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Let's think of the ways to care for the air we breathe

Air Pollution Analysis in 6 European countries

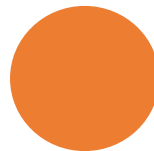


How we worked?

Example (and easy 😊) method to estimate the content of dust pollutants in the air

Let's start!

- Choose in your area some trees (with quite big leaves). It would be best if they belong to the same genre (only beeches, for example).
- Wipe the leaves (3 up to 5) with cotton pads (1 leaf - 1 cotton pad). Chosen leaves should be maximally exposed to the air, it would be best if they would be situated in the outer part of a tree, not in the inner part.
 - * - great idea is to select a few trees from the area exposed to the pollution (e.g., next to the streets or the electricity plants' chimneys) and from the area where the air is relatively clean (e.g. in the forest);
 - ** - this is a great opportunity to learn a bit about the trees in your place of living and you can perform a great experiment comparing different tree species! Perhaps different species have different self-purification abilities.



How we worked?

Next...

- Take photos of the used cotton pads, remember about the same lighting conditions during taking photos.
- Compare pictures of different cotton pads from different days. What do you see? Pay attention to the amount of dust and the color (**cotton pads can be dry or soaked in water. Find out which ones are best for the experiment**).
- It would be best to come to the same trees every day and check their leaves with cotton pads. In your notes, write down how many days have passed since the last rainfall.
- Day by day you should notice more and more dust on your white cotton pad. Always choose new leaves to wipe with new clean cotton pads (if you chose leaves that were already cleaned before e.g. the day before, the results would be distorted).



How we worked?

Some advice...

- After the rain, the leaves are cleaned of dust and pollution. They have the ability to purify themselves during rainfalls. Do not perform the experiment immediately after the rain, the leaves' surface has to dry out.
- A day or two after the rainfall, the cotton pad could stay still clean, perhaps after a few days, the dust would be visible, let's find out!
- Maybe the dust from different countries will differ from each other, we have various types of soil in different areas, some of us are closer to the deserts, others further (it probably have some effect), wind direction also has a lot of importance, amount of rainfall, microclimate, traffic, presence of industrial plants and power plants using conventional energy sources, land relief etc.



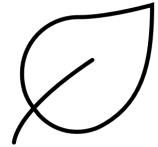


Poland - the quality of air in Sosnowiec



Experiment made by Polish students:

- Jakub Pietraszczyk
- Emilia Grabarczyk



Poland - the quality of air in Sosnowiec

- Most of the air pollution across Poland has been the result of the country's dependence on coal to power its homes and economy. The country's coal industry remains an important part of the local economy. Poland is the second largest coal-mining country in Europe, after Germany.
- In 2012, mining produced 144 million metric tons of coal which provided 55 per cent of the required domestic energy and 75 per cent of the consumption needed to produce power.
- In Sosnowiec in February 2021, the air reached a high level of pollution -higher than the maximum limit for 24 hours established by WHO.
- For now the air is moderately polluted. Greater than the maximum limit established for one year by WHO.



Poland - the quality of air in Sosnowiec

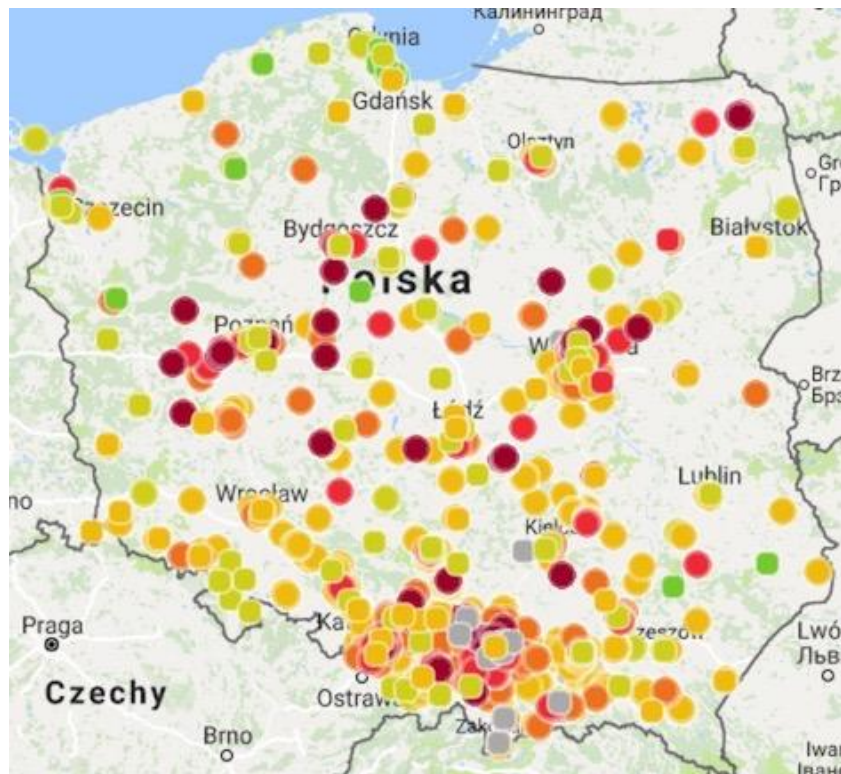
- Of course, there are visible differences between the pollution levels in summer and winter, because of warming of buildings during cold months.
- Many homes use conventional energy sources, such as coal in traditional furnaces. Many of them are unfortunately uneconomical and unecological. The combustion process is ineffective and resulting in pollutants, which are emitted into the atmosphere.



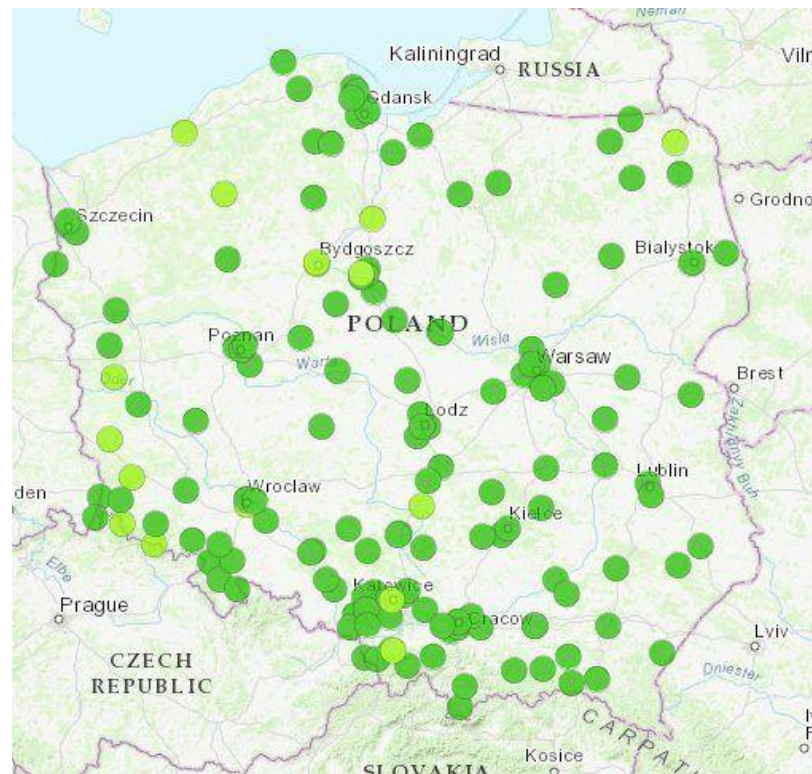
Poland - the quality of air in Sosnowiec

- Luckily, there are furnaces that reduce the amount of emitted pollutants and some of Polish people posses them.
- In addition, the city (Sosnowiec) organizes programs aimed to replace old furnaces with newer ones and programs that partially finance the installation of solar panels on the buldings roofs.





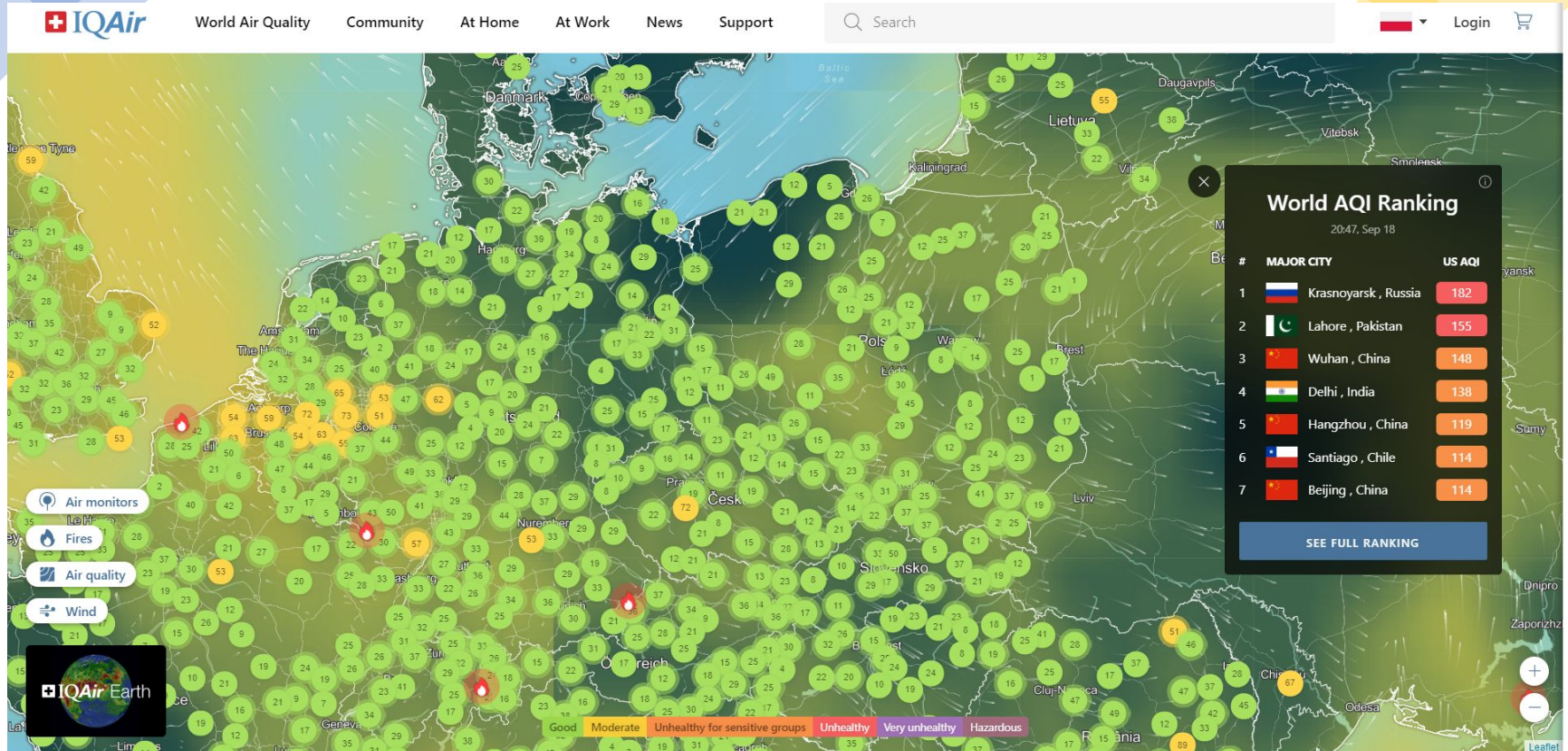
Winter



Summer



Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]

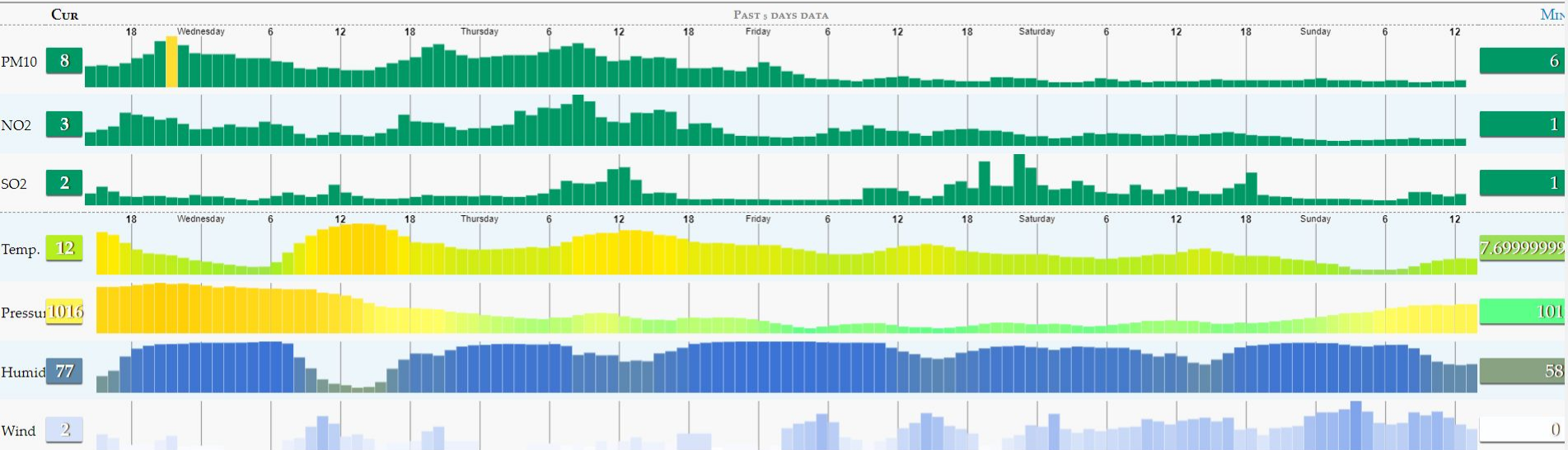
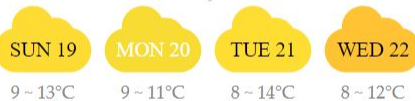


Air Quality Index of Sosnowiec - 19.09.2021

Updated on Sunday 13:00

Temp.: 12°C - Wind: 2m/s 0 -

Air Quality Forecast





Poland - the quality of air in Sosnowiec

- Observation of the leaves showed a slight amount of dust in the air.
- Most likely, the origin is both natural (e.g. pollen) and anthropogenic (pollution from chimneys, cars, etc.).
- It is worth repeating the tests in the winter months to make a comparison.





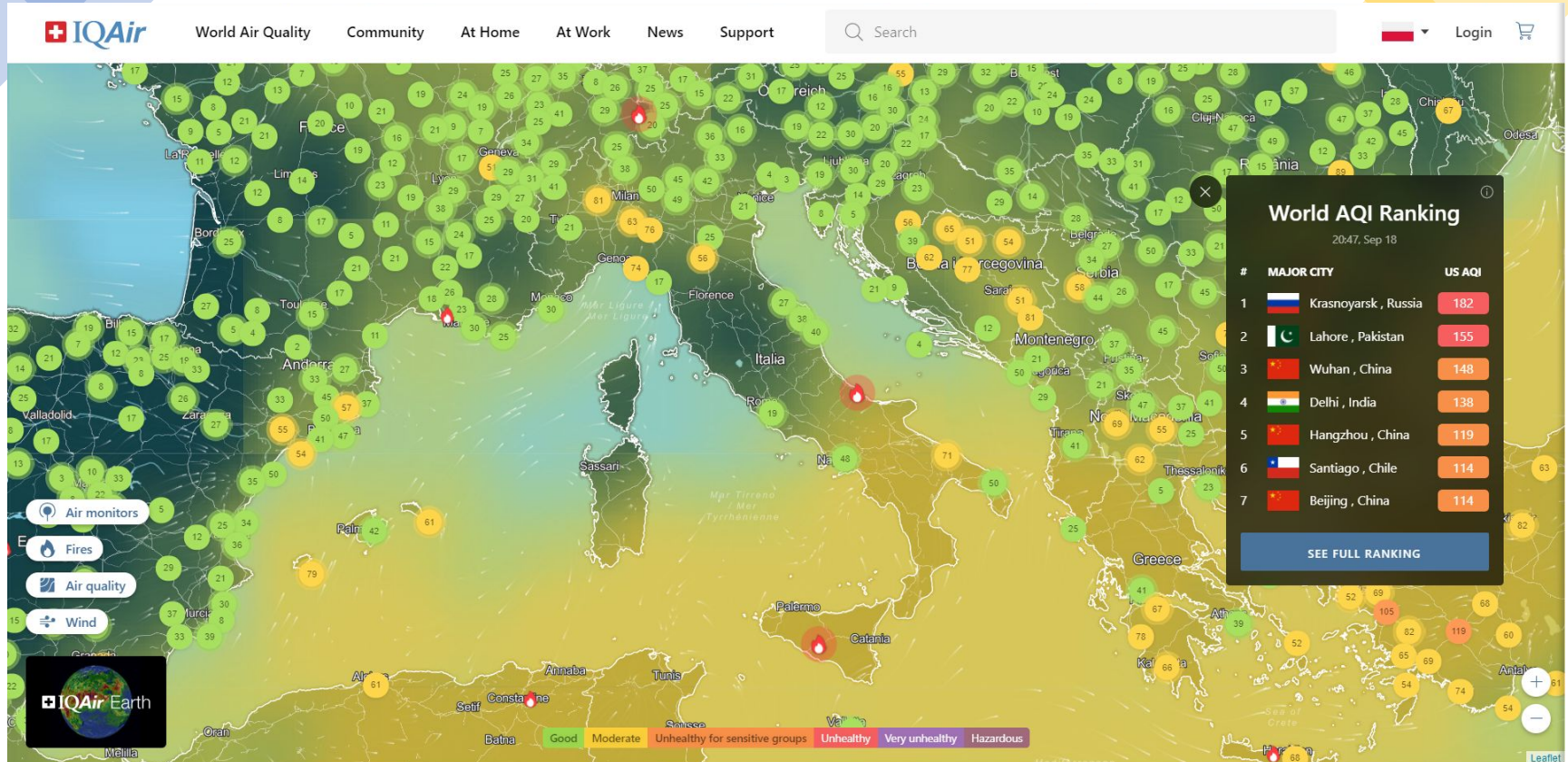
Italy - the quality of air in Palermo



Italy - the quality of air in Palermo

- The quality of air in the town is moderately polluted. Greater than the maximum limit established for one year by WHO.
- In Northern Italy the fact of pollution is worse than the south, since the means are used more frequently.
- Moreover there is a lot of smog there which also affects the climate factor. Over 60,000 people die from pollution and radiation from electrical industries.

Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]





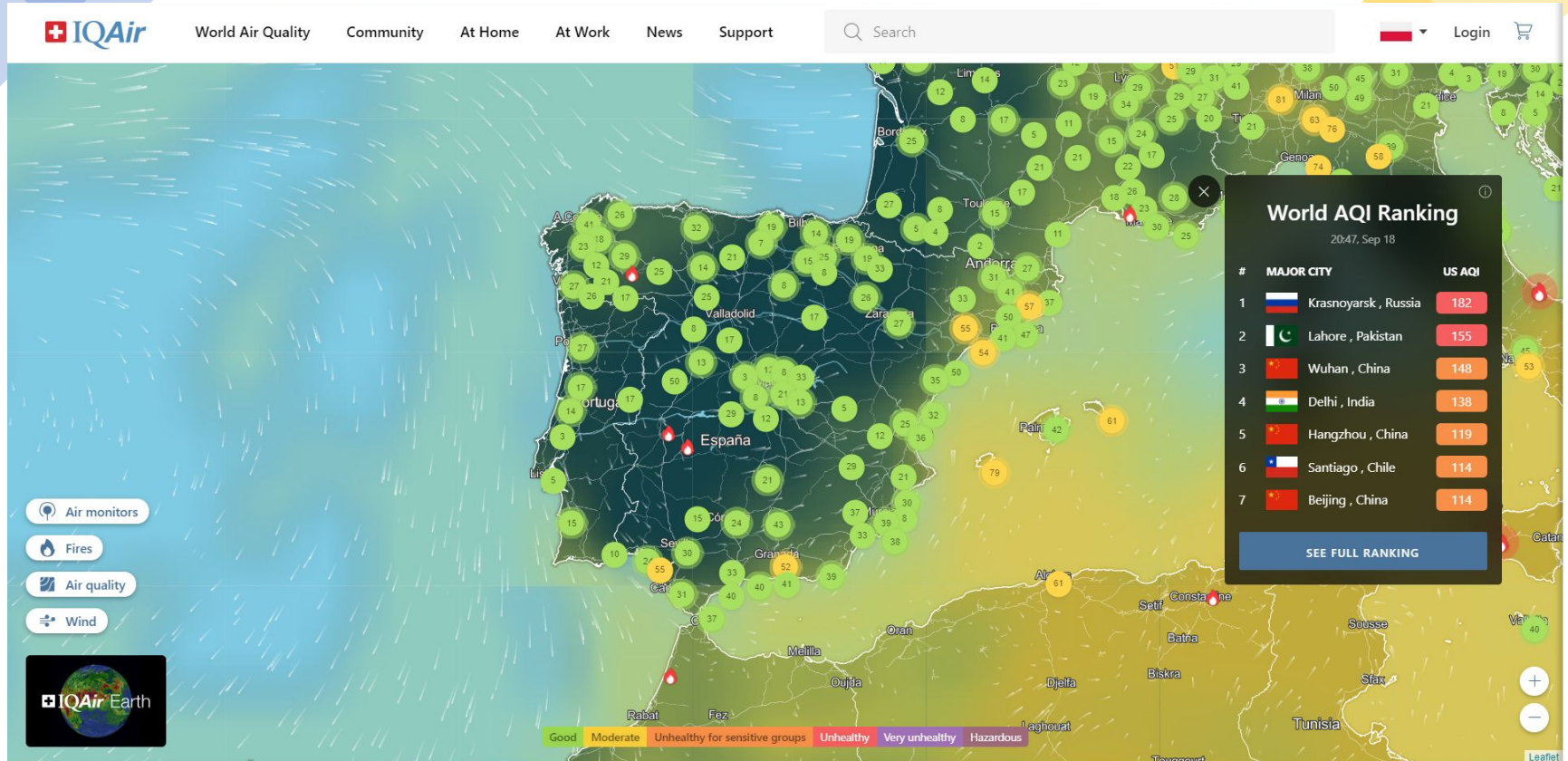
Spain - the quality of air in Elche



Spain - the quality of air in Elche

- The main polluters/emitters in the Valencian Community are the combined cycle plant of Gas Natural Unión Fenosa in Sagunto, the oil refinery of BP oil in Grau, Castellón and the cement factories of Cemex, Buñol and Alicante, and Lafarge Holcim, Sagunto.

Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]





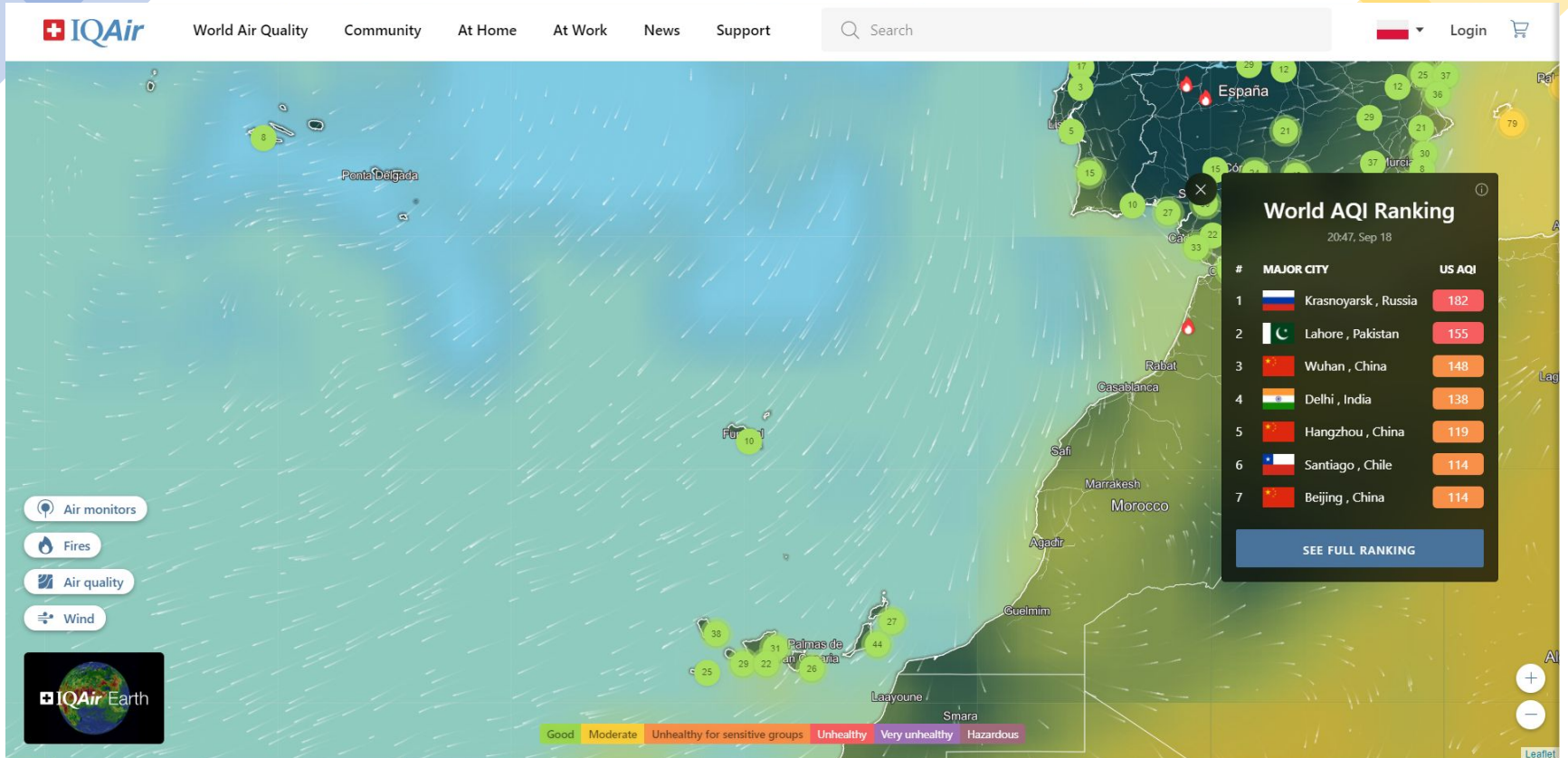
Portugal - the quality of air in Madeira



Portugal - the quality of air in Madeira

- The major air polluter in Portugal is Sines Thermoelectric Power Station (EDP), followed by other industries such as pulp and paper factories (Unicer and Portucel) and cement companies like Cimpor.

Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]

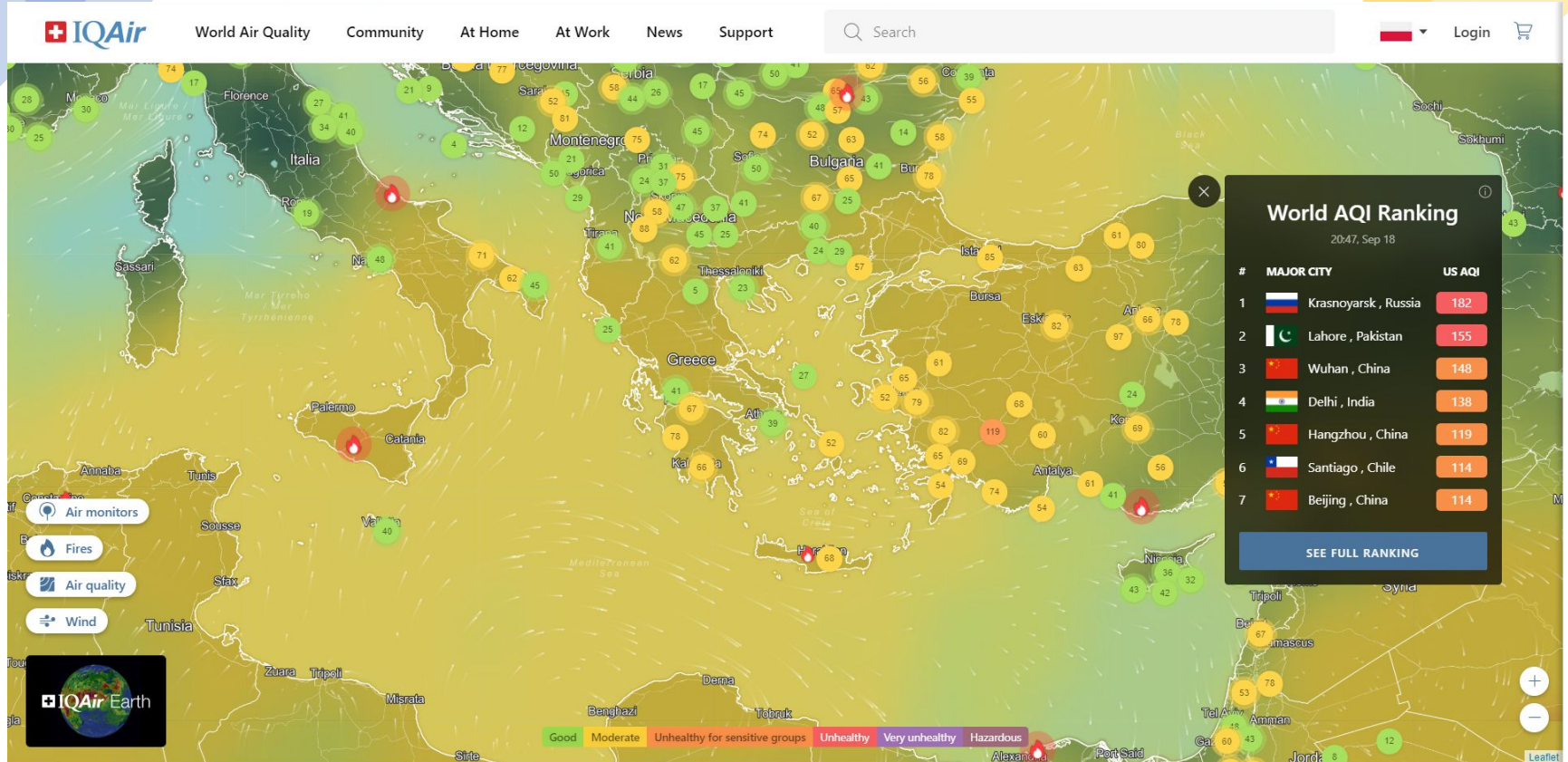




Greece - the quality of air in Thessaloniki



Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]

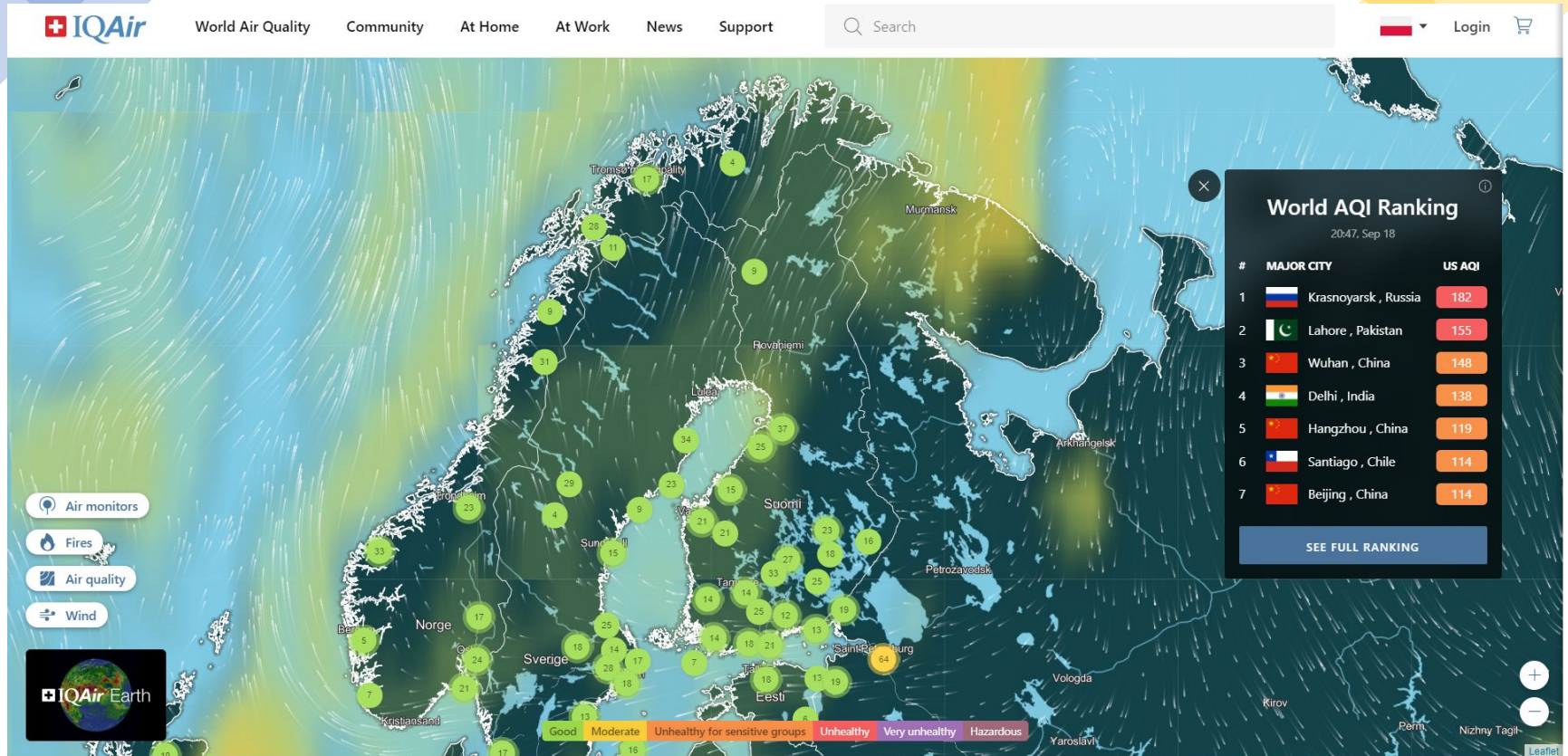




Finland - the quality of air in Mantsala



Air Quality Index of our cities - 18.09.2021 [about 5 o'clock]



Comparison and conclusions





Air Quality Index of our cities



18.09.2021 [ABOUT 5 O'CLOCK]

City	Sosnowiec	Palermo	Elche	Madeira	Thessaloniki	Mantsala (Lahti)
PM 2.5	6 $\mu\text{g}/\text{m}^3$	22.1 $\mu\text{g}/\text{m}^3$	5 $\mu\text{g}/\text{m}^3$	6.5 $\mu\text{g}/\text{m}^3$	6.3 $\mu\text{g}/\text{m}^3$	2 $\mu\text{g}/\text{m}^3$
PM 10	7.8 $\mu\text{g}/\text{m}^3$	ND	ND	16.9 $\mu\text{g}/\text{m}^3$	ND	3.9 $\mu\text{g}/\text{m}^3$
SO ₂	3.6 $\mu\text{g}/\text{m}^3$	ND	ND	2 $\mu\text{g}/\text{m}^3$	ND	8.2 $\mu\text{g}/\text{m}^3$
AQI	25 (Good)	72 (Moderate)	24 (Good)	27 (Good)	26 (Good)	8 (Good)



Air Quality Index of our cities



19.09.2021 [ABOUT 4 O'CLOCK]

City	Sosnowiec	Palermo	Elche	Madeira	Thessaloniki	Mantsala (Lahti)
PM 2.5	ND	13.1 $\mu\text{g}/\text{m}^3$	3 $\mu\text{g}/\text{m}^3$	3.1 $\mu\text{g}/\text{m}^3$	12.2 $\mu\text{g}/\text{m}^3$	3.3 $\mu\text{g}/\text{m}^3$
PM 10	8.6 $\mu\text{g}/\text{m}^3$	ND	ND	ND	ND	5.5 $\mu\text{g}/\text{m}^3$
SO ₂	3.6 $\mu\text{g}/\text{m}^3$	ND	ND	ND	ND	6.5 $\mu\text{g}/\text{m}^3$
AQI	8 (Good)	53 (Moderate)	12 (Good)	13 (Good)	51 (Moderate)	13 (Good)



Do the partner countries have similar or different regional air polluters?

- Gas and Shoe Industries (Spain)
- Thermoelectric and Paper Industries (Portugal)
- Electrical industries (Italy)
- Coal mining and conventional coal-fired power plant (Poland)

The partner countries have different regional air polluters.



Air Quality Index



GOOD



Open your windows to bring clean, fresh air indoors



Enjoy outdoor activities

Unhealthy for Sensitive Groups



Sensitive groups should wear a mask outdoors
GET A MASK



Run an air purifier
GET AN AIR PURIFIER



Close your windows to avoid dirty outdoor air



Everyone should reduce outdoor exercise

MODERATE



Close your windows to avoid dirty outdoor air



Sensitive groups should reduce outdoor exercise

Unhealthy



Wear a mask outdoors
GET A MASK



Run an air purifier
GET AN AIR PURIFIER



Close your windows to avoid dirty outdoor air



Avoid outdoor exercise



What impact on our health and wellbeing does the quality of air have? What are the dangers for us if we live in a town with a polluted air? What are the benefits of breathing in clean air?



Around the world, nine out of 10 people breathe unhealthy air. Air pollution is now the biggest environmental risk for early death, responsible for more than 6 million premature deaths each year from heart attacks, strokes, diabetes and respiratory diseases.

Exposure to high levels of air pollution can cause a variety of adverse health outcomes. It increases the risk of **respiratory infections, heart disease and lung cancer**. Both short and long term exposure to air pollutants have been associated with health impacts. More severe impacts affect people who are already ill.

Breathing in air pollutants can irritate your airways and may cause shortness of breath, coughing, wheezing, asthma episodes and chest pain. Exposure to air pollution puts you at risk for lung cancer, **heart attacks, stroke** and in extreme cases, premature death.





Benefits of breathing in clean air

- cleaner lungs
- decreased asthma and allergies symptoms
- improved skin appearance
- better/easier digestion
- psychological and emotional stabilization
- better mood and normalized sleep patterns
- reduced chances of lung, heart, and arterial diseases

Some advice

- Finally, to improve the air quality in each country we could for example:
 - replace our car to bikes
 - use public transport
 - plant more trees
 - switch to clean energy
 - eat less red meat and meat in general
 - make your home more energy-efficient
 - minimize plastic use
 - give the broken things and garbage „second life”
 - try to recycle more and more





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Thank you 😊

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