



ATMOSPHERE
BUNDLE

**AIR POLLUTION IN MADAGASCAR, MAJOR
CHALLENGE OF HEALTH AND THE ENVIRONMENT**

LYCEE
ANDOHALO

RESEARCH TEAM

GLOBE STUDENTS: - RASAMIMANANA Lovasoa Christi

- ANDRIAMAMINIAINA Lovasoa
- TOLOJANAHARY Jacquelin Bruno

GLOBE TEACHERS: - RABENANDRASANA Doris

ORGANIZATION : LYCEE ANDOHALO High School -District Antananarivo ville
-Commune 1er Arrondissement– Antananarivo Madagascar

ABSTRACT

Atmospheric pollution represents a growing problem air pollution in Madagascar. Despite its exceptional biodiversity, the island faces increasingly worrying environmental challenges linked to air quality. Emissions from industrial activities, transportation and agricultural practices have increased significantly, directly impacting the health of residents and Madagascar's unique biological diversity.

This study examines in depth the specific sources of air pollution in the Malagasy context, assesses its repercussions on public health and the ecosystem, and proposes strategic recommendations to mitigate these effects while promoting sustainable development. The results of this research aim to raise awareness of the issues of air pollution in Madagascar and to guide future actions to preserve the air quality and natural wealth of the island.

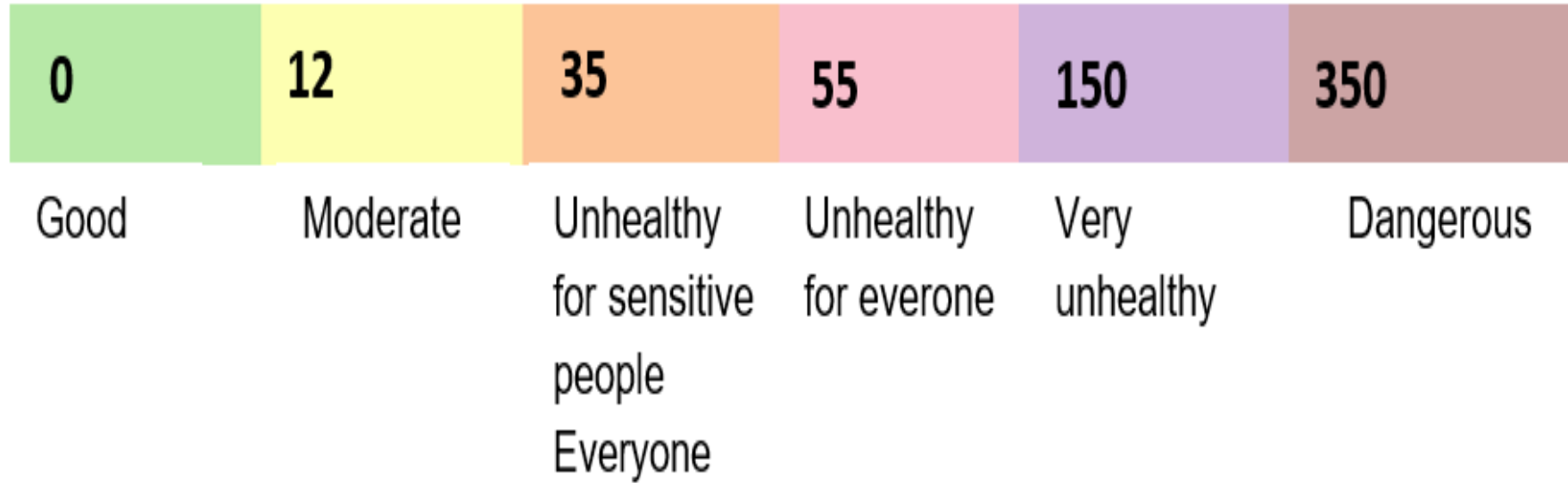
RESEARCH QUESTIONS

WHAT IS THE VARIATION OF AIR POLLUTION IN THE CAPITAL AND THE
NEIGHBORING?
WHAT ARE THEIRS IMPACTS?

Concentrations of $\mu\text{g}/\text{m}^3$	Air quality	health impacts
0-12	Good	Air quality is considered satisfactory and air pollution poses little or no risk
12-35	Moderate	Aire quality is acceptable . however, if people who are exceptionally
35-55	Unhealthy for sensitive people Everyone	sensitive to air pollution are exposed fo 24 hours there may experiencece health effects if exposed for 24 hours, the general public is unlikely to be affecteded .
55-150	Unhealthy for everone	Anyone can begin to experience health effects if exposed for 24 hours. Sensitive people may experience more serious health effects.
150-350	Very unhealthy	Health Alert: anyone can begin to experience more serious health effects if exposed for 24 hours.
350+	Dangerous	Emergency conditions: the entire population is likely to experience very serious health effects if exposed for 24 hours

L'impacts of air quality on health depending on concentration rates of fine PM2.5 particle

Air quality





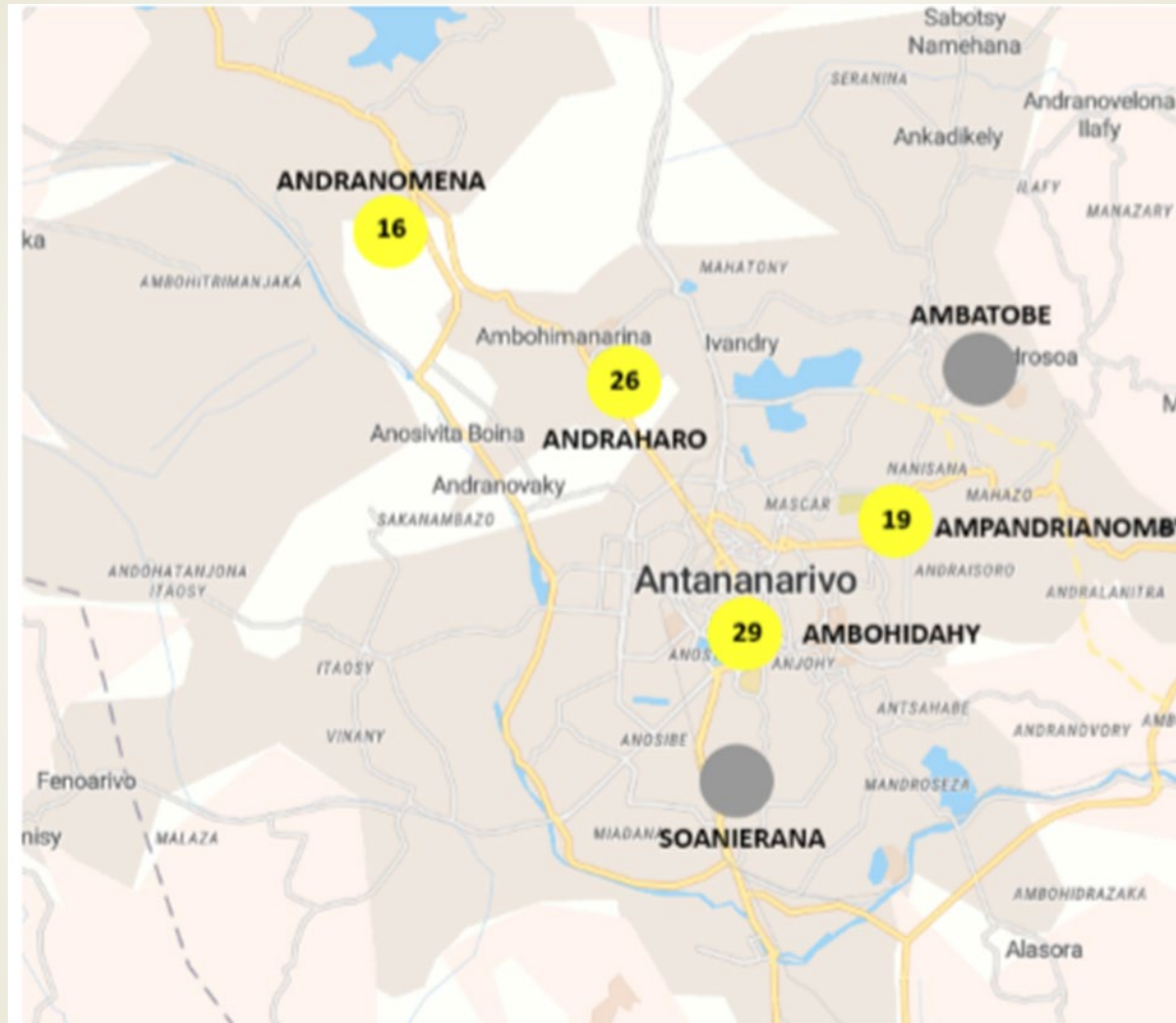
Disadvantages of air pollution on health

1. Respiratory problems: Inhaling fine particles and air pollutants can cause or worsen respiratory illnesses such as asthma, chronic bronchitis and lung infections.



METHODS USED

- Survey from the Ministry of Transport and Meteorology
- Selection of sites representing air pollution in the capital of Madagascar
- Selectin the right sensors
- Collect an analyze data
- Interpret the results

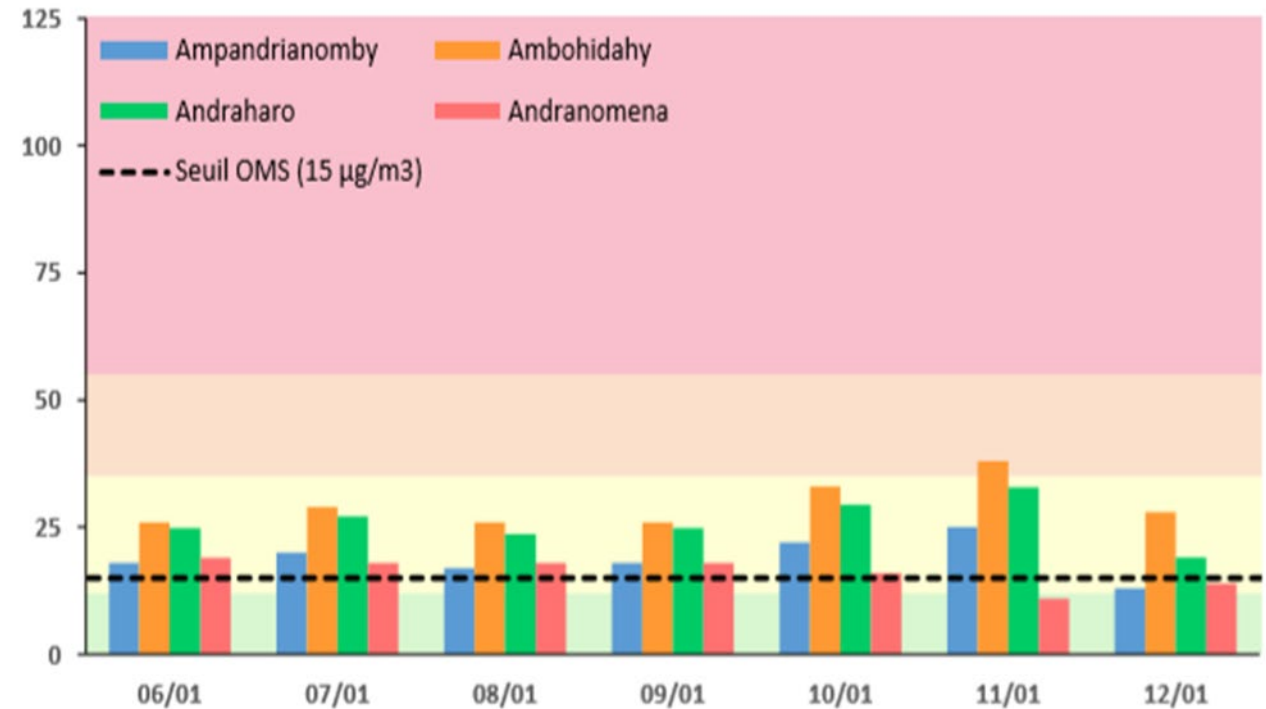


MAPS OF SAMPLING AREA

- Here is the court data from last year from 06 to 12 Janvier 2023

Air quality in Antananarivo generally remained moderate during this week. The concentrations of fine PM2.5 particles (with a diameter of less than 2.5 micrometers) are all close to the threshold recommended by the World Health Organization (WHO). For the next three days, weather conditions should still remain unfavorable for the accumulation of pollutants and air quality should generally remain moderate

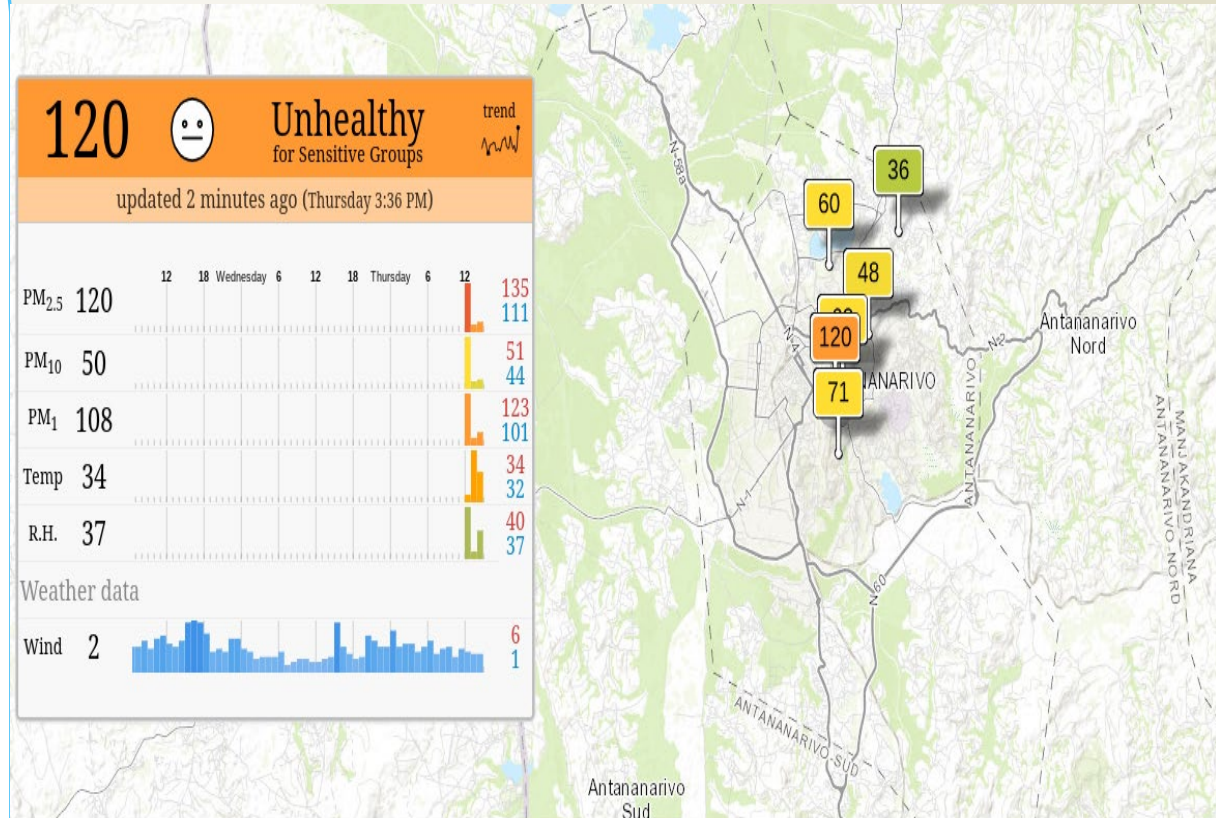
Daily average concentrations of fine PM2.5 particles ($\mu\text{g}/\text{m}^3$) from January 6 to 12, 2023



Here is the court data from last year from 23 February 2024

Air quality in Antananarivo generally remained Unhealthy during this week. The concentrations of fine PM2.5 particles (with a diameter greater than 2.5 micrometers) are all close to the greater recommended by the World Health Organization (WHO).

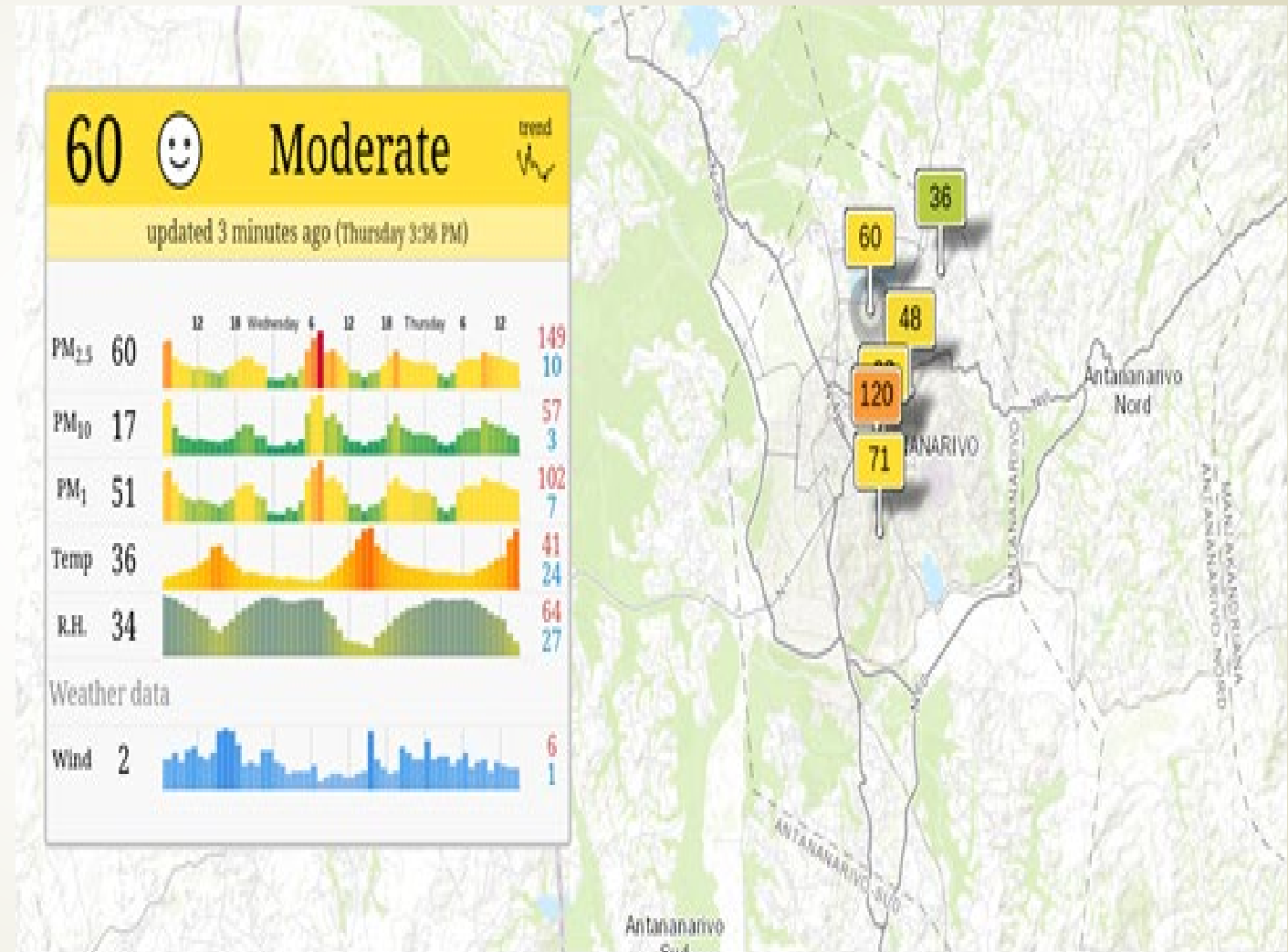
For the next three days, weather conditions should still remain unfavorable for the accumulation of pollutants and air quality should generally remain unhealthy



Here is the court data from last year from 22 to 29 February 2024

Air quality in Antananarivo generally remained Unhealthy during this week. The concentrations of fine PM2.5 particles (with a diameter greater than 2.5 micrometers) are all close to the greater recommended by the World Health Organization (WHO).

For the next three days, weather conditions should still remain unfavorable for the accumulation of pollutants and air quality should generally remain unhealthy

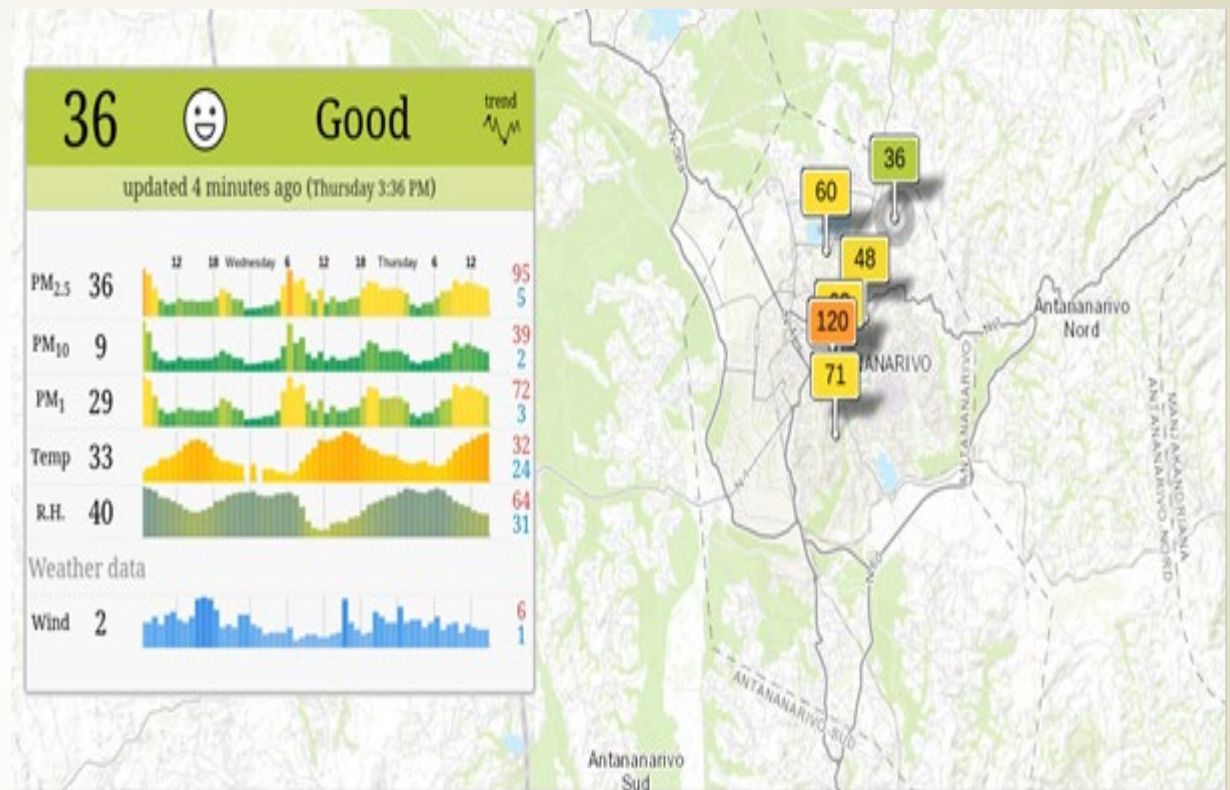


Here is the court data from last year from 23 February 2024

Air quality in Antananarivo generally remained good during this week. The concentrations of fine PM_{2.5} particles (with a diameter of less than 2.5 micrometers) are all close to the threshold recommended by the World Health Organization (WHO).

For the next three days, weather conditions should still remain unfavorable for the accumulation of pollutants and air quality should generally remain good.

RESULTS



After analyzing the results of atmospheric pollution in the different areas of the Analamanga region, we can see that:

- The quality of the air in the next year 2023 shows us that the concentrations of fine particles PM2.5 are twice higher than the standard recommended by the World Health Organization (WHO), but the quality of the air remains moderate. Doc Air quality is acceptable. However, if people who are exceptionally sensitive to air pollution are exposed for 24 hours there may be a moderate health problem.


- The quality of the area for this year 2024 the result shows us different daily average concentrations of fine PM2.5 particles in different areas of the Analamanga region.
 - 1- For the city center of Antananarivo, the concentration of fine PM2.5 particles (with a diameter greater than 2.5 micrometers) are all three times higher than the threshold recommended by the World Health Organization (WHO), therefore the quality of the area is unhealthy for sensitive people. So sensitive people may experience health effects if exposed for 24 hours.

- 2- But if we move away from the city center the quality of the area changes, it becomes a little pure. So air quality is acceptable apart from the sensitive ones.
- 3- But if you leave the city of Antananarivo the area is so good and pure that there is no health risk. Therefore, air quality is considered satisfactory and air pollution poses little or no risk.

SOLUTIONS

Air pollution in Madagascar is a growing problem that requires urgent solutions. The main sources of air pollution in Madagascar are motor vehicles, industries, biomass burning for cooking and heating, and bushfires. To solve this problem, it is crucial to implement measures.

1. Reduction of vehicle emissions: Encourage the use of cleaner vehicles and regular maintenance of existing vehicles to reduce harmful emissions.
2. Promotion of public transport: Develop public transport to reduce the number of vehicles on the roads and thus pollutant emissions.
3. Industry control: Establish strict standards for industries in order to limit their emissions of air pollutants.
4. Use of clean energy sources: Promote the use of renewable and clean energy sources, such as solar and wind energy, to reduce dependence on fossil fuels.

- 
5. **Waste management:** Improve waste management, in particular by promoting recycling and reducing open dumps, which contribute to air pollution.
 6. **Awareness and education:** Raise public awareness of the dangers of air pollution and promote more environmentally friendly behavior
 7. **Air quality monitoring:** Establish an air quality monitoring system to track pollution levels and take corrective action if necessary.
 8. **Awareness and education:** Raise public awareness of the dangers of air pollution and promote more environmentally friendly behavior.



THANK YOU