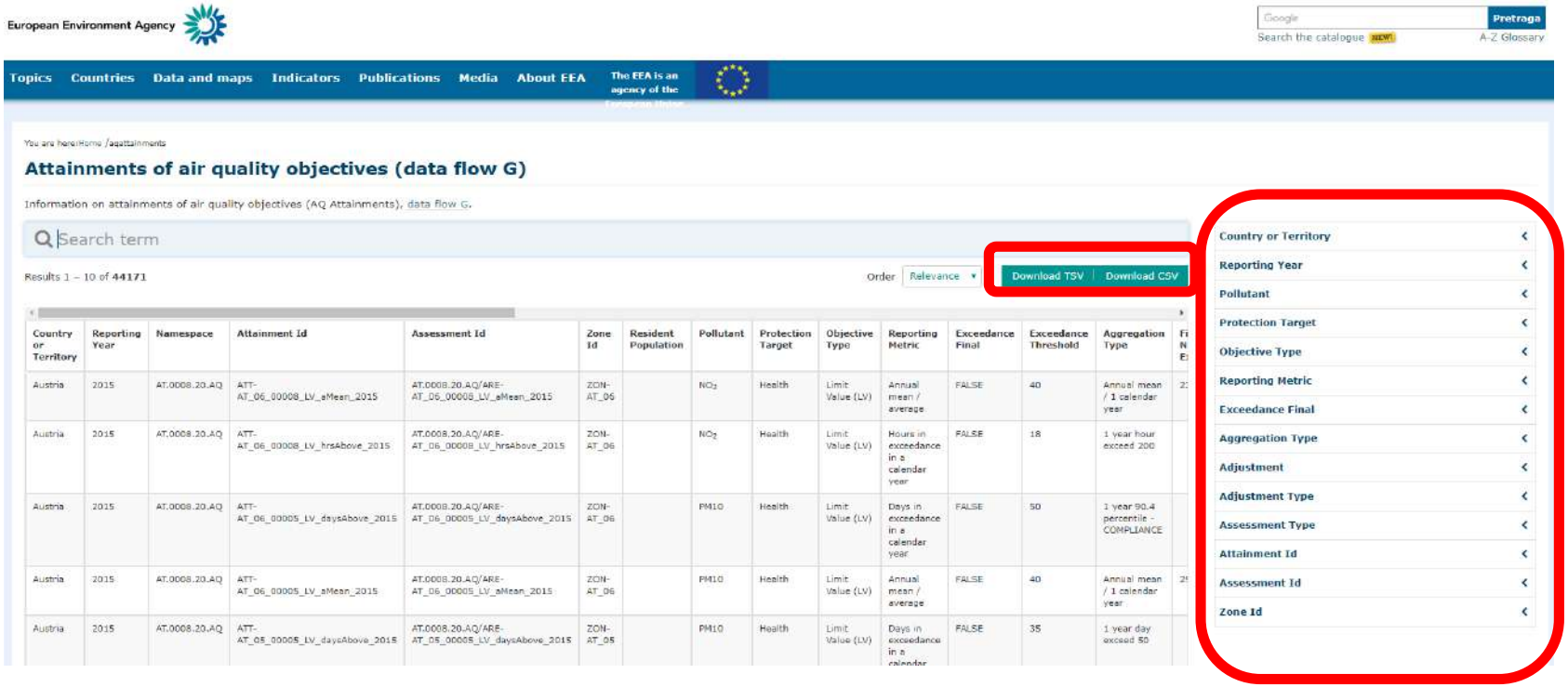
You can download the data using the "download" button that appears in the top line of the table.



http://eeadmz1-cws-wp-air.azurewebsites.net/products/aide-tables/

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

AIDE tables - filters are on the right of the table, and the data can be downloaded with the "download" button.

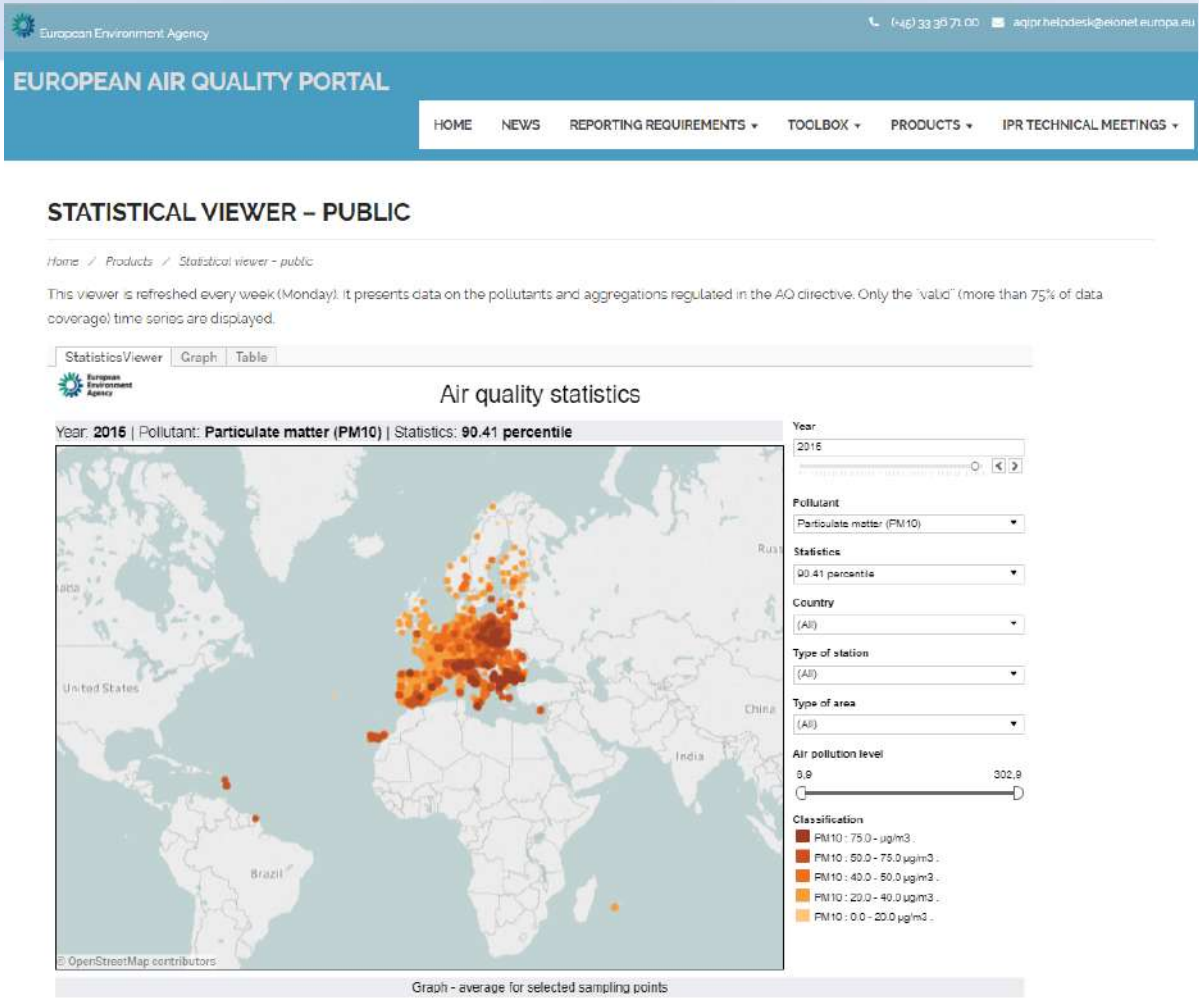


http://aideg.apps.eea.europa.eu/?source=%7B%22query%22%3A%7B%22match_all%22%3A%7B%7D%7D%2C%22display_type%22%3A%22tabular%22%7D

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Statistics of validated data on the EEA AQ Portal

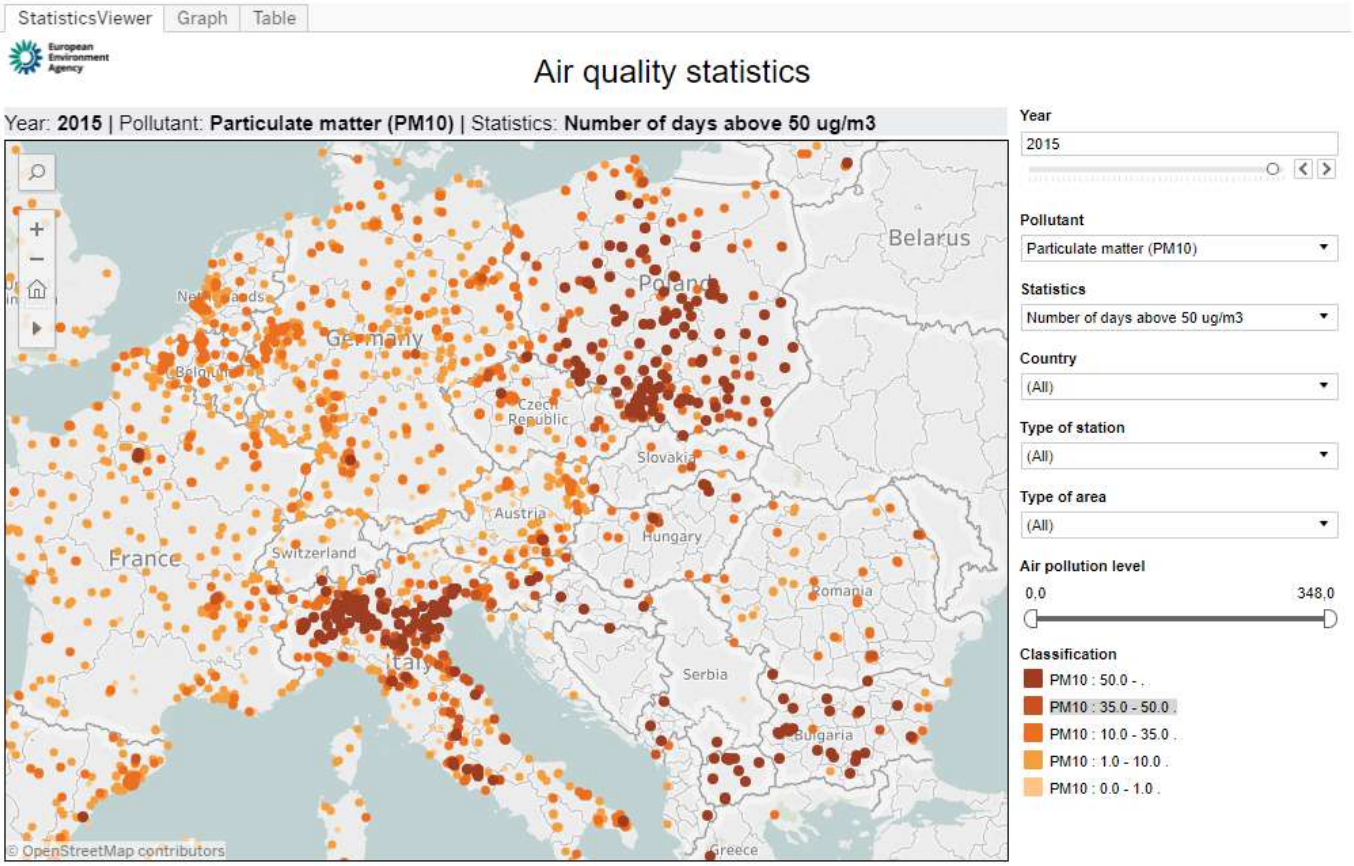
Year, pollutant and statistical parameter can be chosen on the right side of the table- values for the whole Europe are shown Search can also be narrowed down to a particular country, type of station, and type of area.



http://eeadmz1-cws-wp-air.azurewebsites.net/products/data-viewers/statistical-viewer-public/

15.3 WEB REPORTING OF VALIDATED AND NON-VALIDATED DATA

Any area can be zoomed, and placing the cursor at any point of measurement will show the baseline data of the station and in this case the number of GV exceedance days.



http://eeadmz1-cws-wp-air.azurewebsites.net/products/data-viewers/statistical-viewer-public/

15.4 REPORTING BY AIR QUALITY INDEX

AIR QUALITY INDEX

Making the index is a **pragmatic process of reducing the variety of information** on chemical features of a fairly complex blend of pollutants in the air to a **simple image on a scale.**

From a scientific point of view, this is a rough generalization and a huge loss of information, but for **communication purposes this reduction in information is considered essential.**

How to reduce complex information largely depends **on the purpose** for which the index should be used. There are **many ways of making / displaying the air quality index**, and one of the ways is not necessarily better than the other.

The exact formula for the **transmission of concentrations readings into the index classes** is another thing of subjective choices, though **limit values** (for example, those deriving from air quality regulations such as Directive 2008/50 / EC) **are often used as guidelines.**

15.4 REPORTING BY AIR QUALITY INDEX

AIR QUALITY INDEX

There are several reasons for creating an index:

- **Linking air quality with effects on health** to inform the public about air quality and possible corrective measures;
- **compressing a large number of complex data -** simpler review of information (e.g. for policy development or standard compliance verification);
- **attracting public attention to air quality issues and raising awareness**.

Linking information on air quality with influences on health is a potentially very powerful way of communicating and as a health concern of every individual is mostly very convincing. Although the health-based index has some drawbacks, it can be said that it is **important to warn people of unfavorable air quality.**

15.4 REPORTING BY AIR QUALITY INDEX

AIR QUALITY INDEX

Compressing a large number of complex data - providing simple clear information for formulation or policy monitoring, if consistently applied, can indicate progress or stagnation.

Attracting the public's attention to air quality issues and raising awareness - short-term indexes on the website are used to alert the public to air quality and raise awareness – they inform or alert the public because the public is affected by air pollution particularly in urban areas.

15.4 REPORTING BY AIR QUALITY INDEX

AIR QUALITY INDEX

- CAQI - Common Air Quality Index

CAQI was developed during the CITEAIR II project

http://www.citeair.eu/

and is used on the website www.airqualitynow.eu since 2006.

WHY CAQI

CAQI is designed to compare air quality in European cities in real time.

At the beginning of the CITEAIR project it was noted that many cities show air quality in different, hardly comparable ways, often using their own (or sometimes nationally prescribed) air quality index.

The problem was that all the indexes were different in logic and presentation.

15.4 REPORTING BY AIR QUALITY INDEX

CAQI - Common Air Quality Index

Index (CAQI) has been developed to **exist with current indexes** and could be used to compare air quality in cities on the web site; it was not intended to replace existing indices.

It was part of an effort to raise **awareness of air quality in cities**.

Since the launch of CAQI, the Air Quality Directive (CAFE Directive 2008 / 50EU) has been revised, with **the $PM_{2.5}$ limit value added**.

Since **$PM_{2.5}$** is **probably the most important parameter for air quality in urban areas in Europe today**, it is included subsequently in the CAQI calculation.

Display of air quality parameters by CAQI is also available on the "Air Quality in Croatia" portal http://iszz.azo.hr/iskzl/index.html since 2014.

15.4 REPORTING BY AIR QUALITY INDEX

Air quality index on the portal The air quality in Croatia consists of **five levels** (different coloring) ranging from 0 (very low) to >100 (very high) and it is a **relative measure of air pollution.** Lower index values (levels) indicate cleaner air.

The index value depends on the concentrations of **six pollutants**: nitrogen dioxide (**NO_2**), sulfur dioxide (**SO_2**), ozone (**O_3**), floating particles **PM_{10}** and **$PM_{2.5}$** and carbon monoxide (**CO**) according to the European **Common Air Quality Index** (**CAQI**) .

For each pollutant the **index is calculated based on the measured hourly concentration.**

The total index is the highest index of any pollutant at a given moment, at an individual air quality monitoring station.

15.4 REPORTING BY AIR QUALITY INDEX

CAQI - Common Air Quality Index - index levels, colors and pollutants included in index calculation

POLLUTION	INDEKS RANGE	POLLUTANT CONCENTRATIONS (µg/m^3)							
		NO_2	PM_{10}		O_3	$PM_{2.5}$		CO	SO_2
		1 hour	1 hour	24 hours	1 hour	1 hour	24 hours	8-hour	1 hour
VERY HIGH	>100	>400	>180	>100	>240	>110	>60	>20000	>500
HIGH	100	400	180	100	240	110	60	20000	500
	75	200	90	50	180	55	30	10000	350
MEDIUM	75	200	90	50	180	55	30	10000	350
	50	100	50	30	120	30	20	7500	100
LOW	50	100	50	30	120	30	20	7500	100
	25	50	25	15	60	15	10	5000	50
VERY LOW	25	50	25	15	60	15	10	5000	50
	0	0	0	0	0	0	0	0	0

15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

The new European air quality index was published in **November 2017**.

The new European Air Quality Index has been jointly developed by the **European Commission's Directorate General for Environment** and the **European Environment Agency (EEA)** to **inform citizens and public authorities about air quality status across Europe.**

The index points to the **short-term air quality situation** of **more than two thousand air quality monitoring stations across Europe,** using updated data provided by EEA member states.

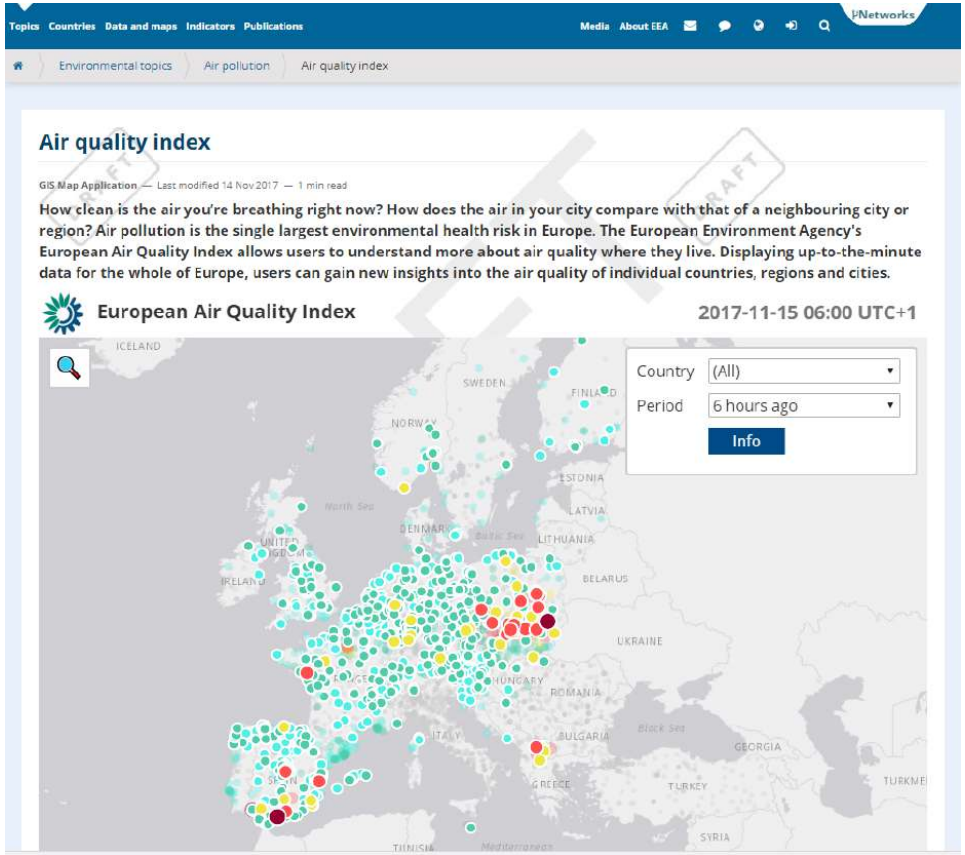
https://www.eea.europa.eu/highlights/european-air-quality-index-current

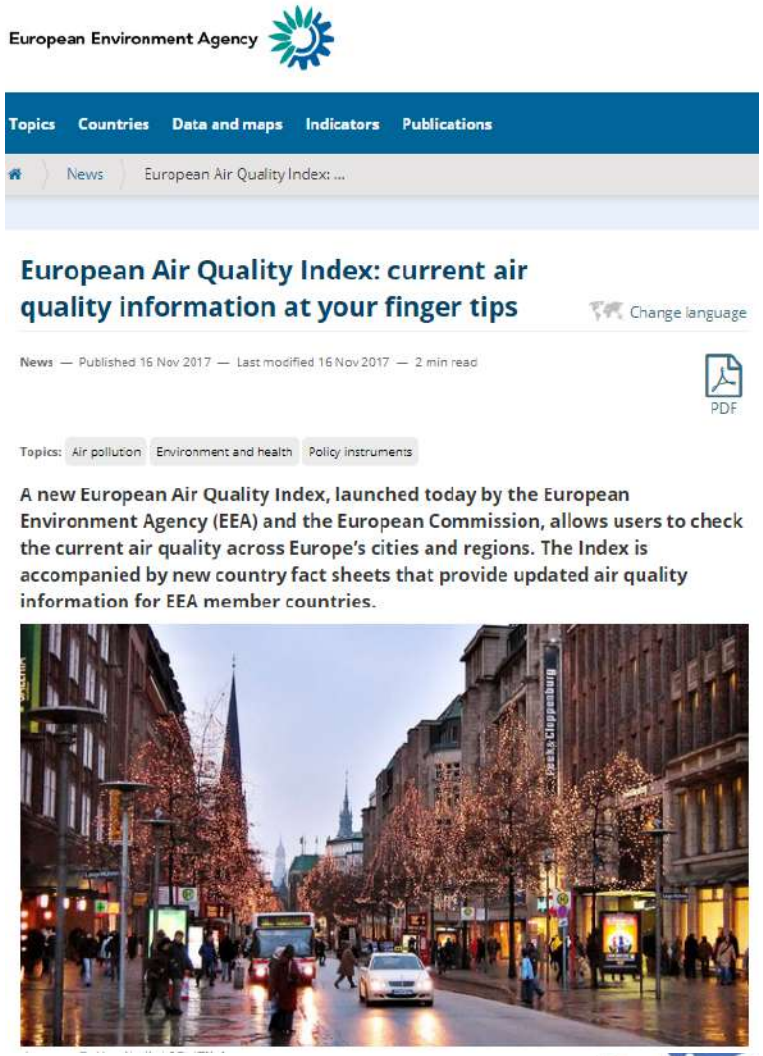
http://www.eea.europa.eu/themes/air/air-quality-index

15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

https://www.eea.europa.eu/highlights/european-air-quality-index-current
http://www.eea.europa.eu/themes/air/air-quality-index





15.4 REPORTING BY AIR QUALITY INDEX

The European Air Quality Index gives users a **better understanding of the current air quality in which they live, work or travel.** By displaying **updated information for the whole of Europe,** users can gain insight into air quality in single countries, regions, and cities**.**

It was found that the **main pollutants for index calculation are** (**AQI**) **O_3**, **NO_2**, **PM_{10}** and **$PM_{2.5}$**. It is calculated by **comparing the index value for each of the individual pollutants,** taking **the worst (maximum) index value**.
SO_2 values are included in the measured index, **if available.**

The current value of the index does not reflect the average annual air quality situation that can be significantly different**.**

15.4 REPORTING BY AIR QUALITY INDEX

Since often a small number of pollutants is measured at air quality monitoring stations, the index is only calculated for those **busy stations** that measure both **NO_2 and PM** (ie. **$PM_{2.5}$ or PM_{10} or both)**.

At all other air quality monitoring stations, the index is calculated for those stations measuring **at least three pollutants NO_2, O_3 and PM** (ie. **$PM_{2.5}$ or PM_{10} or both**).

The total index for a monitoring station or air quality forecast is updated **every hour**, and if the data is not recorded for a particular hour, the values are approximated ("filling in the gap") using **CAMS modeled air quality data** and in such cases are clearly marked within the index as 'modeled data'.

15.4 REPORTING BY AIR QUALITY INDEX

EUROPEAN AIR QUALITY INDEX

Measurements **up to five key pollutants supplemented with modeled data determine the index level** that describes the current air quality situation at each monitoring station. **The overall index corresponds to the poorest index level** for **any of the five pollutants** according to the following scheme:

Pollutant			Particles smaller than 2.5 µm ($PM_{2.5}$)	Particles smaller than 10 µm (PM_{10})	Nitrogen dioxide (NO_2)	Ozone (O_3)	Sulfur dioxide (SO_2)
Index level	(based on pollutant concentrations in µg / m^3)	**Good**	0-10	0-20	0-40	0-80	0-100
		Acceptable	10-20	20-35	40-100	80-120	100-200
		Moderate	20-25	35-50	100-200	120-180	200-350
		Poor	25-50	50-100	200-400	180-240	350-500
		Very poor	50-800	100-1200	400-1000	240-600	500-1250

15.4 REPORTING BY AIR QUALITY INDEX

Pollutant			Particles smaller than 2.5 µm ($PM_{2.5}$)	Particles smaller than 10 µm (PM_{10})	Nitrogen dioxide (NO_2)	Ozone (O_3)	Sulfur dioxide (SO_2)
Index level	(based on pollutant concentrations in µg / m^3)	Good	0-10	0-20	0-40	0-80	0-100
		Acceptable	10-20	20-35	40-100	80-120	100-200
		Moderate	20-25	35-50	100-200	120-180	200-350
		Poor	25-50	50-100	200-400	180-240	350-500
		Very poor	50-800	100-1200	400-1000	240-600	500-1250

The index is **not calculated** for air quality measurements **that exceed the maximum value shown in the category 'very poor'.** Measurements that are higher than those values **are usually incorrect** and in such cases marked as "**no data**" with a note, further analysis is required.

The **PM_{10} and $PM_{2.5}$** values are based on **24-hour movable averages**.

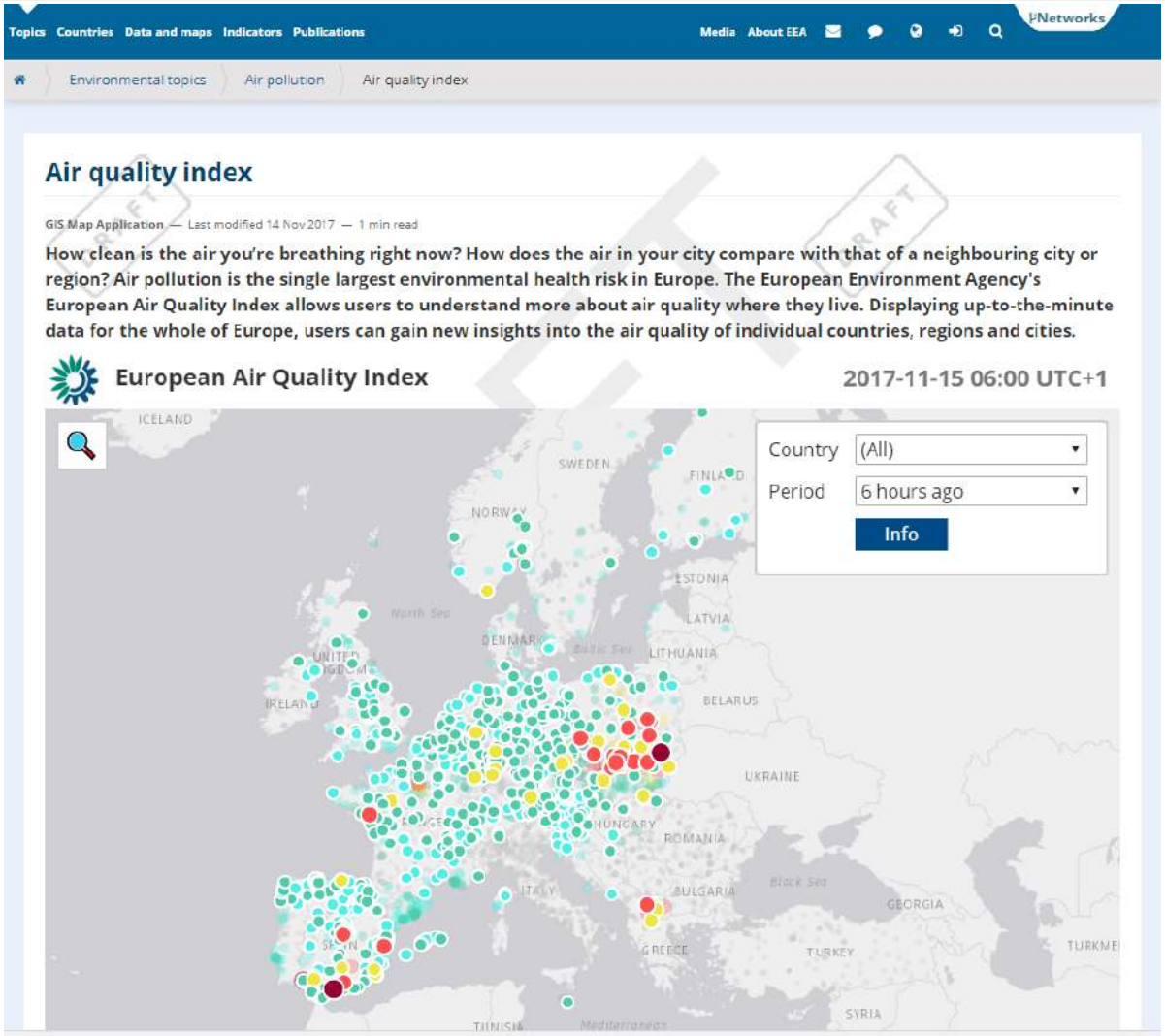
15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

The circles on the map represent air quality monitoring stations.

The color corresponds to the air quality index at a certain hour on that station.

http://www.eea.europa.eu/themes/air/air-quality-index

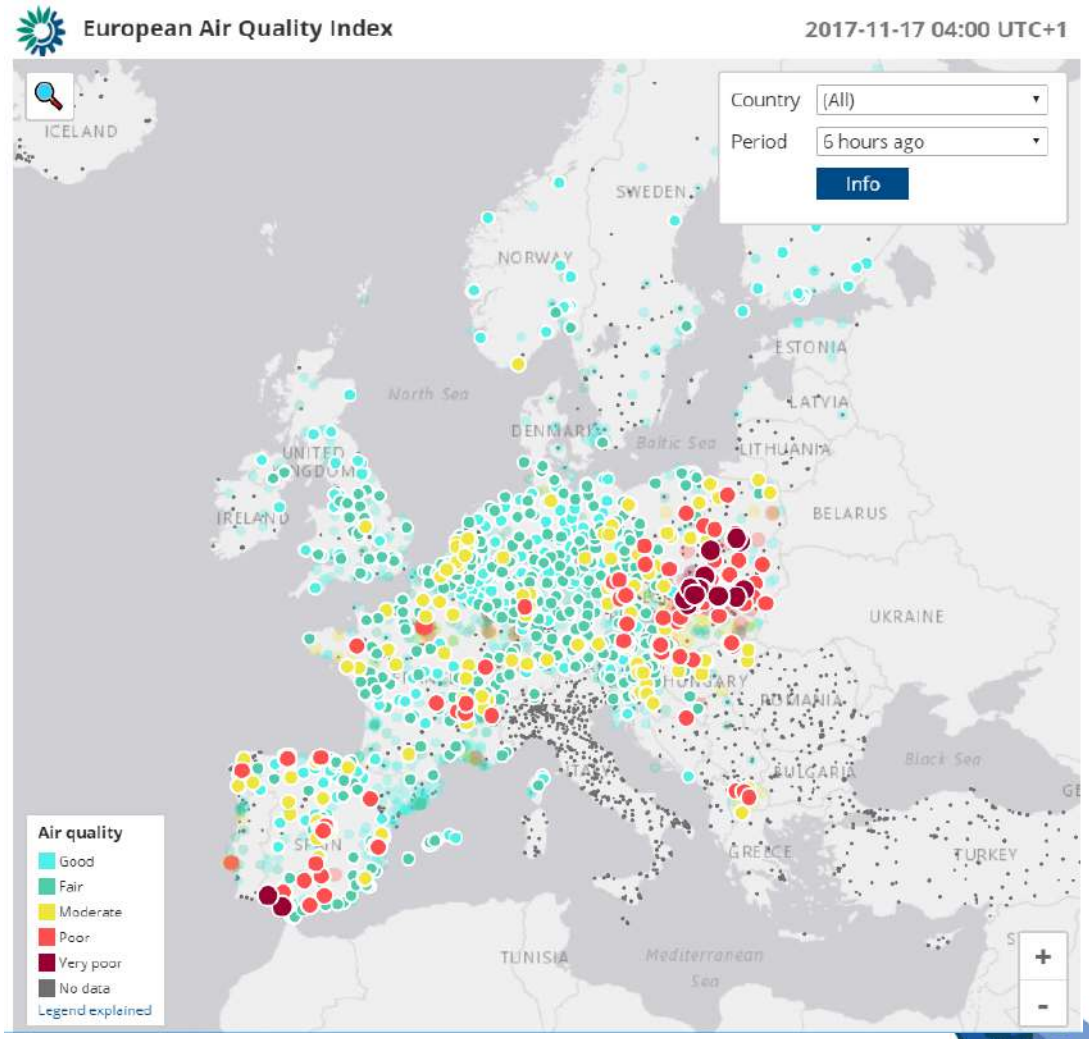


15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

The circles on the map represent air quality monitoring stations.

The color corresponds to the air quality index at a certain hour on that station.



http://airindex.eea.europa.eu/

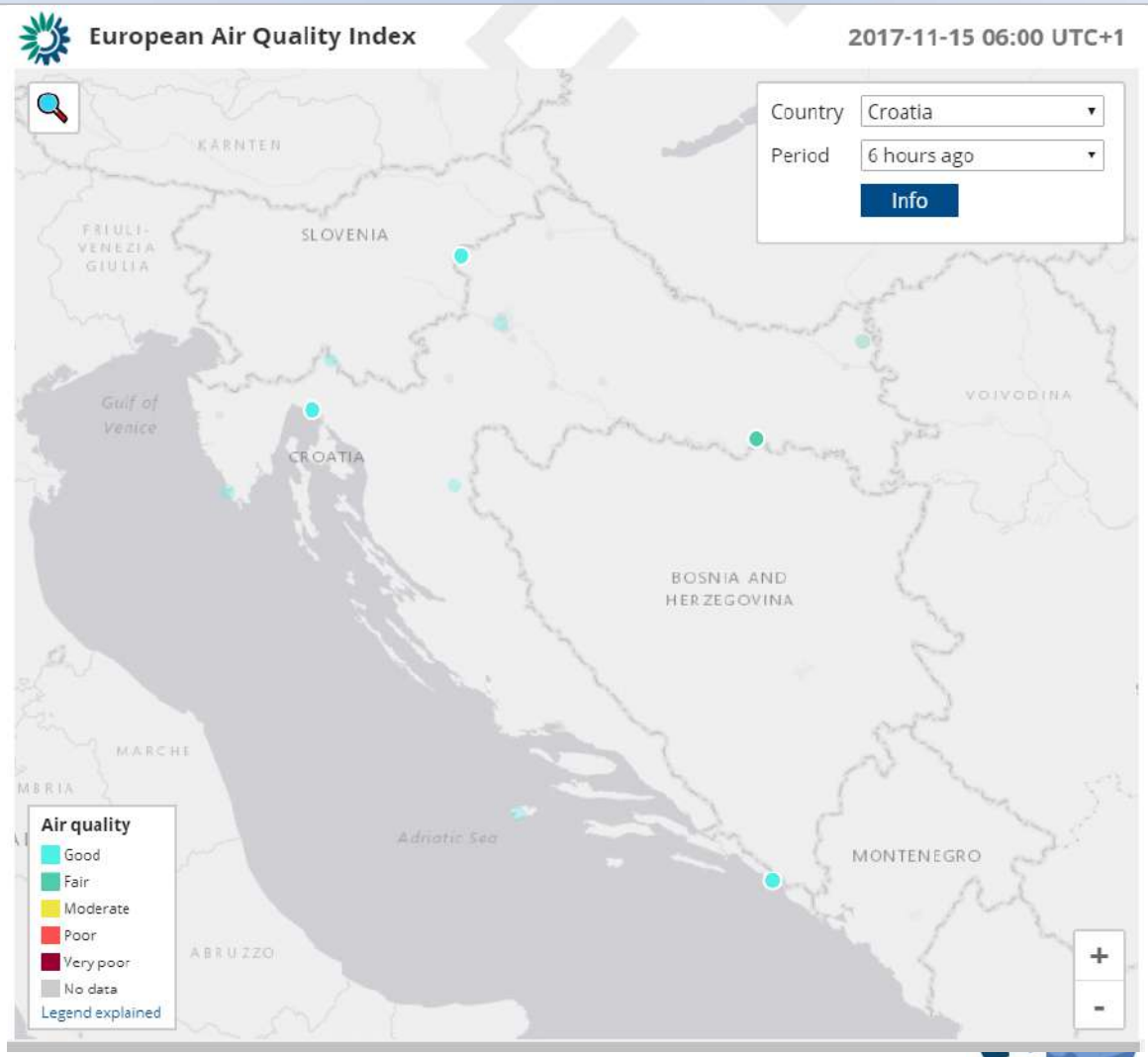
15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

By default settings, the index shows the situation before 6 hours – however, any specific hour can be selected for the last 48 hours.

You can also choose **whole Europe or individual country** (as in the picture - Croatia)

http://airindex.eea.europa.eu/

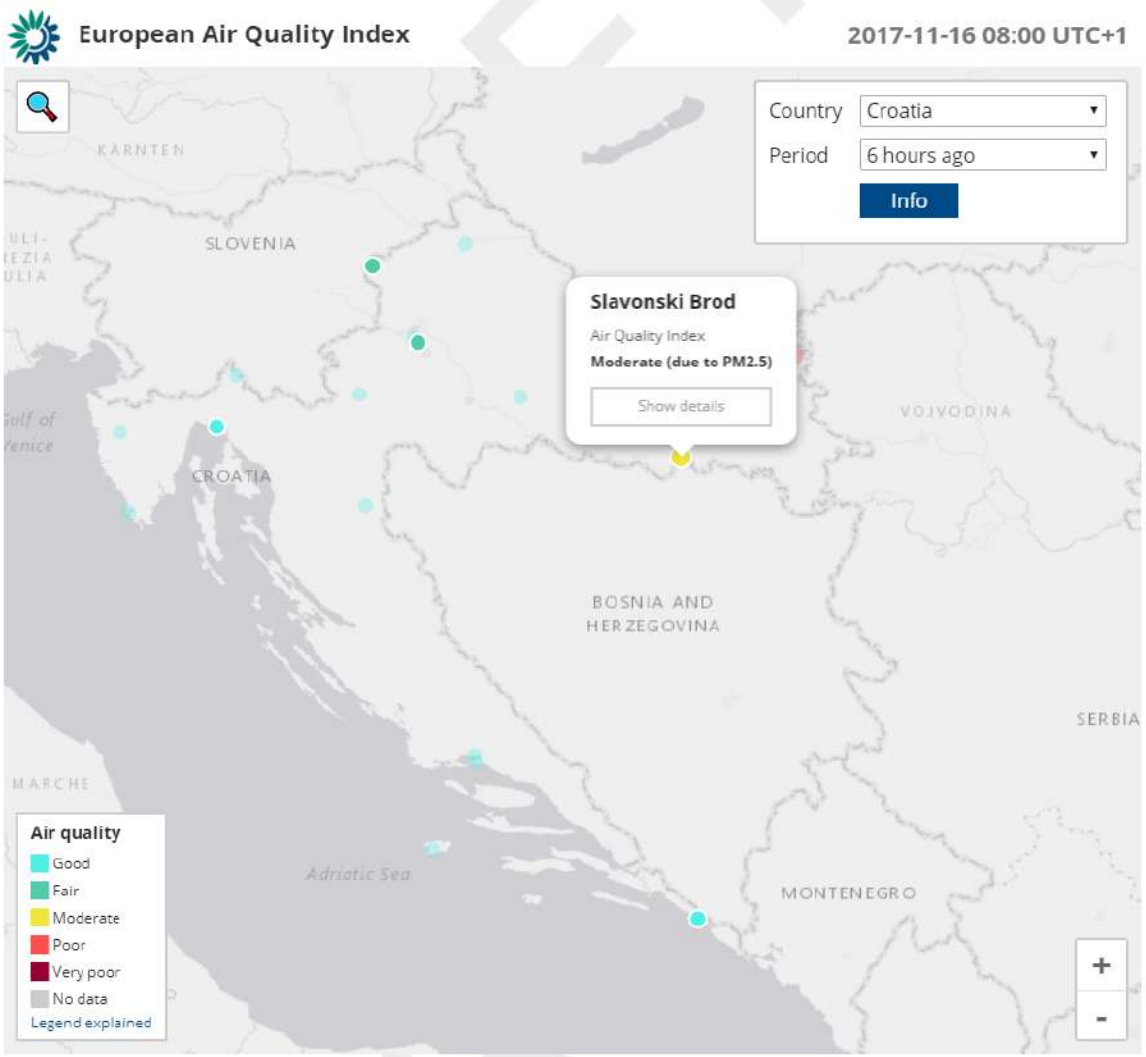


15.4 REPORTING BY AIR QUALITY INDEX

NEW EUROPEAN AIR QUALITY INDEX

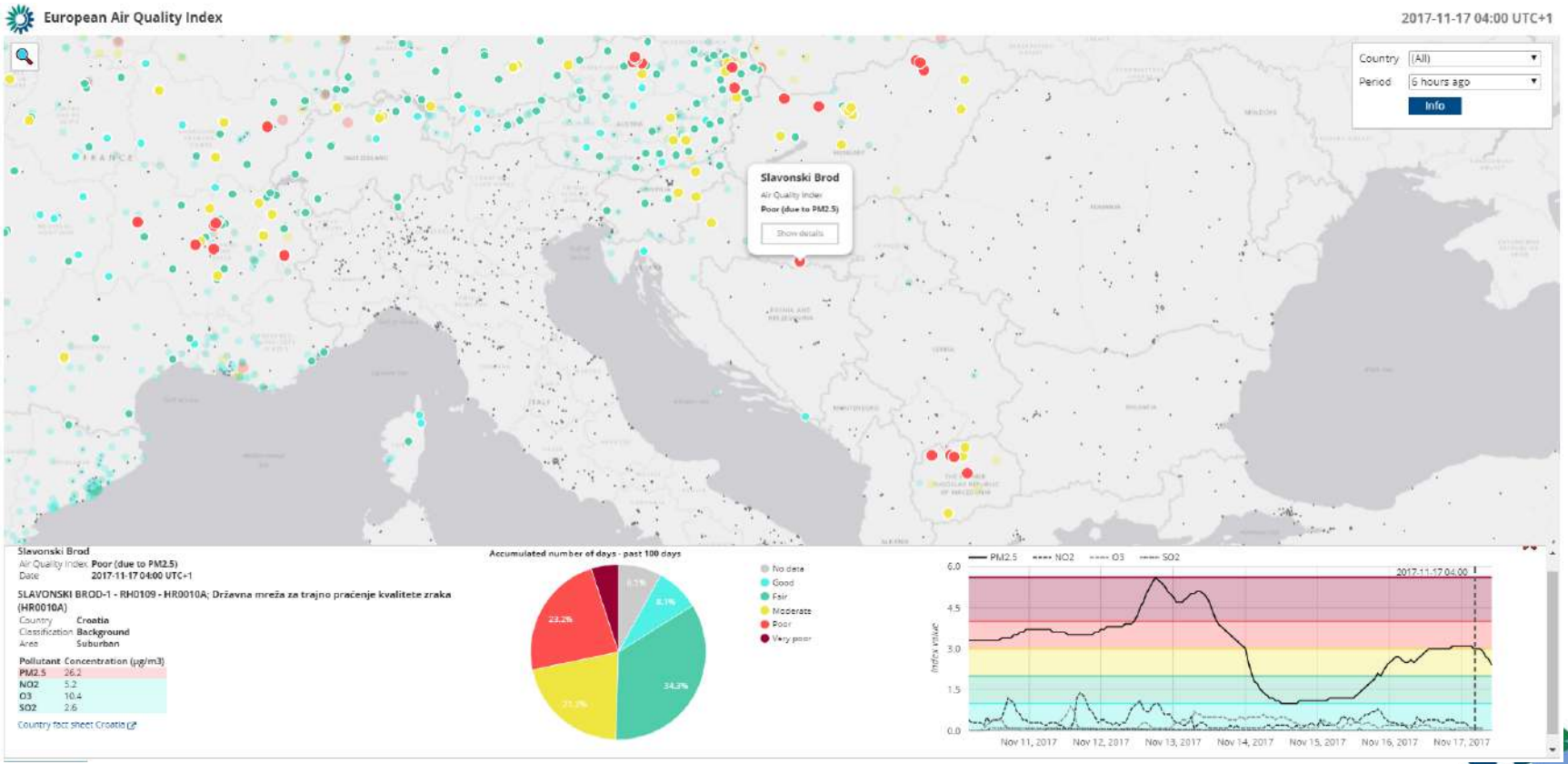
Clicking on a particular monitoring station (circle) will show the pollutant that determines **the highest total index level**

http://airindex.eea.europa.eu/



15.4 REPORTING BY AIR QUALITY INDEX

By clicking on show the details - the basic station information, pollutant concentrations, a graph with index value share in the last hundred days and a graph of index values for each substance in the last week are shown.



15.4 REPORTING BY AIR QUALITY INDEX

The index uses **"updated" air quality data officially delivered every hour** from European Economic Area Member States.

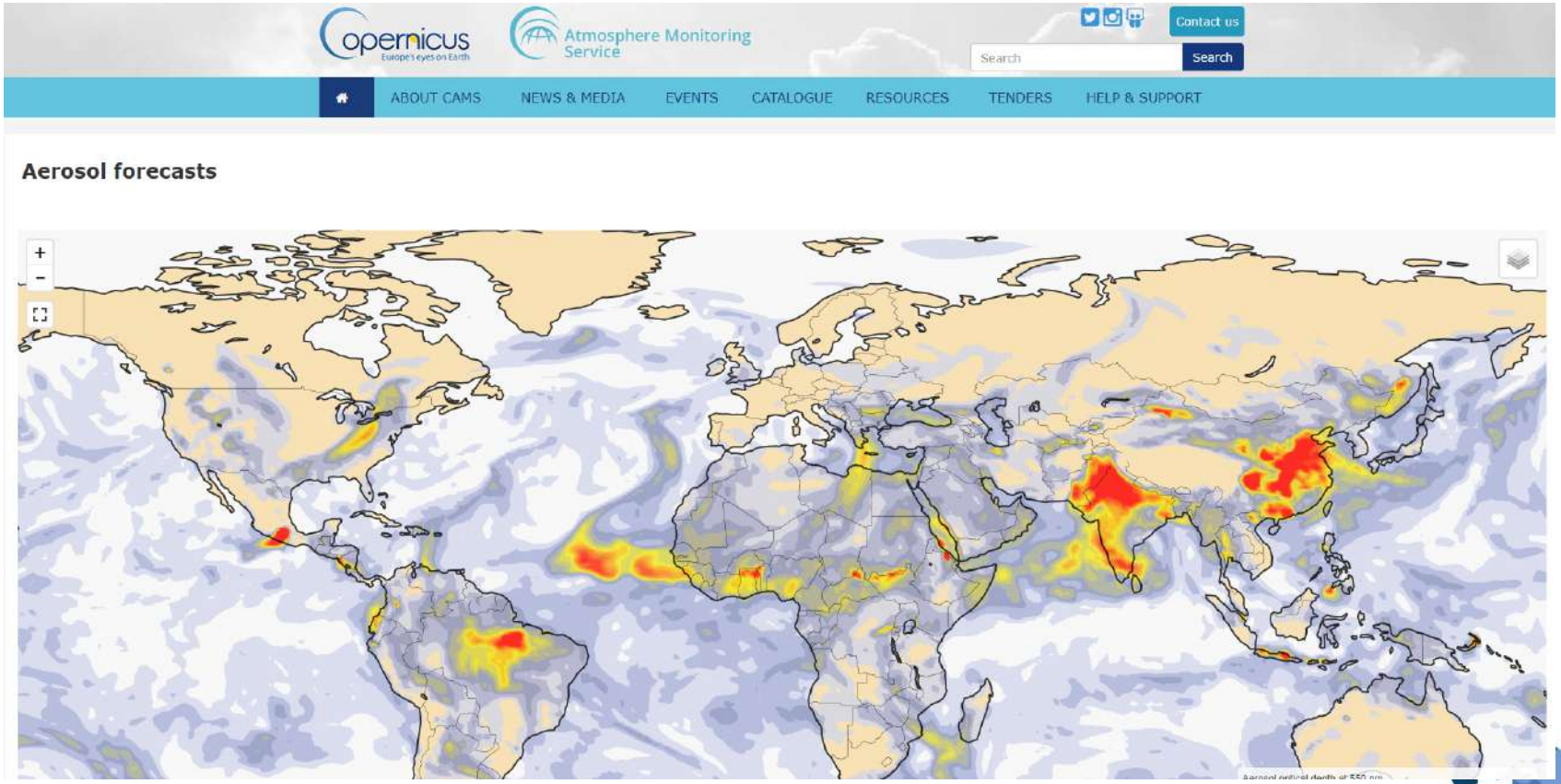
There are **three color schemes** that provide information about **the status of data** on each monitoring station:

- **Full color:** Minimum number of data required to calculate the index is met
- **Semi-transparent color:** Minimum number of data required for calculating the index is not satisfied - color indicates the air quality index that is calculated only for available pollutants
- **Gray:** There is not enough data to calculate the index.

15.4 REPORTING BY AIR QUALITY INDEX

Air quality measurement data are supplemented with modeled air quality data from the **Copernicus Atmospheric Monitoring Service (CAMS)** as needed.

http://atmosphere.copernicus.eu/



15.4 REPORTING BY AIR QUALITY INDEX

Copernicus is a program of the European Union aimed at developing European information services **based on satellite observations**.

The program is coordinated and managed by the European Commission. It was implemented in partnership with Member States, the European Space Agency (ESA), the European Organization for Exploitation of Meteorological Satellites (EUMETSAT), the European Center for Medium-Range Weather Forecasts (ECMWF), EU Agencies and Mercator Océan.

Large amounts of global data obtained **from satellites, field, airborne and maritime** measuring systems are used to **provide information** that would help service providers, public bodies, and other international organizations to **improve the quality of life of Europe's citizens**.

Information services provided **are publicly available** to their users.

15.4 REPORTING BY AIR QUALITY INDEX

Index methodology

If data is not recorded for a particular hour, the values are **approximated** ("filling in the gap") using **CAMS modeled dana on air quality**. In such cases, they are **clearly labeled within the index as 'modeled data'.**

The gap filling method depends on the pollutant, i.e.,

- for **NO_2, $PM_{2,5}$ and PM_{10}** using the **difference method**;
- for **O_3** using a **multiplicative method**;
- for **SO_2** there is **no filling**.

15.4 REPORTING BY AIR QUALITY INDEX

Index methodology

Difference Method: The value is approximated by taking the CAMS modeled value and adding or subtracting the difference in the correction. This correction is the average difference between the previously measured values and the CAMS modeled value for the same hour for at least three of the previous four days.

Multiplicative Method: The value is approximated by taking CAMS modeled values and applying correction factors. This correction is the average ratio between the previously measured values and the CAMS modeled values for the same hour for at least three of the previous four days.

In cases where there are **no measured values** for the same hour over three of the previous four days, the **index value for this pollutant is not counted** and is marked as **'no data'.**

15.4 REPORTING BY AIR QUALITY INDEX

Comparison of index levels, color and pollutants that are included in the calculation of the index:

CAQI

POLLUTION	INDEKS RANGE	POLLUTANT CONCENTRATIONS (µg/m^3)							
		NO2	PM10		O3	PM2.5		CO	SO2
		1hour	1 hour	24 hours	1 hour	1 hour	24 hours	8-hour	1 hour
VERY HIGH	>100	>400	>180	>100	>240	>110	>60	>20000	>500
HIGH	100	400	180	100	240	110	60	20000	500
	75	200	90	50	180	55	30	10000	350
MEDIUM	75	200	90	50	180	55	30	10000	350
	50	100	50	30	120	30	20	7500	100
LOW	50	100	50	30	120	30	20	7500	100
	25	50	25	15	60	15	10	5000	50
VERY LOW	25	50	25	15	60	15	10	5000	50
	0	0	0	0	0	0	0	0	0

and new

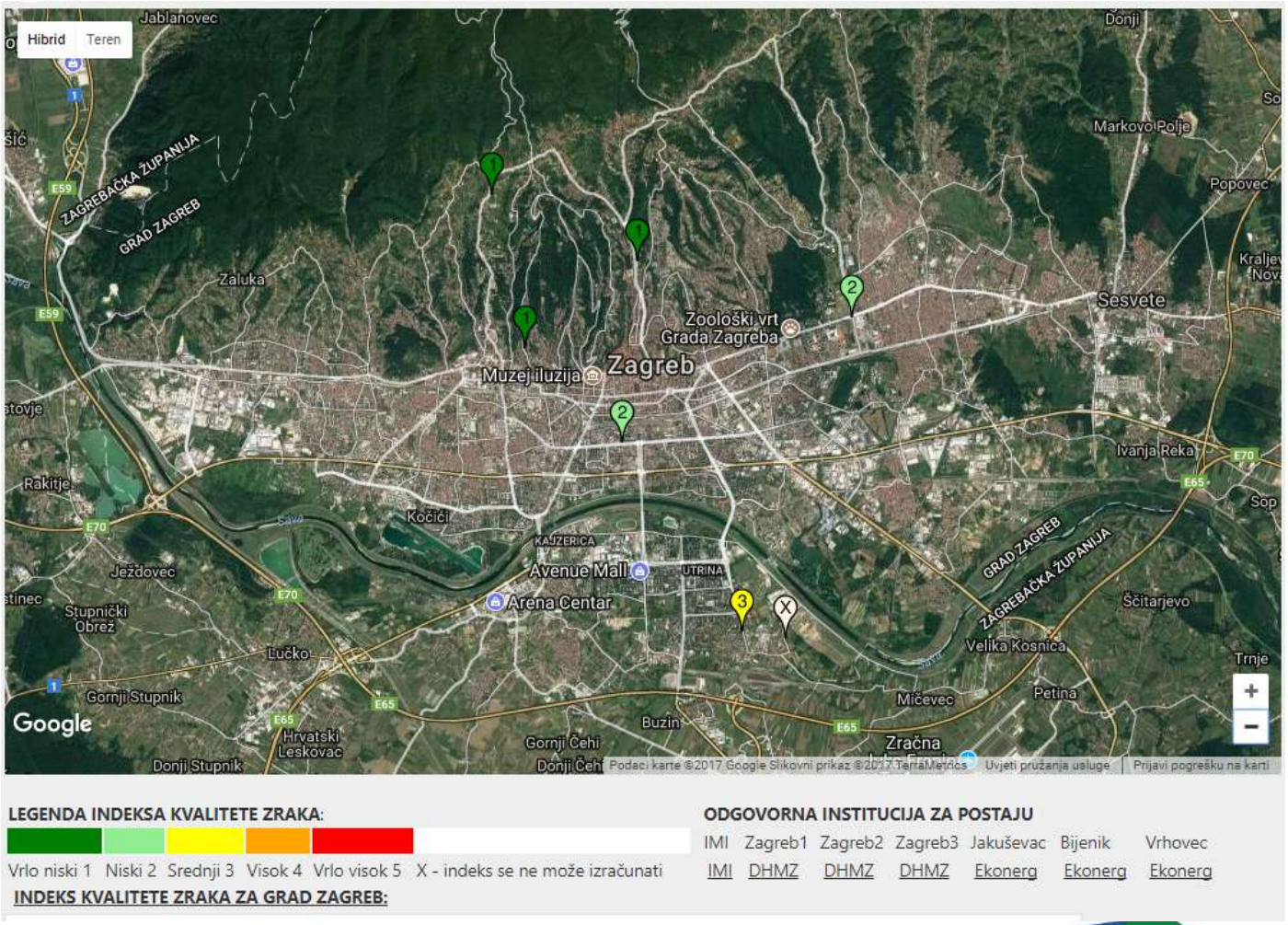
European AQI

Pollutant			Particles smaller than 2.5 µm ($PM_{2.5}$)	Particles smaller than 10 µm (PM_{10})	Nitrogen dioxide (NO_2)	Ozone (O_3)	Sulfur dioxide (SO_2)
Index level	(based on pollutant concentrations in µg / m^3)	Good	0-10	0-20	0-40	0-80	0-100
		Acceptable	10-20	20-35	40-100	80-120	100-200
		Moderate	20-25	35-50	100-200	120-180	200-350
		Poor	25-50	50-100	200-400	180-240	350-500
		Very poor	50-800	100-1200	400-1000	240-600	500-1250

15.5 EXAMPLES

City of Zagreb

On the Institute for Medical Research and Occupational Health websites there is an overview for the City of Zagreb through the same index of CAQI - as well as on the pages of the Croatian Agency for Environment and Nature.

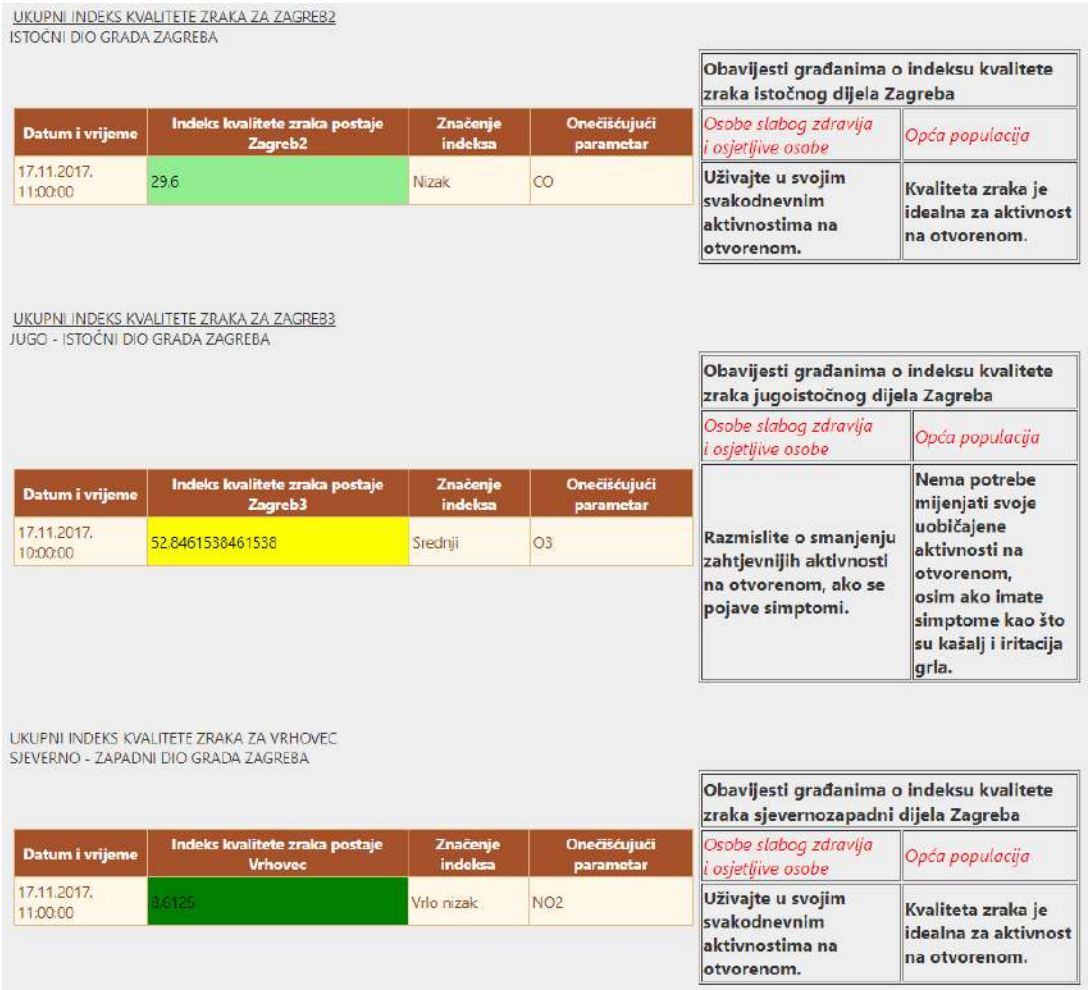


15.5 EXAMPLES

City of Zagreb

Notifications to citizens on the Air Quality Index have additionally been added - for parts of the city where the station is located for people with poor health and at-risk population as well as general population

https://zrak.imi.hr/



UKUPNI INDEKS KVALITETE ZRAKA ZA ZAGREB2
ISTOČNI DIO GRADA ZAGREBA

Datum i vrijeme	Indeks kvalitete zraka postaje Zagreb2	Značenje indeksa	Onečišćujući parametar
17.11.2017. 11:00:00	29.6	Nizak	CO

Obavijesti građanima o indeksu kvalitete zraka istočnog dijela Zagreba	
Osobe slabog zdravlja i osjetljive osobe	*Opća populacija*
Uživajte u svojim svakodnevnim aktivnostima na otvorenom.	Kvaliteta zraka je idealna za aktivnost na otvorenom.

UKUPNI INDEKS KVALITETE ZRAKA ZA ZAGREB3
JUGO - ISTOČNI DIO GRADA ZAGREBA

Datum i vrijeme	Indeks kvalitete zraka postaje Zagreb3	Značenje indeksa	Onečišćujući parametar
17.11.2017. 10:00:00	52.8461538461538	Srednji	O3

Obavijesti građanima o indeksu kvalitete zraka jugoistočnog dijela Zagreba	
Osobe slabog zdravlja i osjetljive osobe	*Opća populacija*
Razmislite o smanjenju zahtjevnijih aktivnosti na otvorenom, ako se pojave simptomi.	Nema potrebe mijenjati svoje uobičajene aktivnosti na otvorenom, osim ako imate simptome kao što su kašalj i iritacija grla.

UKUPNI INDEKS KVALITETE ZRAKA ZA VRHOVEC
SJEVERNO - ZAPADNI DIO GRADA ZAGREBA

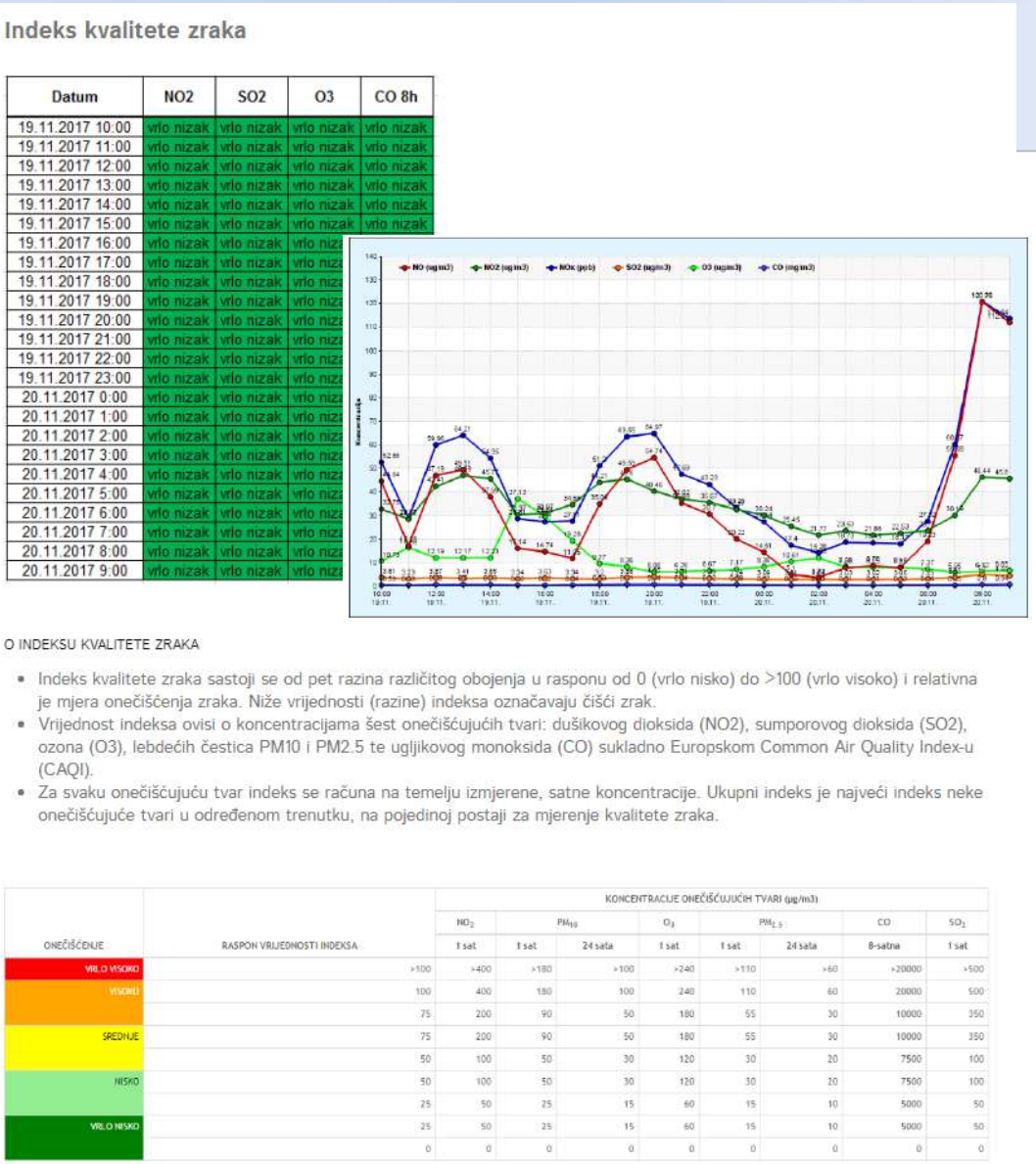
Datum i vrijeme	Indeks kvalitete zraka postaje Vrhovec	Značenje indeksa	Onečišćujući parametar
17.11.2017. 11:00:00	3.6125	Vrlo nizak	NO2

Obavijesti građanima o indeksu kvalitete zraka sjevernozapadni dijela Zagreba	
Osobe slabog zdravlja i osjetljive osobe	*Opća populacija*
Uživajte u svojim svakodnevnim aktivnostima na otvorenom.	Kvaliteta zraka je idealna za aktivnost na otvorenom.

15.5 EXAMPLES

On the web sites of **Andrija Štampar Teaching Institute of Public Health/ Air Quality in the city of Zagreb**, concentrations of pollutants measured at the station Mirogojska cesta 16 and index levels according to CAQI indexation are also shown

http://www.stampar.hr/hr/kakvoca-zraka-u-gradu-zagrebu



Indeks kvalitete zraka

Datum	NO2	SO2	O3	CO 8h
19.11.2017 10:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 11:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 12:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 13:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 14:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 15:00	vrlo nizak	vrlo nizak	vrlo nizak	vrlo nizak
19.11.2017 16:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 17:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 18:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 19:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 20:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 21:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 22:00	vrlo nizak	vrlo nizak	vrlo nizak	
19.11.2017 23:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 0:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 1:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 2:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 3:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 4:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 5:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 6:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 7:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 8:00	vrlo nizak	vrlo nizak	vrlo nizak	
20.11.2017 9:00	vrlo nizak	vrlo nizak	vrlo nizak	

O INDEKSU KVALITETE ZRAKA

- Indeks kvalitete zraka sastoji se od pet razina različitog obojenja u rasponu od 0 (vrlo nisko) do >100 (vrlo visoko) i relativna je mjera onečišćenja zraka. Niže vrijednosti (razine) indeksa označavaju čišći zrak.
- Vrijednost indeksa ovisi o koncentracijama šest onečišćujućih tvari: dušikovog dioksida (NO2), sumporovog dioksida (SO2), ozona (O3), lebdećih čestica PM10 i PM2.5 te ugljikovog monoksida (CO) sukladno Europskom Common Air Quality Index-u (CAQI).
- Za svaku onečišćujuću tvar indeks se računa na temelju izmjerene, satne koncentracije. Ukupni indeks je najveći indeks neke onečišćujuće tvari u određenom trenutku, na pojedinoj postaji za mjerenje kvalitete zraka.

ONEČIŠĆENJE	RASPON VRIJEDNOSTI INDEKSA	KONCENTRACIJE ONEČIŠĆUJUĆIH TVARI (µg/m3)							
		NO_2	PM_{10}		O_3	$PM_{2.5}$		CO	SO_2
		1 sat	1 sat	24 sata	1 sat	1 sat	24 sata	8-satna	1 sat
VRLO VISOKO	>100	>400	>180	>100	>240	>110	>60	>20000	>500
VISOKO	100	400	180	100	240	110	60	20000	500
	75	200	90	50	180	55	30	10000	350
SREDNJE	75	200	90	50	180	55	30	10000	350
	50	100	50	30	120	30	20	7500	100
NISKO	50	100	50	30	120	30	20	7500	100
	25	50	25	15	60	15	10	5000	50
VRLO NISKO	25	50	25	15	60	15	10	5000	50
	0	0	0	0	0	0	0	0	0

15.5 EXAMPLES

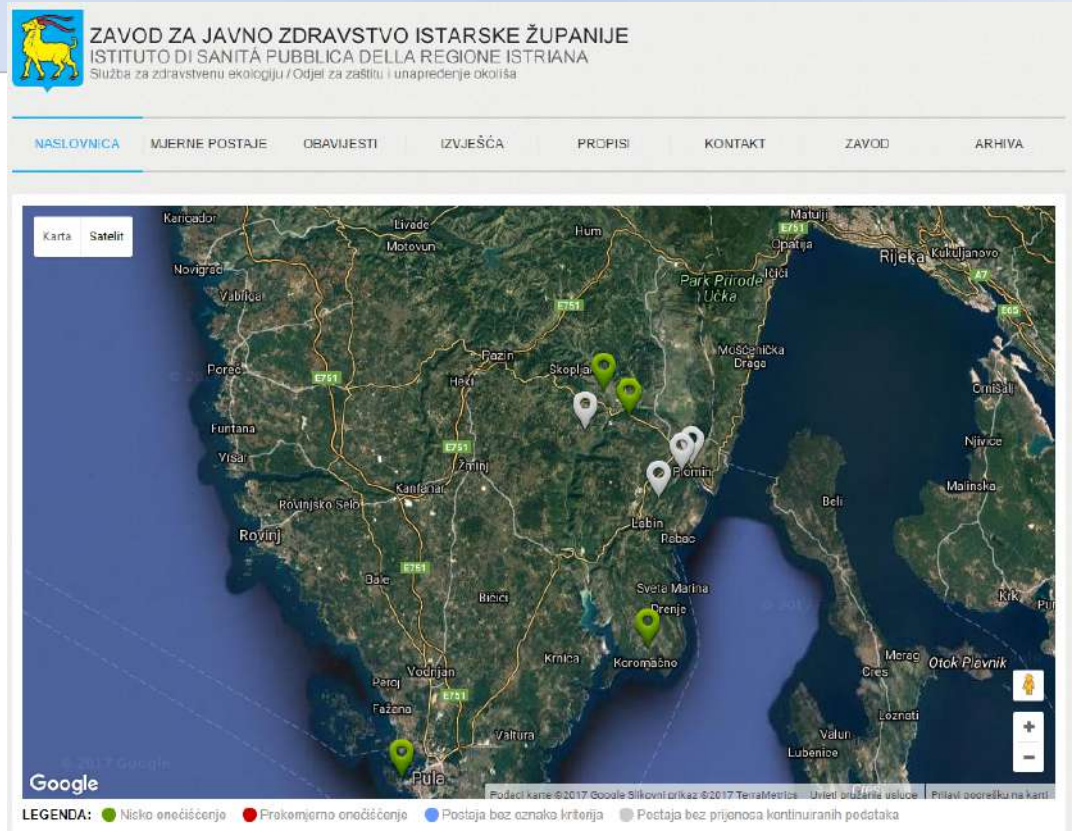
Only the concentrations of pollutants are shown on the web sites of **Teaching Institute of Public Health of Primorsko-goranska County** - no display via index

http://www.zzjzpgz.hr/zrak/

15.5 EXAMPLES

Only the concentrations of pollutants are shown on the web sites of **Teaching Institute of Public Health of** Istarska County - no display via index

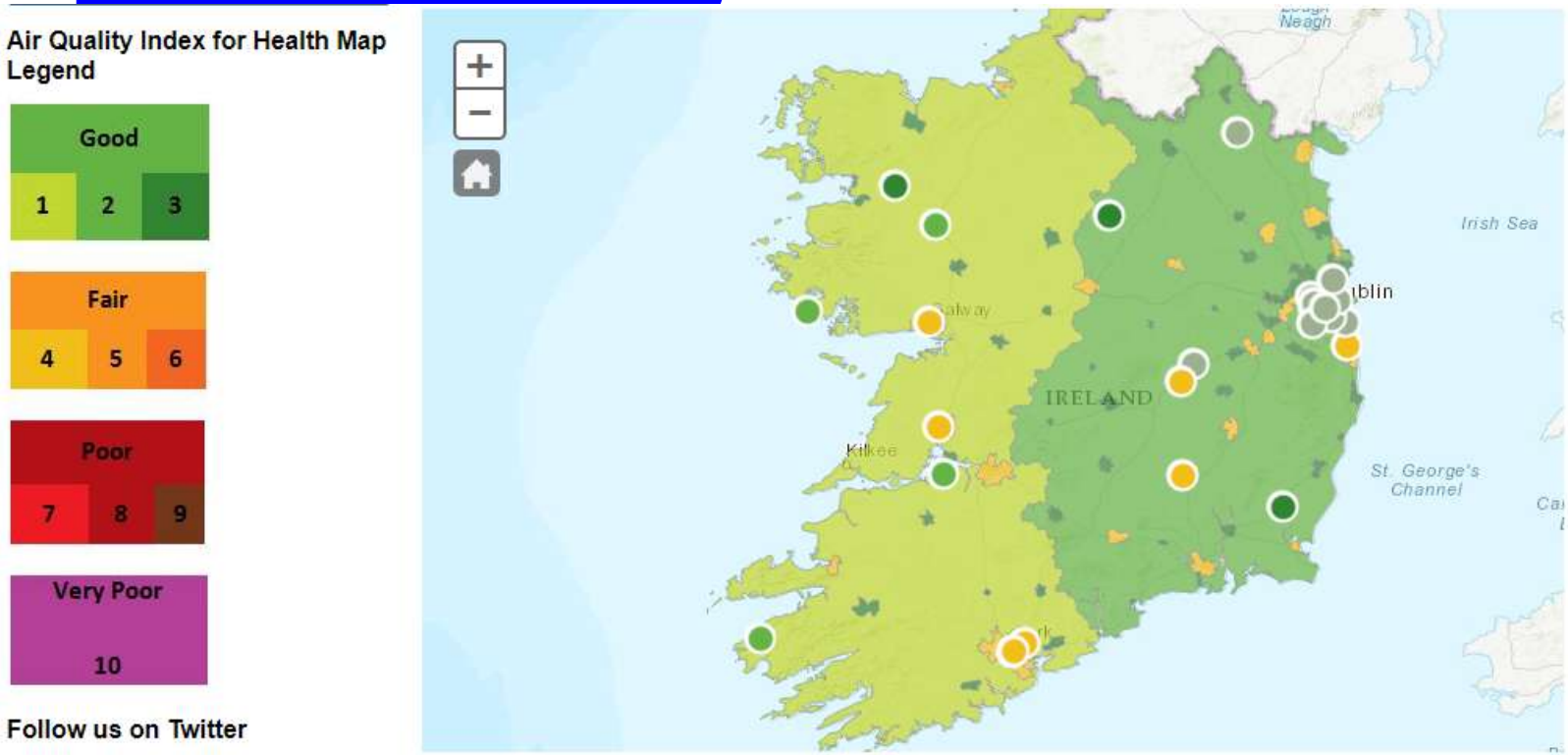
http://zrak.zziziz.hr/



15.5 EXAMPLES

Ireland - the whole regions (zones) and cities (agglomerations) are colored by the index color. Monitoring stations in indexing colour can also be displayed optionally. The index differs from CAQI.

http://www.epa.ie/air/quality/



15.5 EXAMPLES

Ireland

- Explanation of index levels with health message

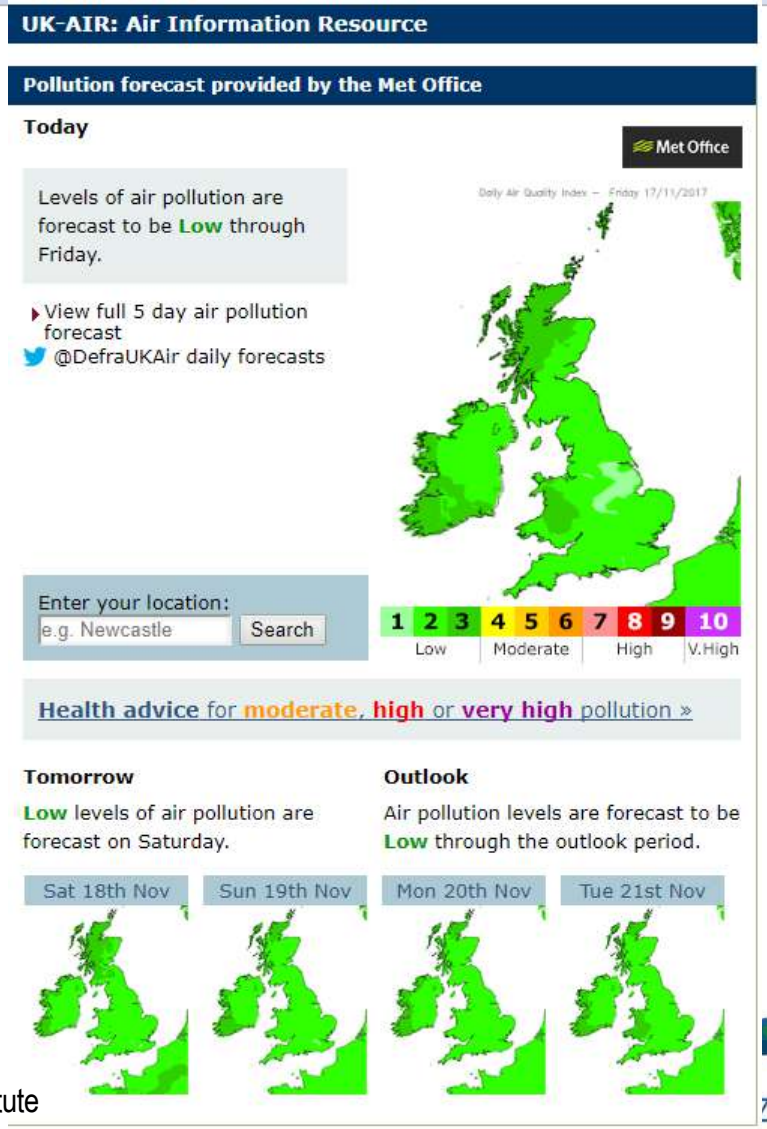
Band	Index	Accompanying health messages for at-risk groups and the general population	
		At-risk individuals *	General population
Good	1	Enjoy your usual outdoor activities.	Enjoy your usual outdoor activities.
	2		
	3		
Fair	4	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors.	Enjoy your usual outdoor activities.
	5		
	6		
Poor	7	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical activity, particularly outdoors, and particularly if they experience symptoms. People with asthma may find they need to use their reliever inhaler more often. Older people should also reduce physical exertion.	Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors.
	8		
	9		
Very Poor	10	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity. People with asthma may find they need to use their reliever inhaler more often.	Reduce physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat.

15.5 EXAMPLES

Great Britain

- Forecast of index levels for the next five days

https://uk-air.defra.gov.uk/



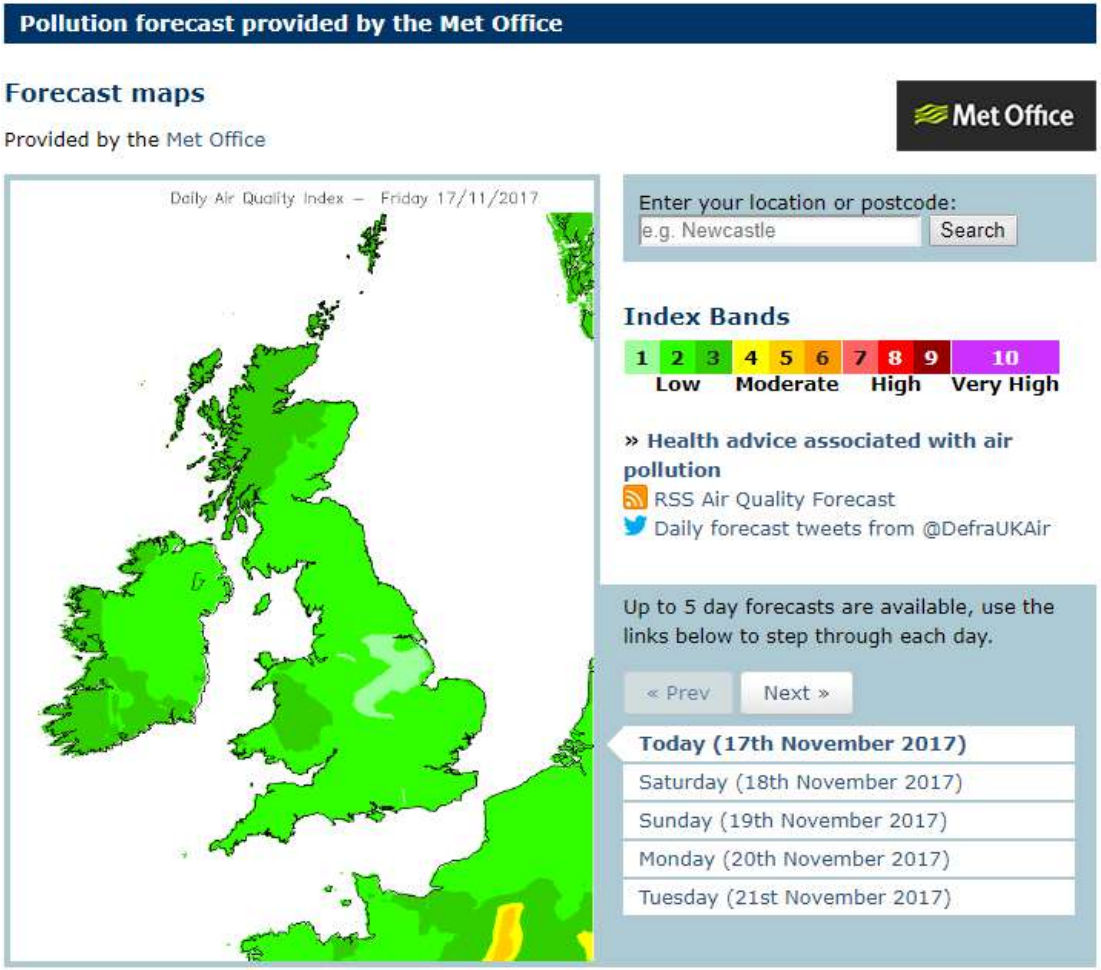
15.5 EXAMPLES

Great Britain

- Forecast of index levels for the next five days

https://uk-air.defra.gov.uk/

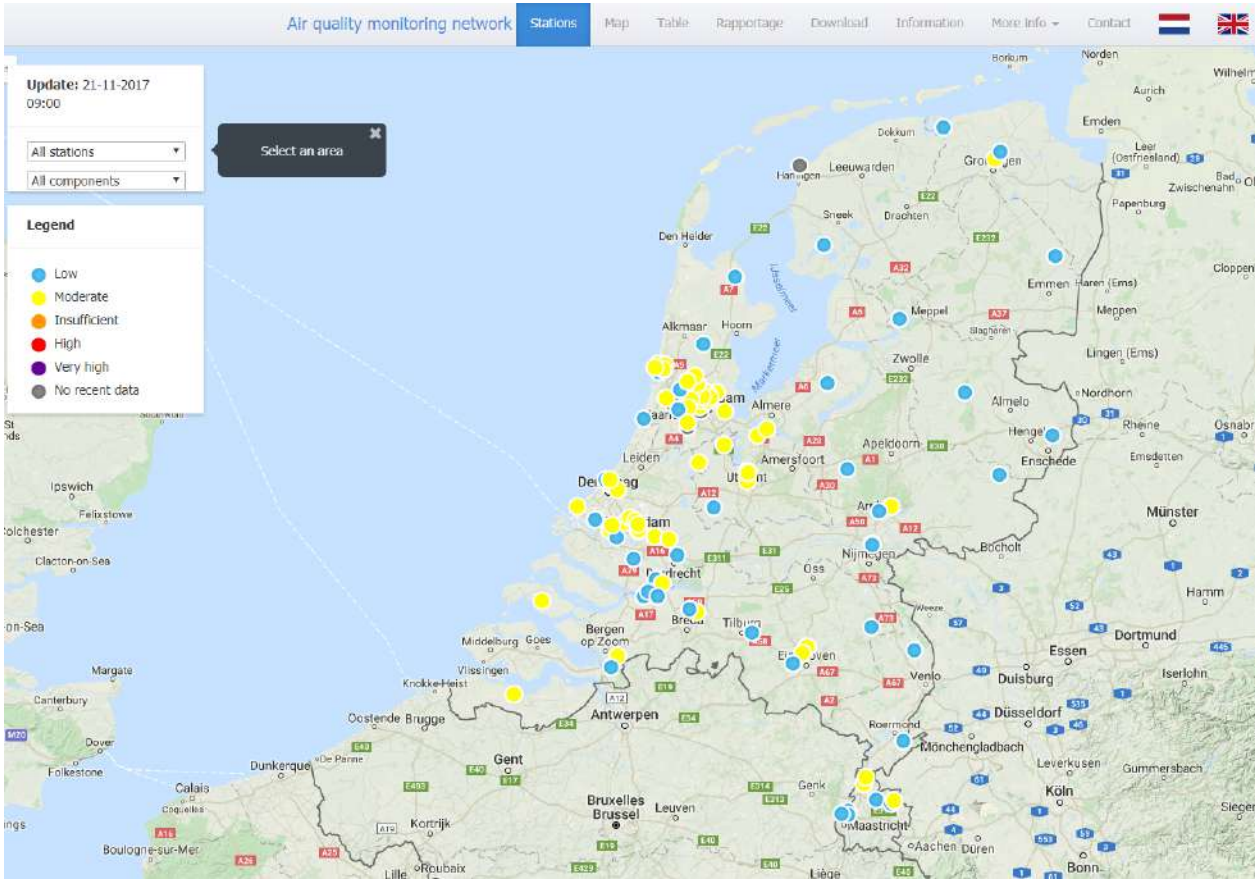
https://uk-air.defra.gov.uk/forecasting/



15.5 EXAMPLES

Netherlands

- Indexation with display of monitoring stations in index colour



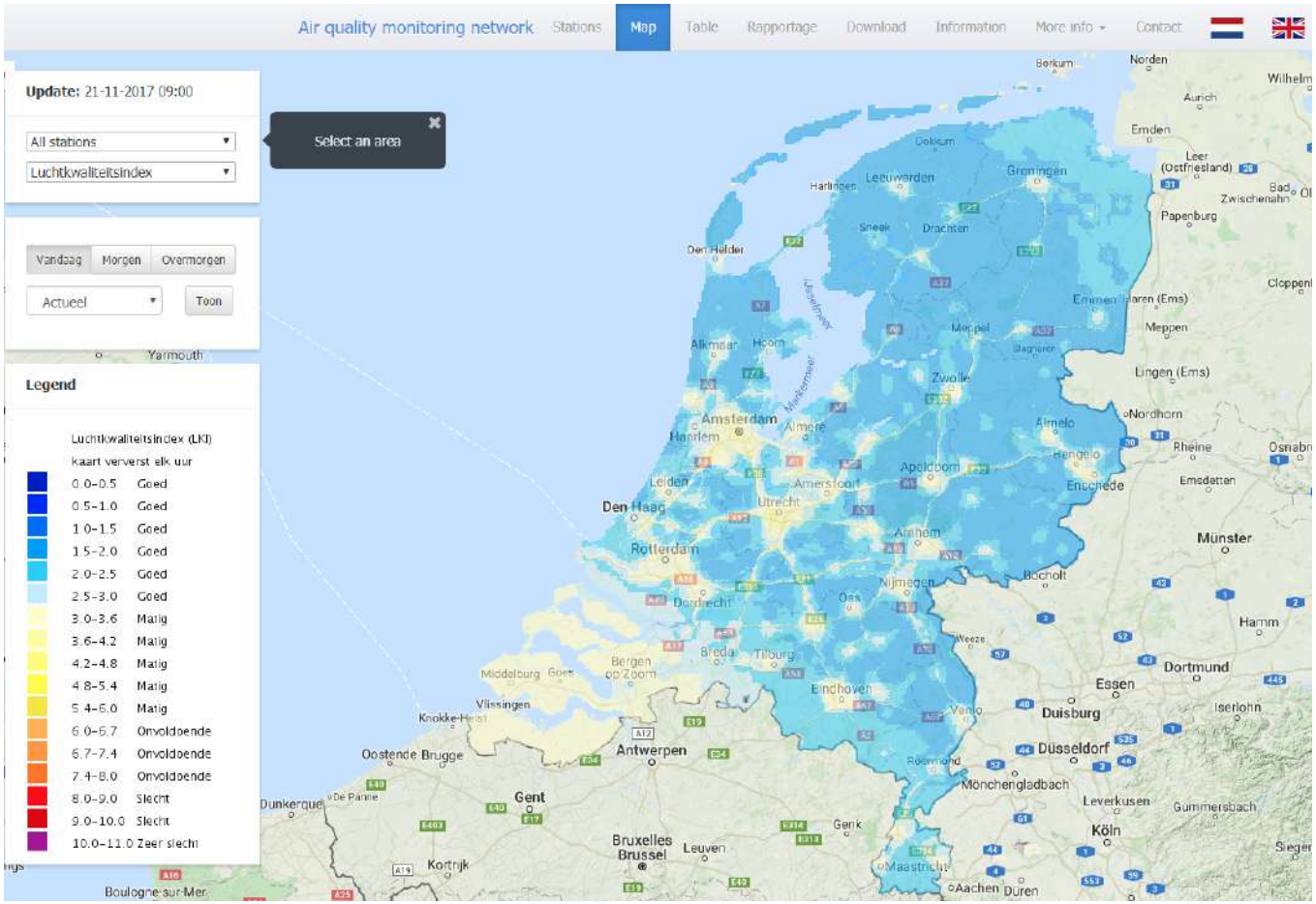
https://www.luchtmeetnet.nl/

15.5 EXAMPLES

Netherlands

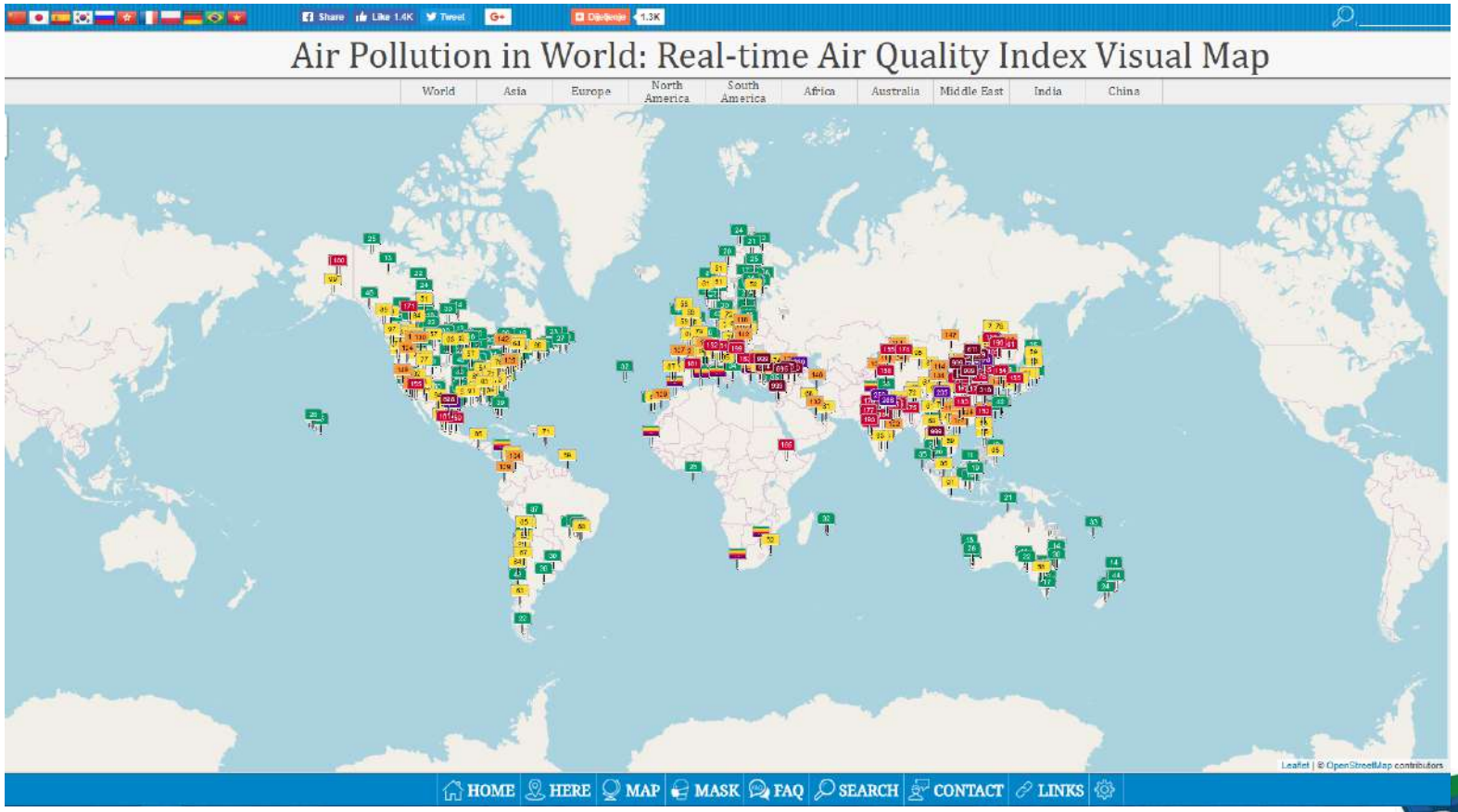
- -A cartographic view can also be seen - with the air quality forecast up to two days in advance

https://www.luchtmeetnet.nl/kaart



15.5 EXAMPLES

World – display of air quality index in the world– multilingual selection option
http://aqicn.org/map/world/

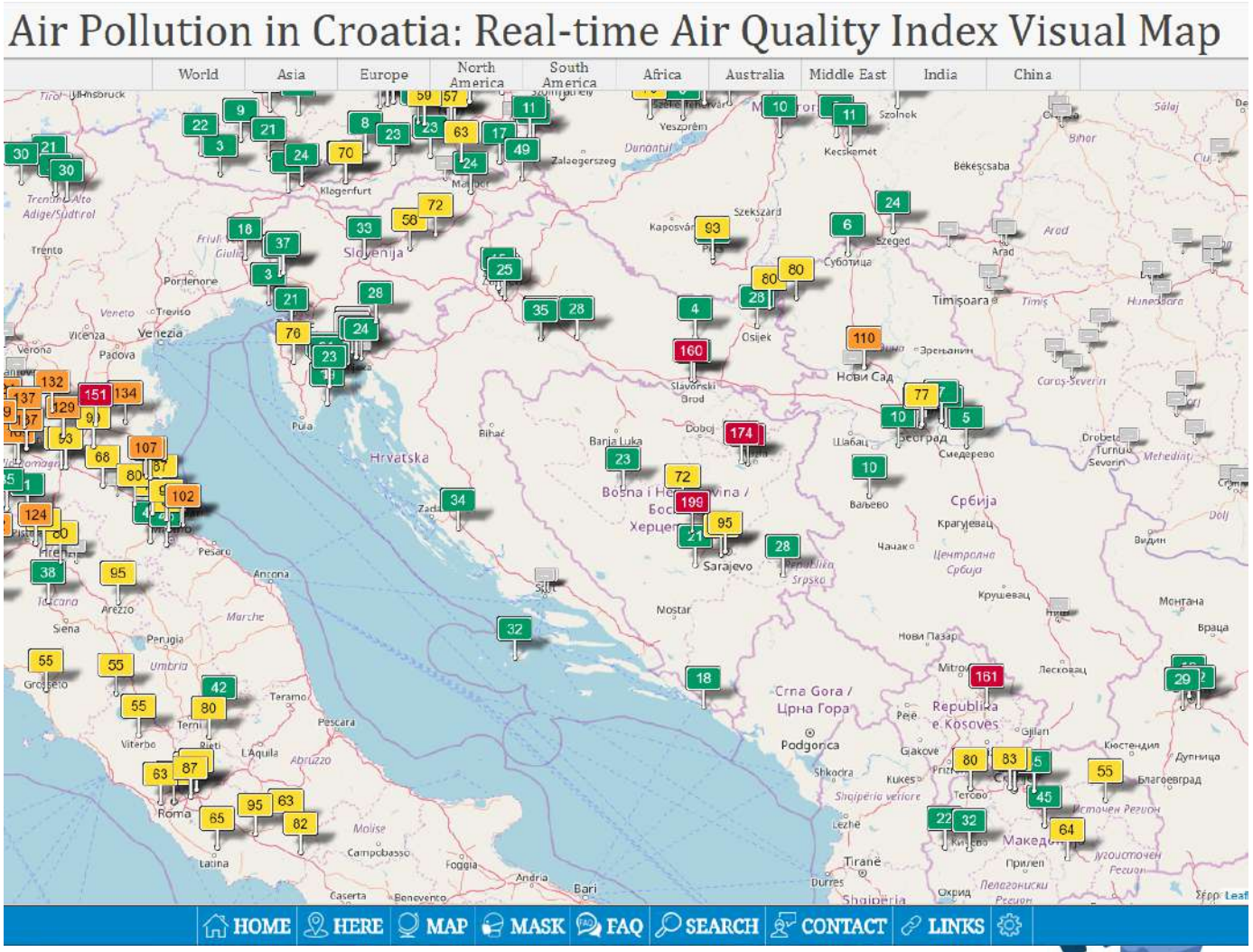


15.5 EXAMPLES

World

Chinese web site- option to select a country, a region, a continent

http://aqicn.org/map/croatia/#@g/44.183/16.2872/7z

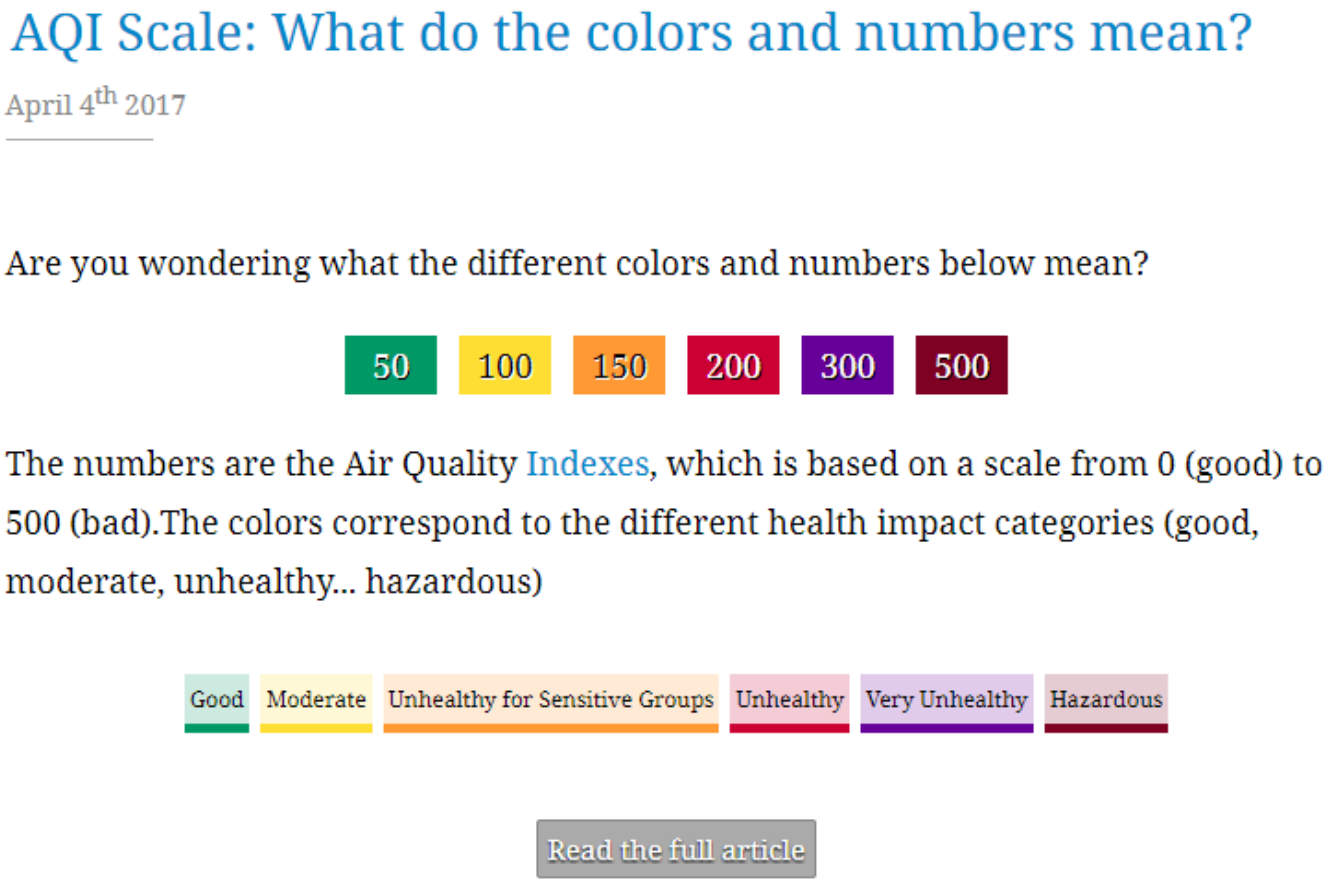


15.5 EXAMPLES

World

Chinese web site- option to select a country, a region, a continent

http://aqicn.org/faq/



AQI Scale: What do the colors and numbers mean?

April 4th 2017

Are you wondering what the different colors and numbers below mean?

50 100 150 200 300 500

The numbers are the Air Quality Indexes, which is based on a scale from 0 (good) to 500 (bad).The colors correspond to the different health impact categories (good, moderate, unhealthy... hazardous)

Good | Moderate | Unhealthy for Sensitive Groups | Unhealthy | Very Unhealthy | Hazardous

Read the full article

15.5 EXAMPLES

World

Chinese web site- option to select a country, a region, a continent

http://aqicn.org/scale/

Air Quality Index Scale and Color Legend

The table below defines the Air Quality Index scale as defined by the US-EPA 2016 standard:

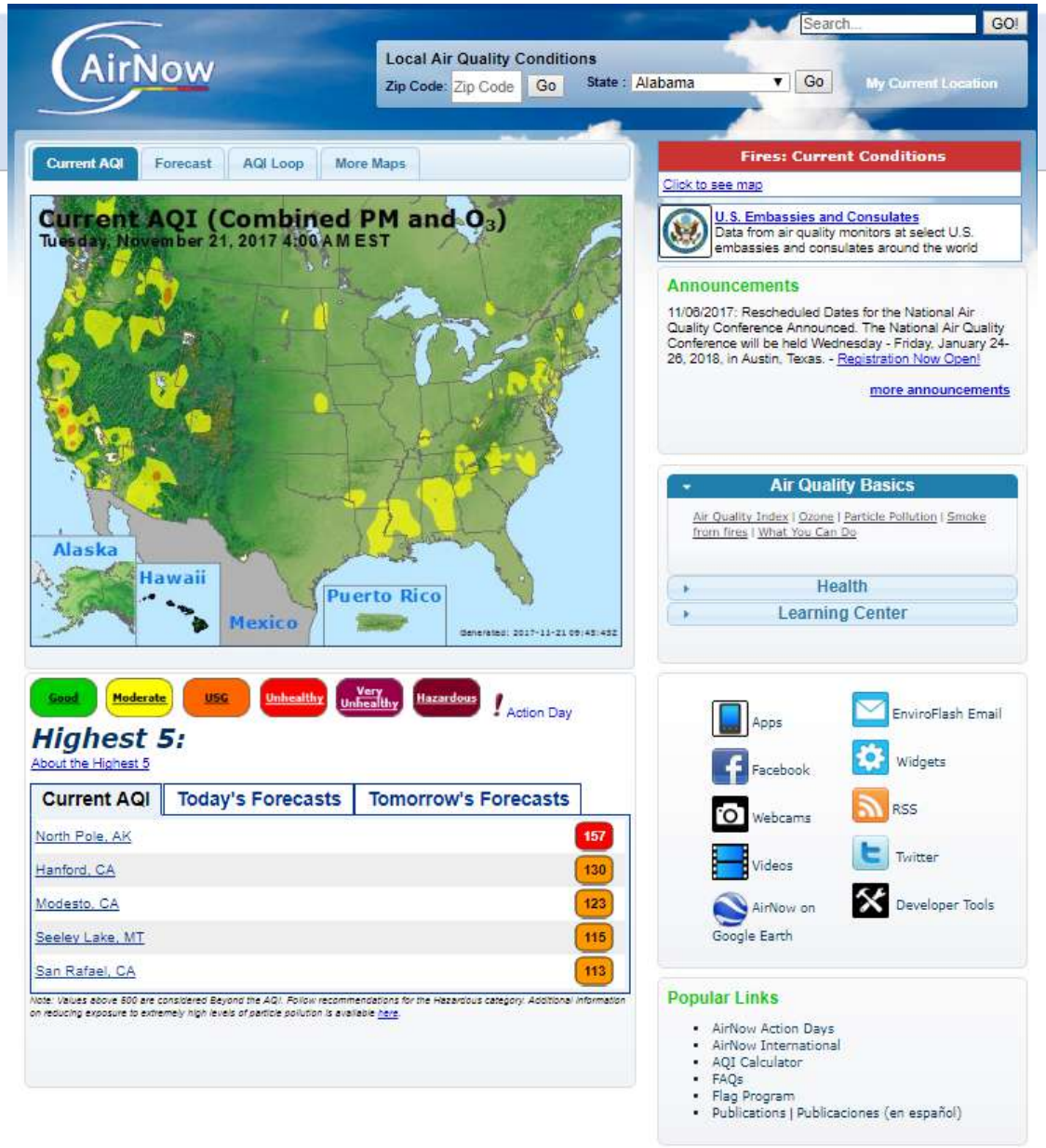
AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

15.5 EXAMPLES

USA

The Air Quality Index on the EPA (Environmental Protection Agency) website

https://www3.epa.gov/airnow/aqi_brochure_02_14.pdf



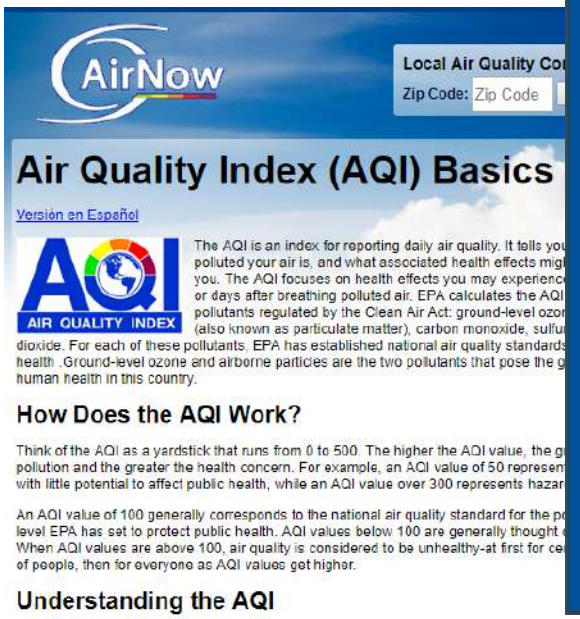
15.5 EXAMPLES

USA

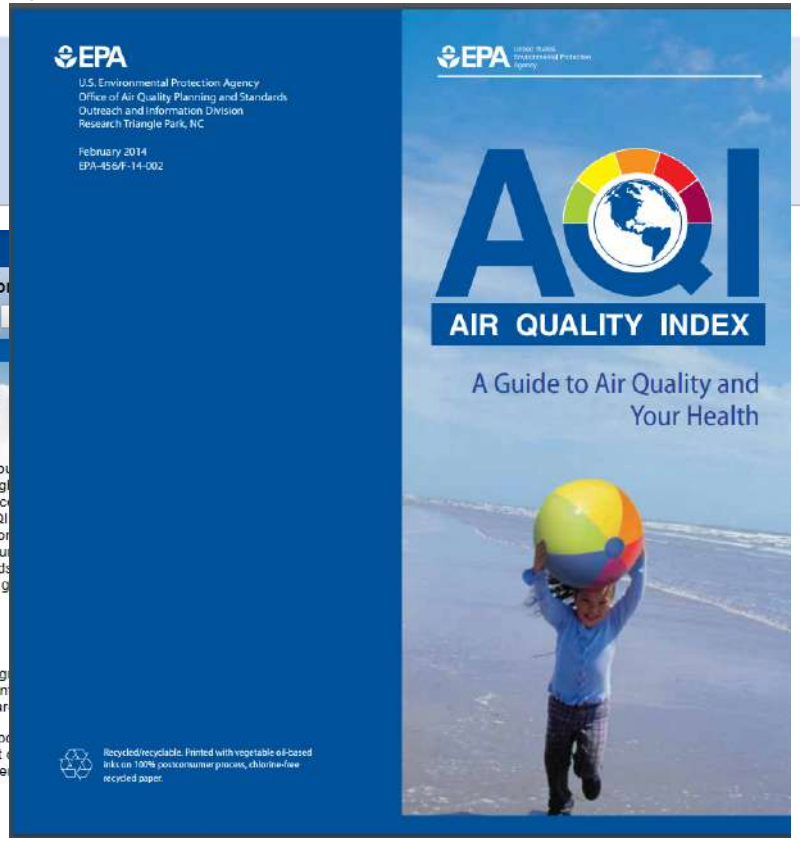
- Indexation legend

https://airnow.gov/index.cfm?action=aqi.basics

https://www3.epa.gov/airnow/aqi_brochure_02_14.pdf



Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*..air quality conditions are:*	*...as symbolized by this color:*
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon



15.5 EXAMPLES

USA - EPA

Interactive air quality data map

https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

EPA United States Environmental Protection Agency

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Outdoor Air Quality Data

- Air Data Home
- Learn about Air Data
- Pre-generated Data Files
- Download Daily Data
- Download Raw Data
- **Interactive Map**
- Air Quality Index Report
- Air Quality Statistics Report
- Monitor Values Report
- Monitor Values Report - Hazardous Air Pollutants
- Air Quality Index Daily Values Report
- Tile Plot - Multiyear
- Tile Plot - Single Year
- AQI Plot
- Concentration Plot
- Ozone Exceedances
- Concentration Map

Interactive Map of Air Quality Monitors

The AirData Air Quality Monitors app is a mapping application available on the web and on mobile devices that displays monitor locations and monitor-specific information. It also allows the querying and downloading of data daily and annual summary data.

Map layers include:

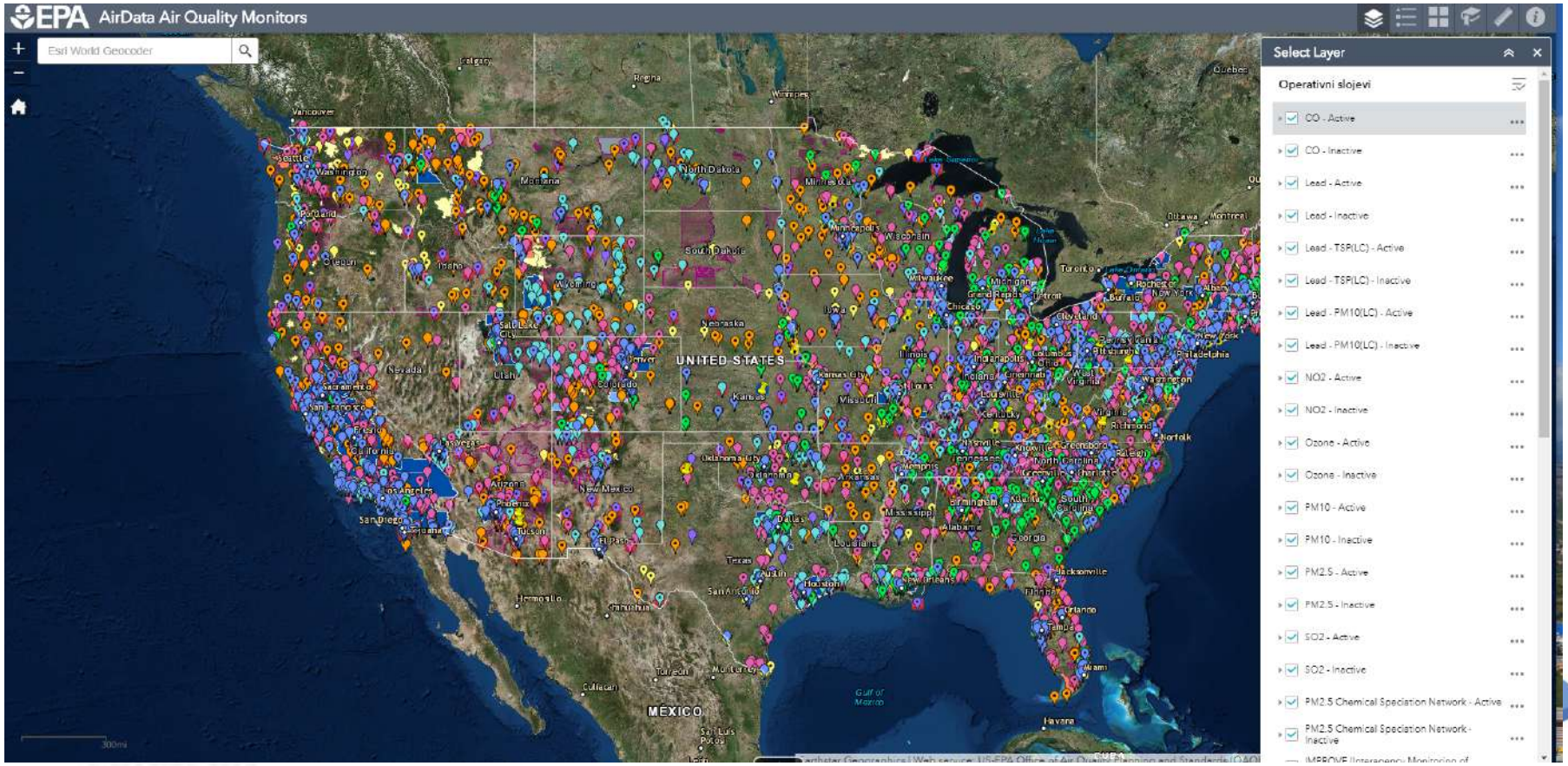
- Monitors for all criteria pollutants (CO, Pb, NO2, Ozone, PM10, PM2.5, and SO2)
- PM2.5 Chemical Speciation Network monitors
- IMPROVE (Interagency Monitoring of PROtected Visual Environments) monitors
- NATTS (National Air Toxics Trends Stations)
- NCORE (Multipollutant Monitoring Network)
- Nonattainment areas for all criteria pollutants
- Tribal areas
- Federal Class I areas (national parks and wilderness areas)

Note: We are working to provide a KML service for the monitor network layers. In the meantime, we are posting a static version of the KMZ files on this page for your convenience.

15.5 EXAMPLES

USA – option to add all individual layers on the map....

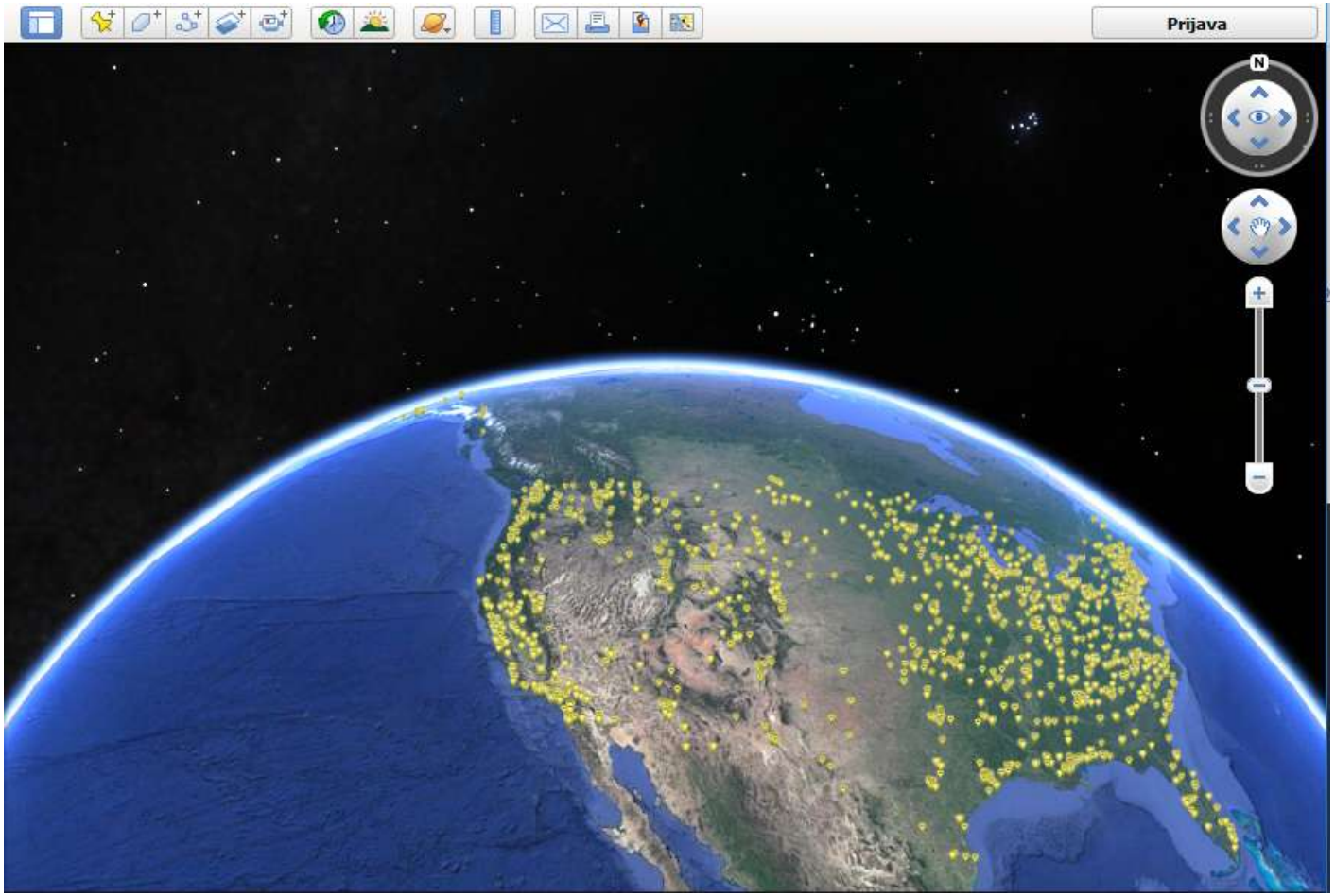
https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=5f239fd3e72f424f98ef3d5def547eb5&extent=-146.2334,13.1913,-46.3896,56.5319



15.5 EXAMPLES

USA

Viewing is possible also through Google Earth App....



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THANK YOU FOR YOUR ATTENTION

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