Science Workshop on Air Quality and Meteorological Prediction and Forecasting Improvement for Africa (PREFIA)

African overview

WORLD METEOROLOGICAL ORGANIZATION

PROGRAMME OF THE EUROPEAN UNION

Copernicus

IMPLEMENTED BY EUMETSAT

WCRP World Climate Research Programme

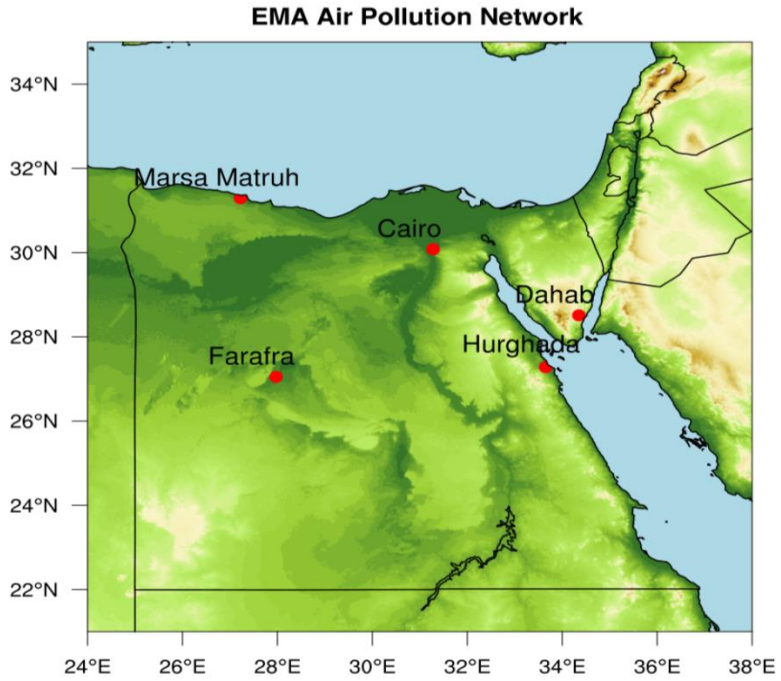
GLOBAL ATMOSPHERE WATCH

1. Egypt

Name: Rehan Ahmed
Affiliation: EMA

Air Quality Monitoring in Egypt
Egyptian Meteorological Authority

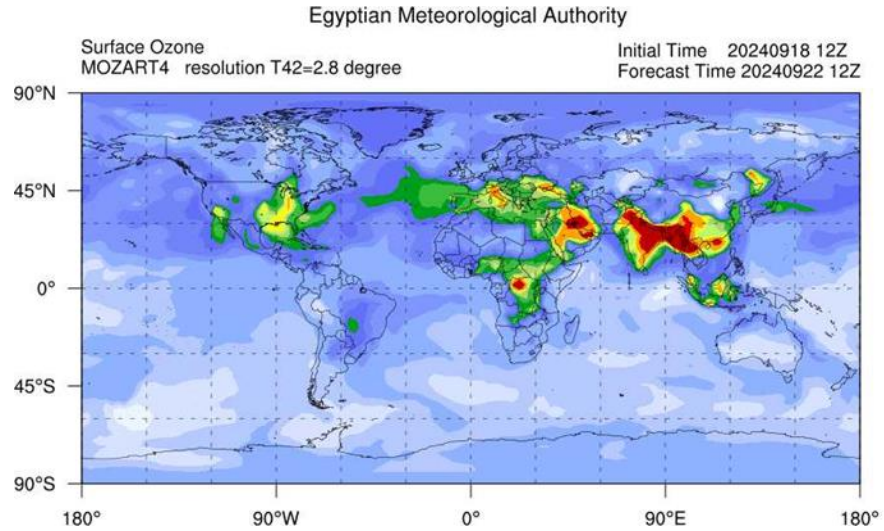
Stations

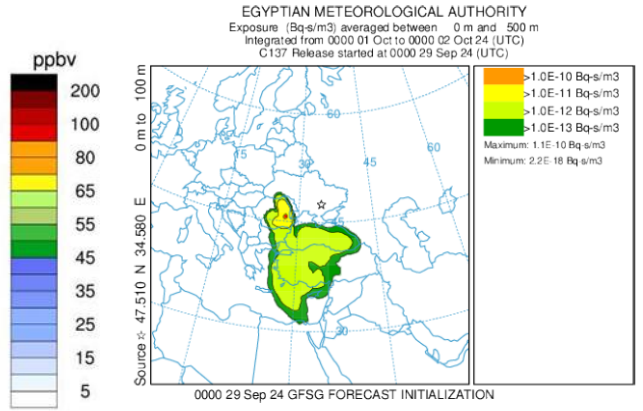


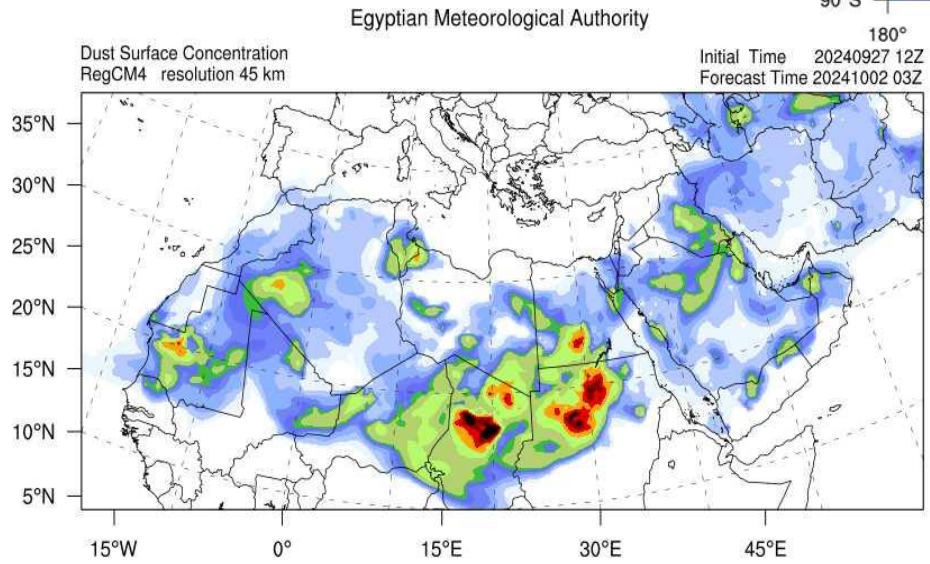
Station	Species
Cairo GAW-regional	CO2, CO, SO2, O3, NOx, PM10
Farafra GAW-regional	CO2, SO2, O3, PM10
Hurghada GAW-regional	CO2, O3, PM10
Marsa Matruh GAW-regional	SO2, O3, PM(10,2.5,1)
Dahab	SO2, O3, PM(10,2.5,1)

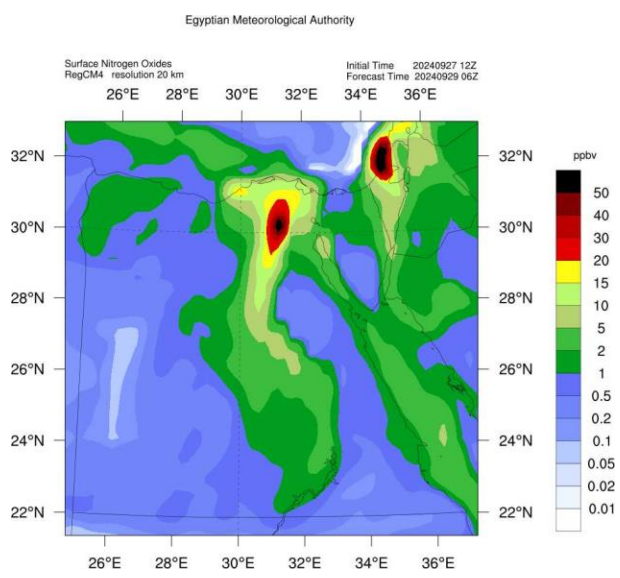
Modelling System

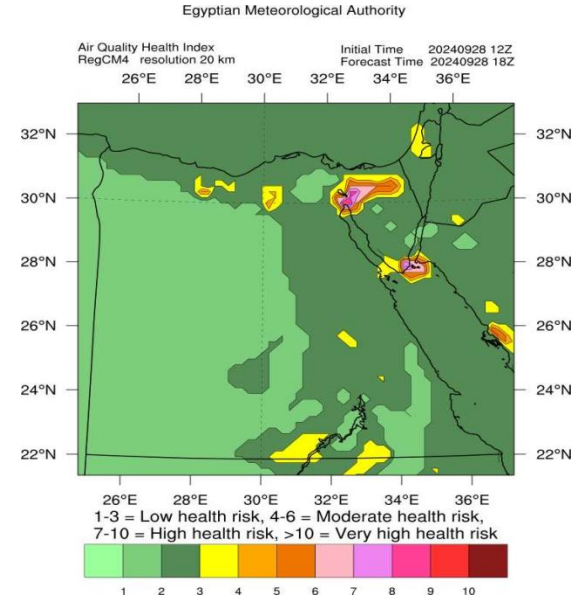
- MOZART4
- RegCM4
- WRF
- HYSPLIT
- GRAL





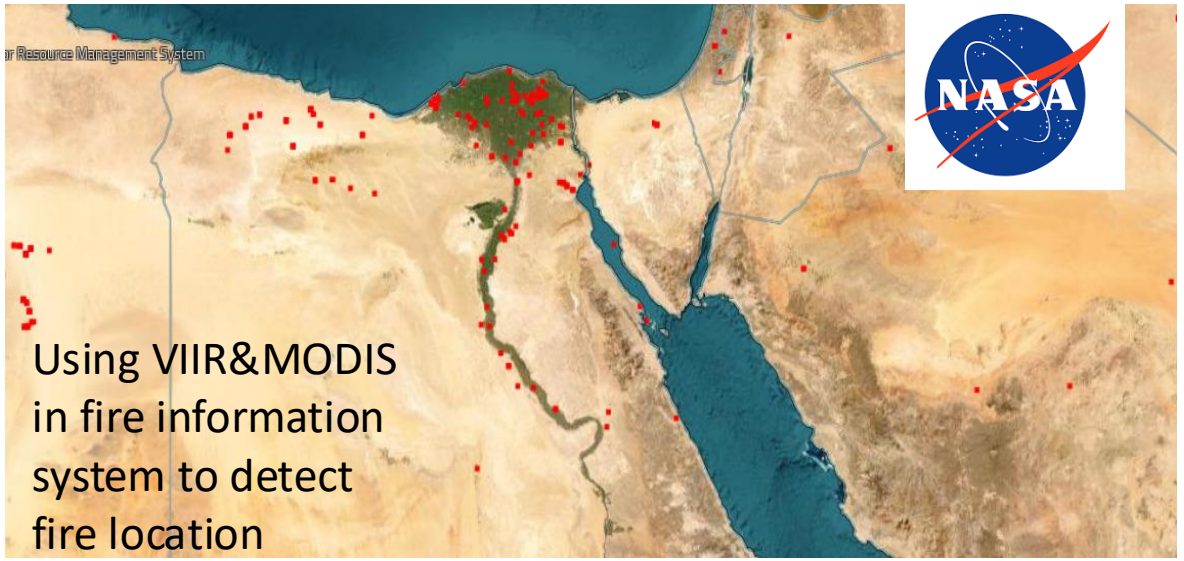


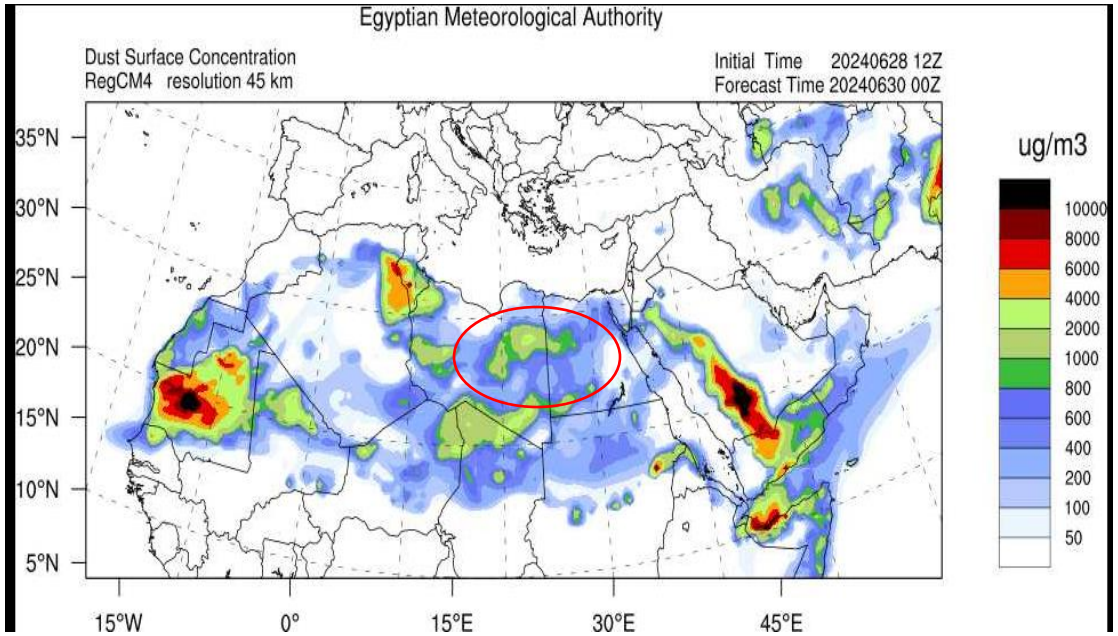




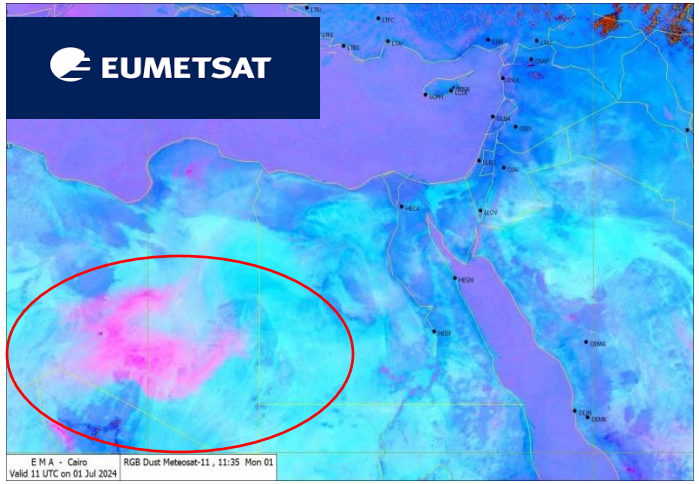
- **The output is uploaded: nwp.gov.eg**
- **The dust forecast is sent to WMO-SDS regional center in Barcelona**

Using CAMS DATA for comparison between output of RegCM and Measurements of stations





Verification of RegCM4 with EUMETSAT Satellite Dust RGB Channel



2. Algeria

Name: Imad Eddine HELALI MAHIDDINE
Affiliation: National Office of Meteorological (ONM) Algeria

Operational Sand Forecasting Models at ONM

ALADIN-Dust

Operational since :	Avril 2014
Resolution	14 x 14 km
Grid points :	250*250
Levels :	70 Lev
Forecast range :	72 h
Coupling files :	ALADIN
Initialisation :	24h previous forec

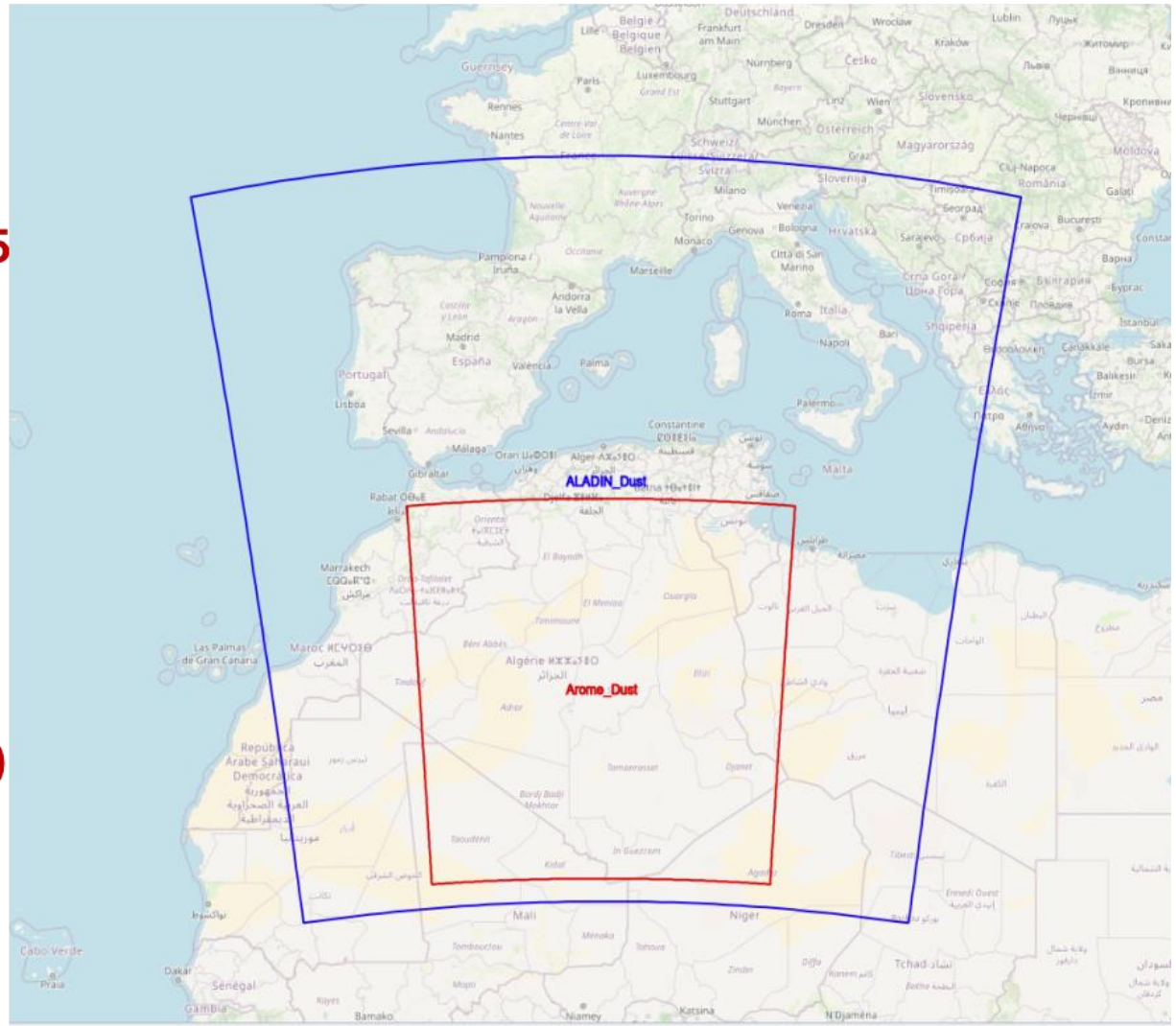
Same Fields as ALADIN plus :

- Visibility
- Optical thickness
- Surface flux
- Dust concentration at the levels 700hPa, 850hPa,1000hPa

AROME Dust Configuration over the Sahara

AROME Dust:

Research & Development Configuration	
Resolution	2.5
Grid	
621*521	
Levels	41
Levels	
Forecast range	48h
Coupling model	ALADIN_Dust(14km)



Same Fields as AROME plus :

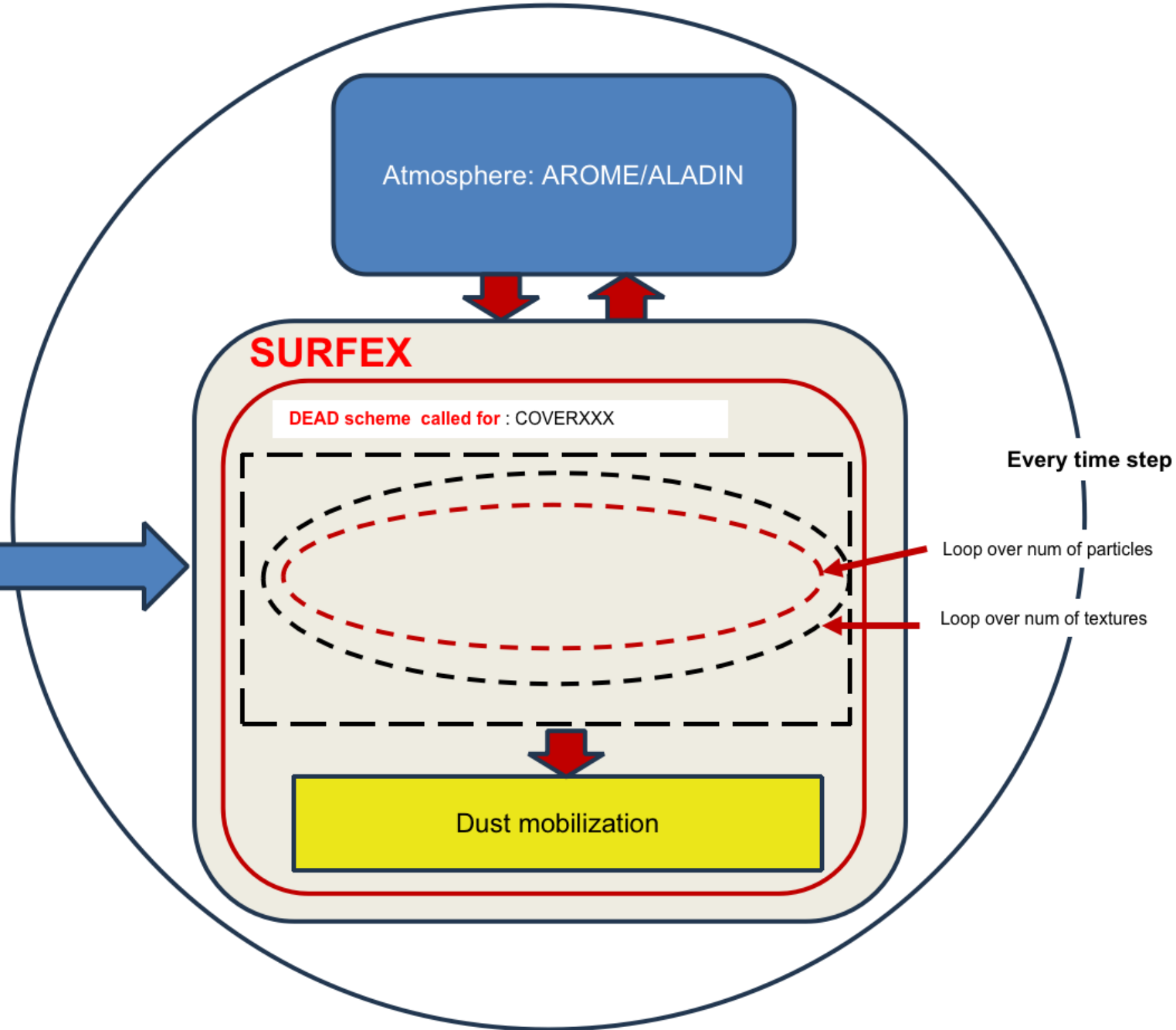
- Visibility
- Optical thickness
- Surface flux
- Dust concentration at the levels 700hPa, 850hPa,1000hPa

Perspectives

الديـوان الوطنـي للأرصـاد الجويّـة
Office National de la Météorologie

PGD Step :

Declare new cover: COVERXXX related to dust source intensity in function of soil and surface characteristics



Name:Mpho Ishwadhara
Affiliation: Botswana Meteorological Services

3. Botswana

AIR QUALITY MONITORING

- Air quality monitoring is not well defined but we have several Air quality policies and strategies driven by both the government and non government organisations
- Atmospheric Pollution Prevention act 1971 that calls for the prevention of atmospheric pollution by industrial processes in declared controlled areas
- Environmental Impact Assessment legislation 2005 which requires all new developments to be assessed for their environmental impactss
- Botswana Strategy for waste management of 1978 on how waste management is to be carried out to protect human health and the environment
- In addition Botswana has signed several agreements such as Dakar Declaration,Basel convention 1999,Bamako Convention,Kyoto Protocol etcte lclo

AIR POLLUTION FORECASTING AND TOOLS

- Currently we do not forecast air pollution so that also means that we do not use any products
- But we are ready and willing to change !!!

- THANK YOU!!

4. Cameroon

Name: **BITA LEKINA Henriette**
Affiliation: National Meteorological Service of Cameroon

A. AIR QUALITY MONOTORING NETWORK

- Existing data on air quality are fragmentary, and come from a variety of sources, including scientific

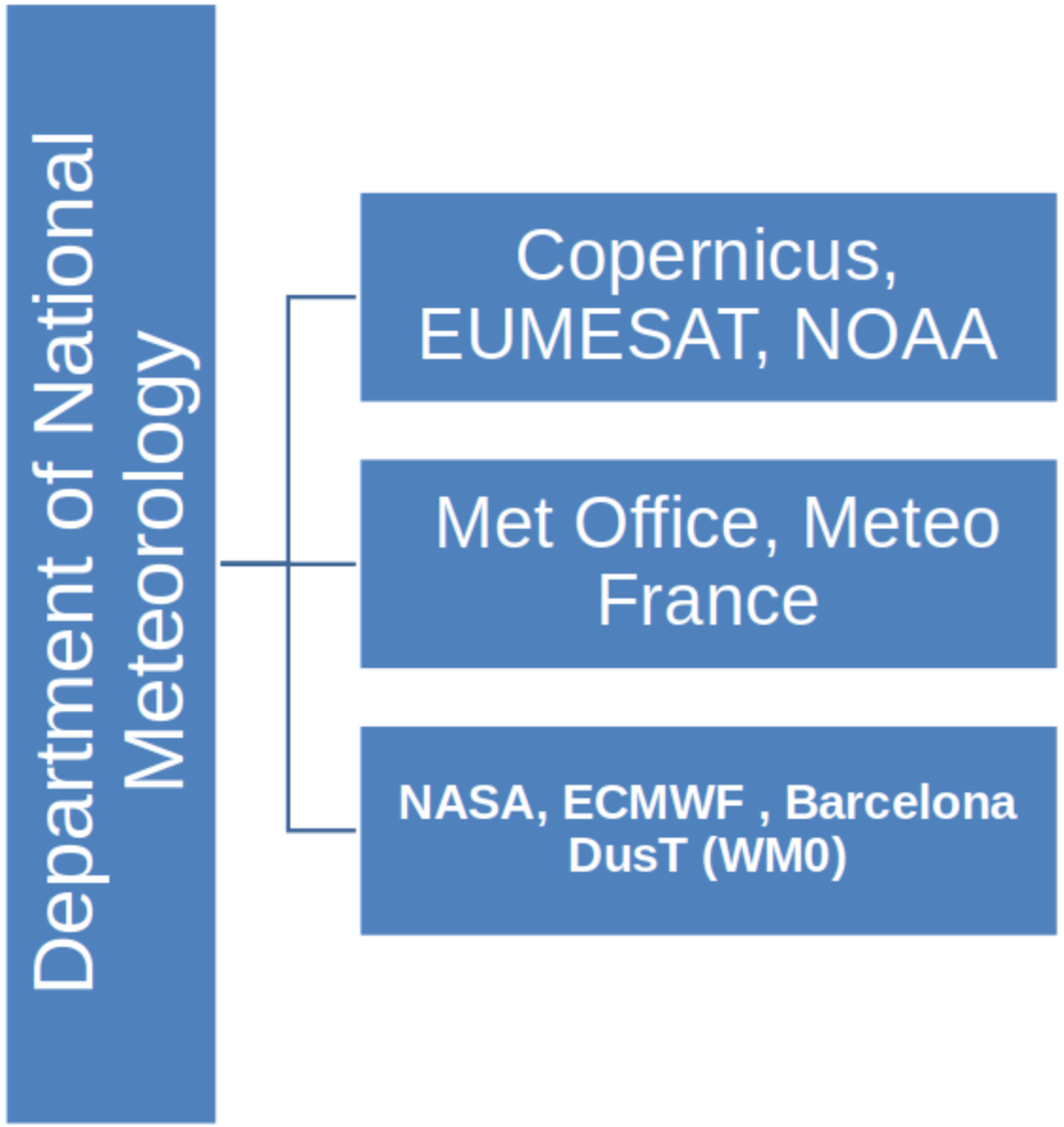
Reports from international organizations (World Bank and Institute for Health Metrics and Evaluation, WHO).

- Ministry of the Environment, Nature Conservation and Sustainable Developmentmonitors air quality through projects with partners, publishes reports and issues warnings to help people adjust their lifestyles.

- Department of National Meteorology, which uses its tools to monitor air quality.

- stations: citiesYaoundé and Douala
- Aluminium du Cameroun (ALUCAM)
-Kribi Power *Development Company* (KPDC)
have set up stations to measure their pollutant emissions.

B. AIR QUALITY: FORECAST



5. Chad

Name: IDRISS ABDALLAH HASSAN
Affiliation: AGENCE NATIONALE DE LA METEOROLOGIE(ANAM)

IS THERE A NATIONAL SURVEILLANCE NETWORK?

THERE IS NO NATIONAL SURVEILLANCE NETWORK.

-IS THERE AN OPERATIONAL REGIONAL OR URBAN AIR QUALITY FORECASTING?

TO DATE,THERE IS NO OPERATIONAL REGIONAL OR URBAN AIR QUALITY FORECASTING SYSTEM.

WHAT PRODUCTS DO YOU USE FOR YOUR DAILY WORK?

WE USE EUMETSAT NOWCASTING PLAT FORMS,AS WELL AS ITS

NWC-SAF PRODUCTS WITHS ITS DIFFERENT MODELS. WE USE HRV, RGB_DUST PRODUCTS DURING THE DUST SEASON FROM DECEMBER TO MID_APRIL.

IN CASE OF TECHNICAL FAILURE OF THE PLATFORM,WE USE THE WINDY FORECAST PLATFORM

ADDITIONAL AIR QUALITY INFORMATION

- **THE CLIMATE CHANGE DIRECTORATE HAS SET UP A MULTIDISCIPLINARY GROUP OF SECTORAL SERVICES AT THE NATIONAL LEVEL CALLED THE MRV (MEASUREMENT, NOTIFICATION VERIFICATION) GROUP OF THE NATIONALLY DETERMINED CONTRIBUTION (NDC) TO INVENTORY GREENHOUSE GAS EMISSIONS BY SECTOR. THE RESULT WOULD BE PRESENTED TO THE CONFERENCE OF THE PARTIES EACH YEAR.**

6. Comoros

Name:
Affiliation:

CANCELLED

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7. Congo

Name: Helmut Clardad Ondongo Moumbetekey
Affiliation: Direction of Meteorology

Current state

- No existence of a national air quality network and the service is not operational

Outlook

- Purchase of an AQM-09 station
- Low cost local sensors

Air Quality Management (AQM) Practice in Ethiopia

Name: Tofikk Redi,
Affiliation:Air Quality Research and Monitoring Desk Leader, Management of Climate Change, Ethiopian Meteorology Institute, Addis Ababa, Ethiopia
Email: tofikk858@gmail.com / tofikk.redu@aau.edu.et

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AQM activities

In Ethiopia, some AQM activates, and initiatives has taken-place to address the effects on public health, the environment, and the economy. Such as;

1.National Legal Framework

❖ **Env't Impact Aassesment Proclamation and Env'tal Policy**

Designed for managing environmental issues, including air pollution. Are encourages the development of monitoring systems, regulations and awareness programs.

2. Air Quality Monitoring Programs

❖ **Ethiopian Meteorological Institute(EMI):**

Monitor all upper air meteorological parameter at nationwide including air pollutant with collaborating international organizations. Data obtained trough letter request.

❖ **U.S. Diplomatic Posts (USDP):**

Operates AQ monitoring systems in AA, sharing real-time data on particulate matter (PM2.5). Data obtained online (Airnow.gov)

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❖ **AddisAir**:

A project that aims to monitor air quality in AA and provide citizens with real-time air pollution data through mobile and web platforms. Data obtained online

❖ **NASA's MAIA**:

Project in collaboration with local institutions, helps to measure particulate matter in the air and assess its impact on human health. Data obtained online (PurpleAir.com and OpenAir.com)

3. International Collaborations

❖ **GEOHealth Hub**:

Funded by the U.S. NIH, the Hub conducts research on air pollution's health impacts in Ethiopia and the wider East African region. Data obtained through letter request.

❖ **UNEP/AAEPGDC Initiative**:

focuses on improving AQ monitoring capacity in AA and supporting the development of local policies for air pollution reduction.

❖ **World Bank Initiatives**:

Efforts are underway to strengthen Ethiopia's environmental management capacities, including AQ

❖ **Etho-Finland project:**

The Finnish government has funded upper air monitoring devices for EMI. Accordingly, 10 reference air quality monitoring devices will be installed in Addis Ababa by the end of 2024.

AQM activities

In Ethiopia, some AQM activates, and initiatives has taken-place to address the effects on public health, the environment, and the economy. Such as;

4. Government Efforts and Policies

❖ **National Clean Air Strategy**:

Ethiopia is developing a national clean air strategy to cut emissions from transport, industry, and residential sectors, focusing on cleaner technologies and renewable energy.

❖ **Clean Energy Investment**:

Ethiopia is investing in clean energy technologies like hydroelectric power, wind, and solar to reduce reliance on polluting fuels.

❖ **Vehicle Emissions Control**:

There have been initiatives aimed at controlling vehicle emissions through stricter regulations and the promotion of electric and hybrid vehicles.

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Challenges and Gaps

- **Limited Infrastructure:** Despite recent progress, Ethiopia faces challenges with limited air quality monitoring infrastructure and data gaps, especially in rural and industrial areas.
- **Funding and Technical Capacity:** Limited financial resources and technical expertise hinder the expansion of air quality management systems.
- **Promoting, investing and using Biomass:** Very low, reduce cleanness of the atmosphere.
- **AQG** Not updated And no **AQI** at national level
- **Relaxes policy implementation**
- **Using secondary technology for investment case**
- **Health impact study of each pollutants**
- **Limited in Investigating chemical component and source each pollutant with their impact on health and environment**
- **No using global satellite data** e.g. Copernicus, EUMESAT, NASA
- **No nation air quality data centre**

Air quality monitoring

However, in Ethiopia, AQ activities have been emerging over the past few years, with efforts to monitor and evaluate air quality based on both national and global standards, taking into account their health impacts.

Air quality monitoring

The Ethiopian Meteorology Institute has installed Federal Equivalent Method (FEM) devices in three cities: Addis Ababa, Adama, and Hawassa

The Environmental Protection Authority and the Athletic Federation have installed Kunak devices at six sites in Addis Ababa.

UNDP and GeoHealth have installed three BAM devices at three sites in Addis Ababa.

The NASA MAIA Project has installed PurpleAir sensors at seven sites in Addis Ababa.

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However, all of these air quality monitoring devices are facing challenges with maintenance and calibration issues.

Therefore, addressing these challenges requires local and international collaboration, policy interventions, and future research on all aspects of air pollution's impact on public well-being.

9. Gambia

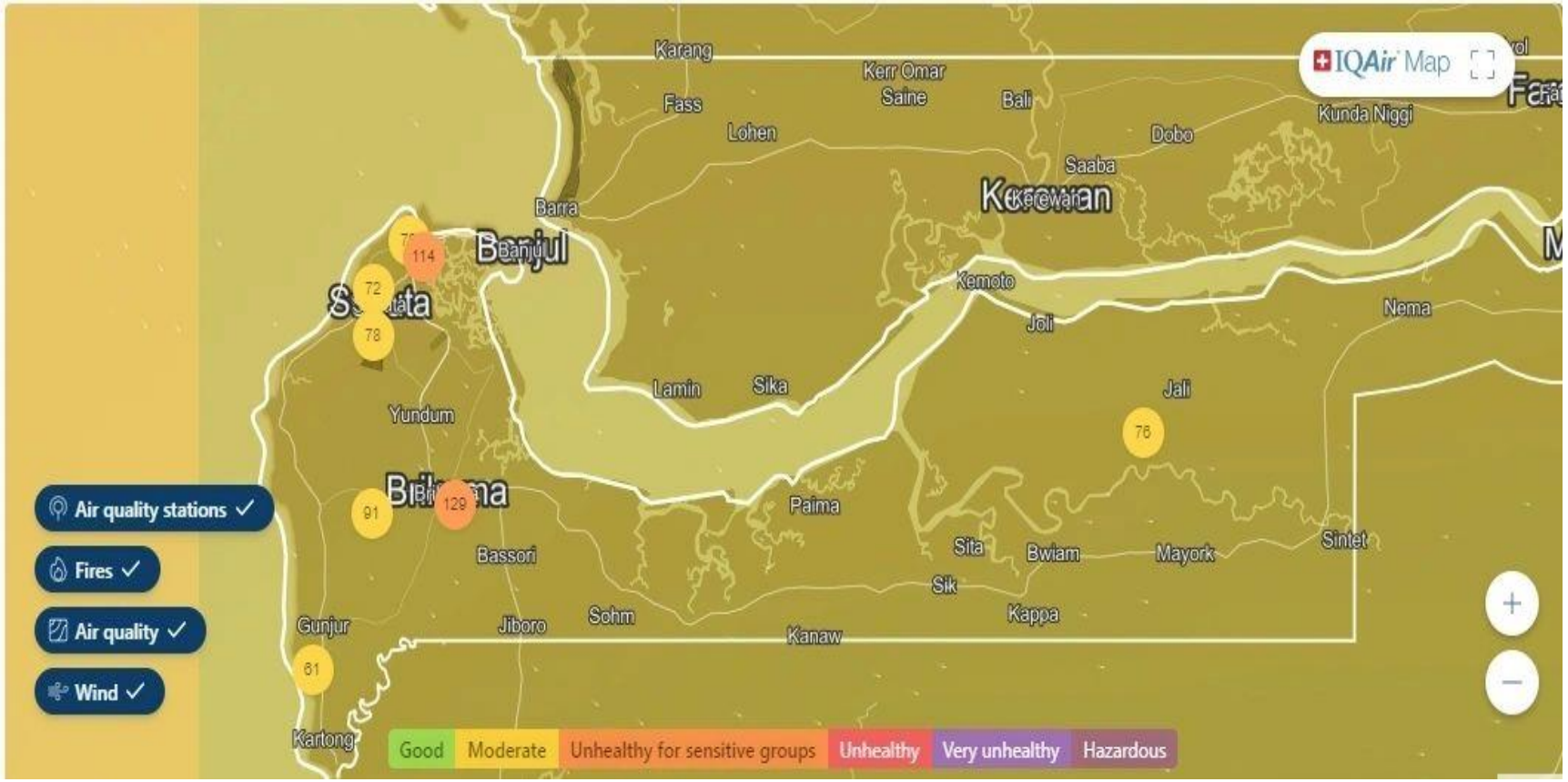
Name: Dr. Teeda Njie
Affiliation: Lecturer and Researcher, University of The Gambia

Air Quality Monitoring In The Gambia

There's a significant data gap in Africa when it comes to understanding our air and The Gambia is not an exception.

To have access to air quality data in Gambia Permian Health install low-cost air quality monitors (AirVisual outdoor monitors) throughout the country. This monitor up to 8 environmental parameters including AQI, PM1, PM2.5, PM10, temperature, relative humidity, and pressure. The data from these monitors are accessible to the general public through their website and NEA' website.

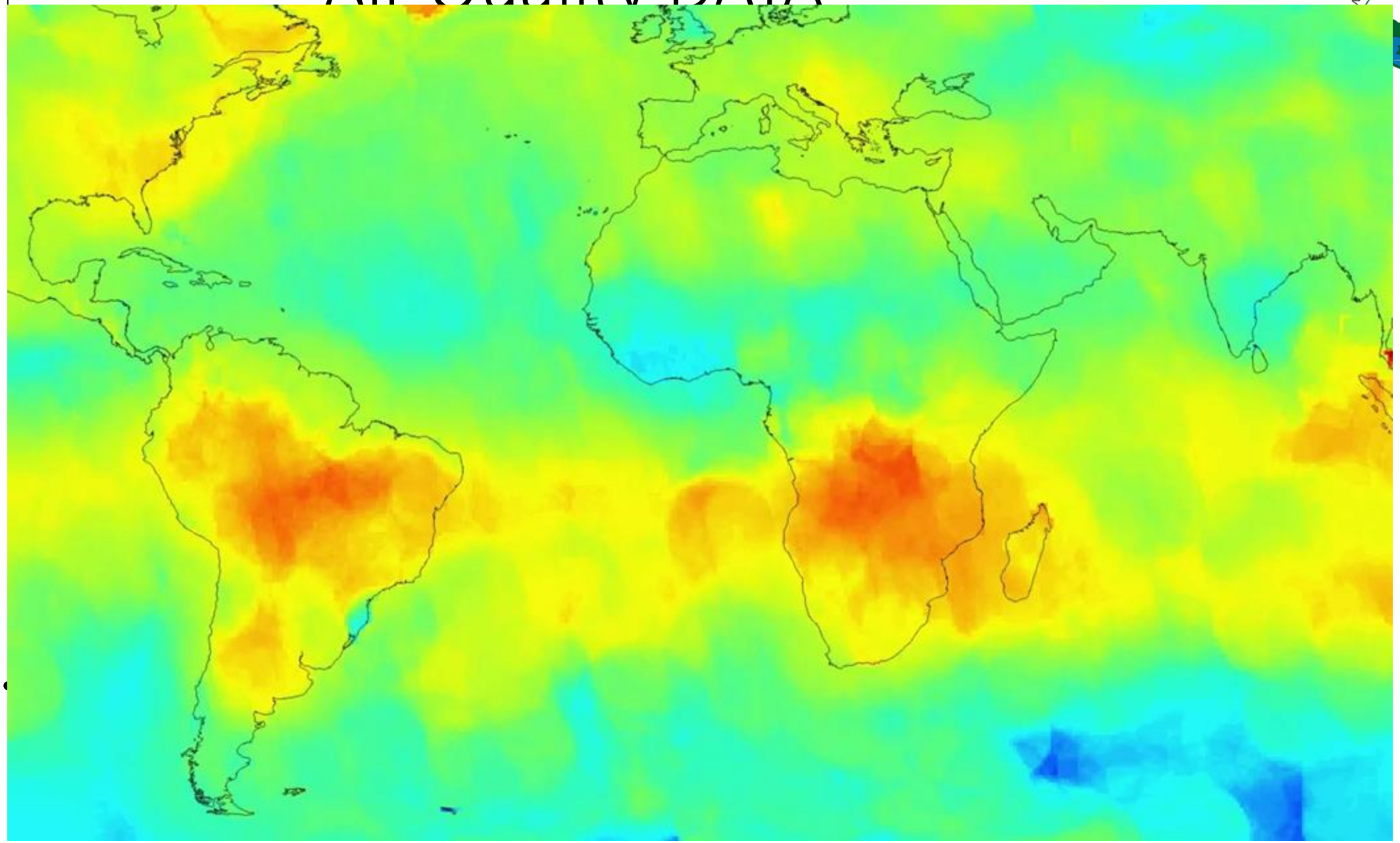
Network of Air quality monitors in the gambia



The air monitoring stations in the Gambia, as the installation is still ongoing.

- There is no Air Quality Forecasting system operational in The Gambia

Air Quality DATA

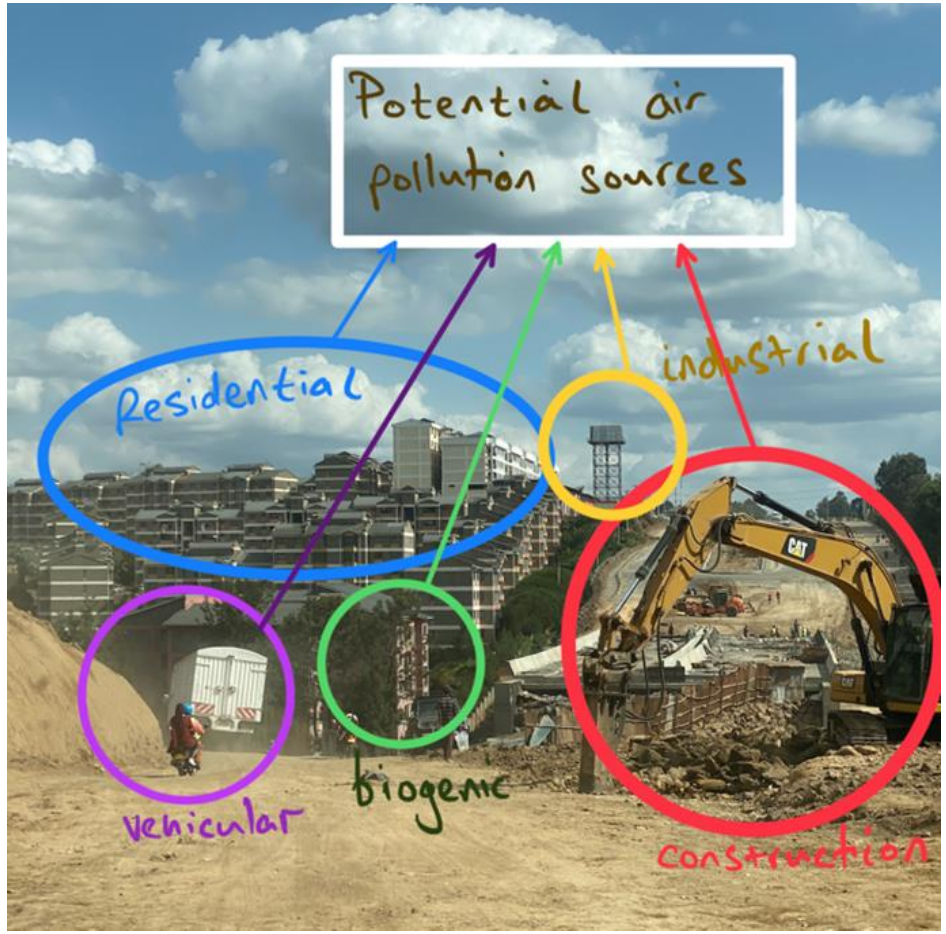


Current Status of Air Quality Management Strategy - Ghana

- Name: Enock Dickson
- Affiliation: Ghana Meteorological Agency

Overview

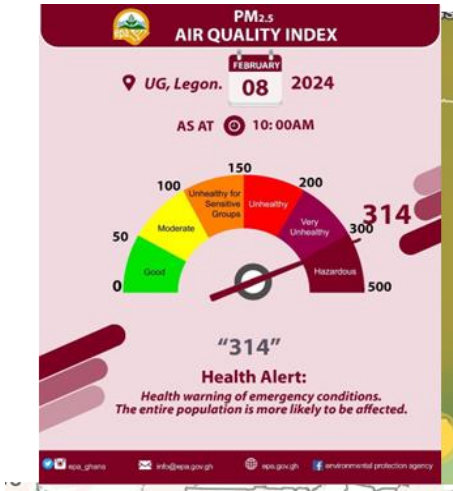
- In the urban areas of Ghana, particularly Accra, air quality continues to deteriorate rapidly due to uncontrolled urbanization.
- 28,000 premature deaths in Ghana (WHO, 2016).
- Exhaust and non-exhaust emissions from the transport sector, wind-blown dust from unpaved surfaces, household air pollution (open burning of waste and cooking with biomass), and industrial emissions among others have resulted in high levels of air pollution (particulate matter) with its associated negative health outcomes.
- A comprehensive AQMP that delves into the major contributors to air pollution and measures that can be implemented to ensure that pollution levels meet the requirements of the National Ambient Air Quality Standard has been developed (EPA, 2024).
- Assistance provided through the DVLA and local police and the National Road Safety Authority on-road vehicle inspections.
- Since 2023, AQI from the real time FEM monitors has been communicated to the public on daily basis via social media handles
- **Gaps**: Data availability challenges with real time data reporting and public access to information from limited number of monitoring sites across major cities.

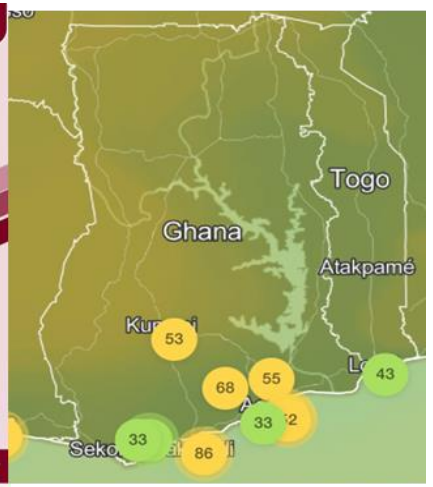


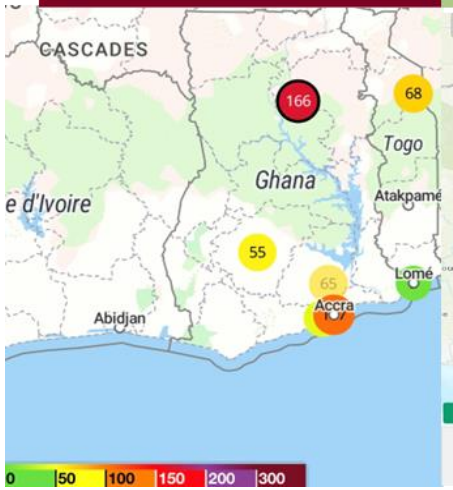
- Lack of district level inventory including data management systems
- Access to air quality health data

Air Quality Monitoring - Sources of data

- **NO** National Air Quality Monitoring network. However, the EPA leads monitoring efforts. Currently, 16 air monitoring sites exists: 3 in residential areas, 2 in industrial areas, 1 in a commercial area, and 10 by the roadside along specific corridors.
- **Ground Observations (Reference grade monitors)**
- Most accurate- sparse and limited access (TEOM, TELEDYNE, BAM, Aethelometer (AE33)) -- (PM_{10} and $PM_{2.5}$), black carbon, CO, CO2, NO2, SO2, and O3)
- **Low cost sensors**
- Real time monitoring (Purple Air, IQAir, Airqo, Airly etc.)
- Low-cost sensor evaluation: https://afriset.org/
- Sparse network of sensors mostly in the north and transition zones where dust raised from the source regions affect health and visibility enormously.



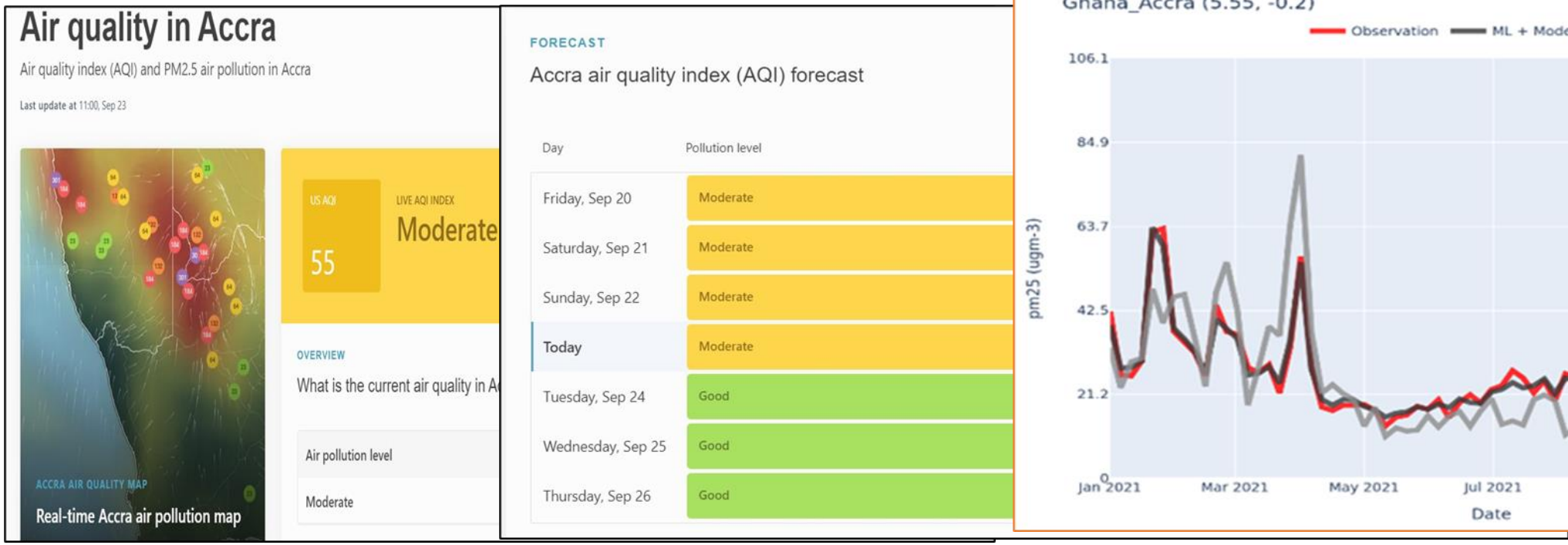




https://map.purpleair.com/air-quality
https://www.iqair.com/air-quality-map/ghana

Air Quality Forecasting

- Currently, there is no operational regional or urban Air Quality Forecasting system, due lack of capacity and logistics for GMet to provide reliable and timely forecast to safeguard public health, which is in high demand from users.
- In the dry season, GMet issues daily weather forecast on the increased dust and general dry weather conditions with advisories to the public. This lacks accurate characterization and quantification of criteria pollutants and does not predict exceedances of specific thresholds not ambient concentrations.
- **IQAir** – Hourly and daily average AQI forecast of pm2.5 pollution level accompanied with health recommendations over Greater Accra, with 7 days validity period (https://www.iqair.com/ghana/greater-acrra/accra).
- Forecasting models are being developed, but not widely implemented.

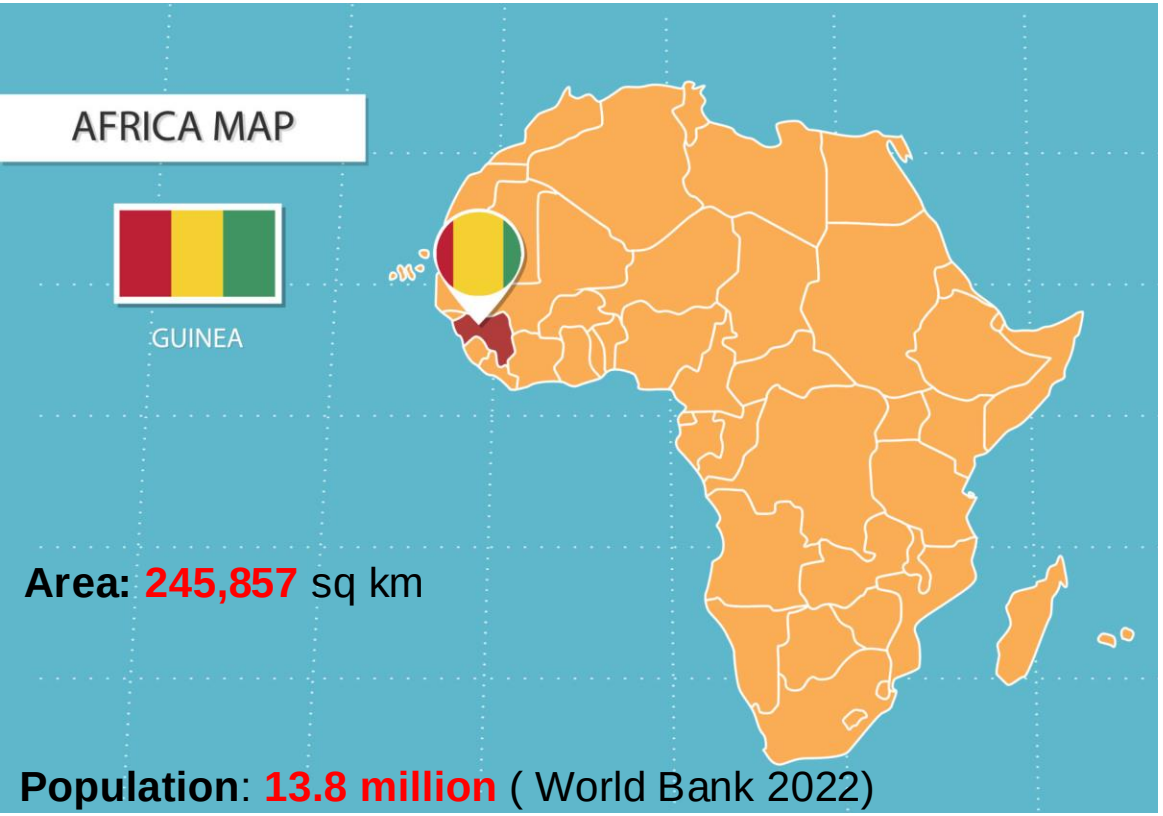


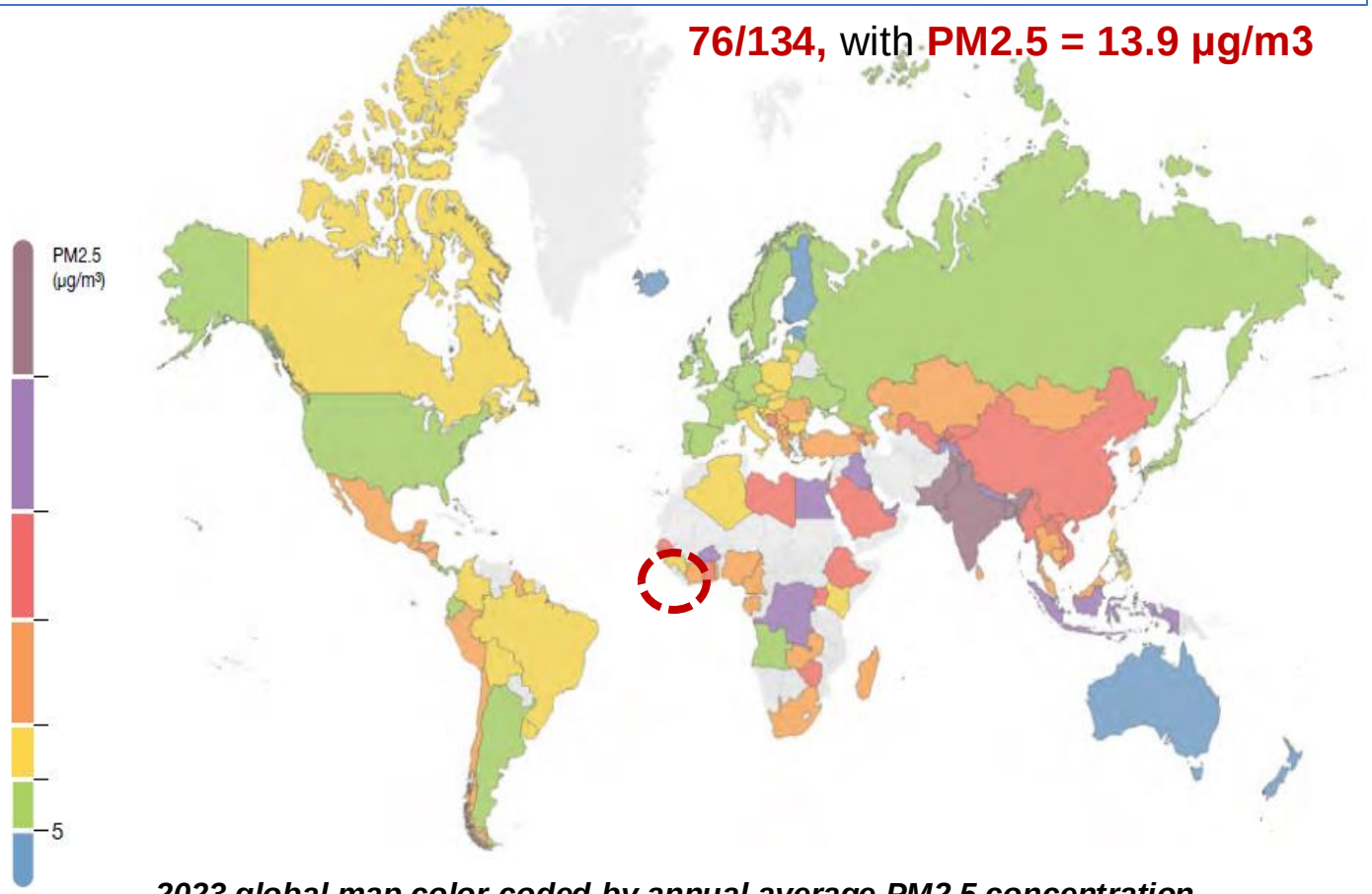
Overview of Air Quality and Air Quality Monitoring in Guinea

- Name: **Seydouba SOUMAH**

- Affiliation: ***Weather observer at the National Meteorological Agency of Guinea (ANM)***

STATUS OF AIR QUALITY IN GUINEA





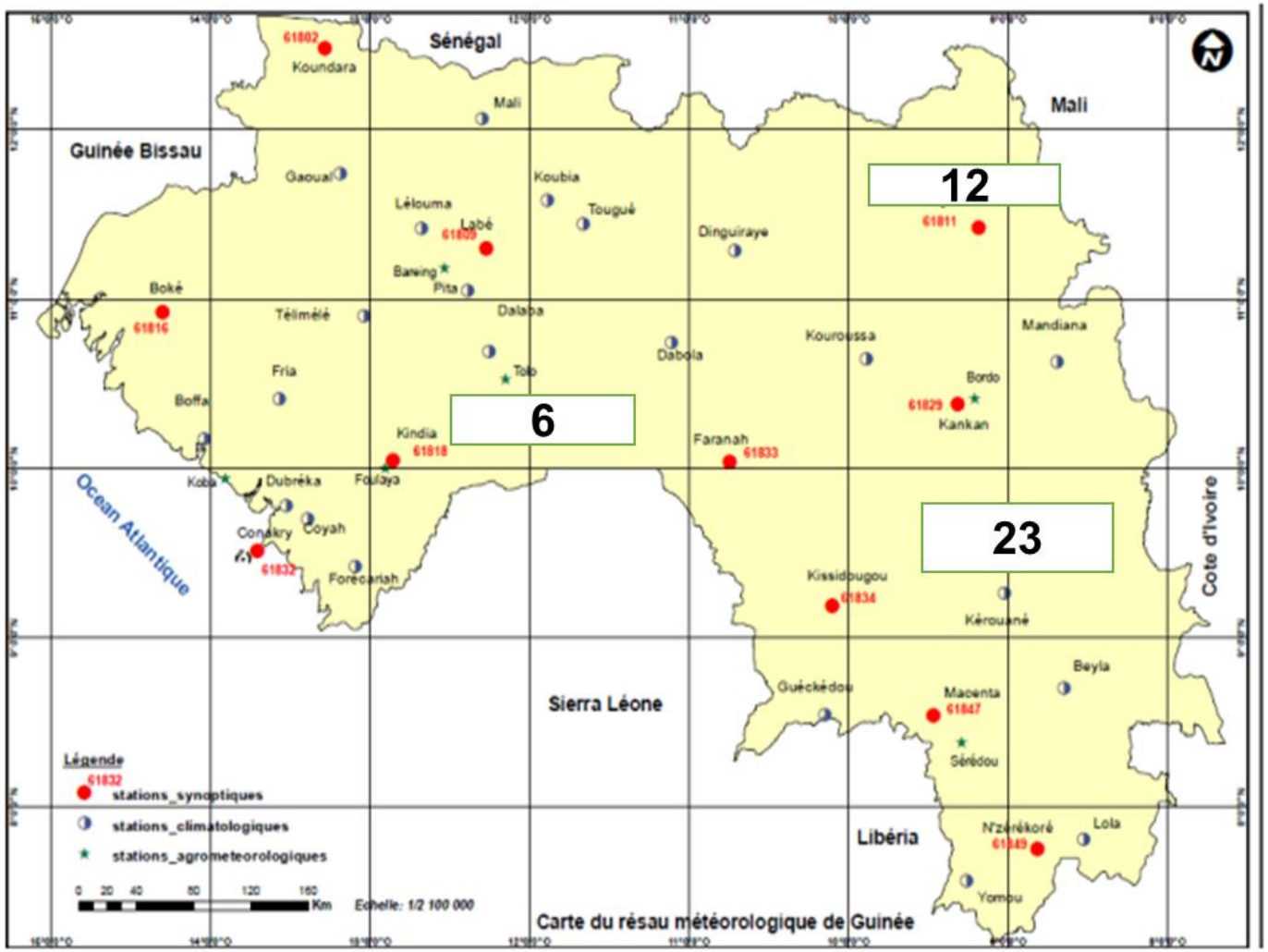
2023 global map color-coded by annual average PM2.5 concentration

- The country is extremely vulnerable to climate change and air pollution.
- Guinea became a partner of CCAC in 2014, aiming to adopt measures to reduce SLCPs.
- The most recent data indicate an annual mean concentration of PM2.5 = 26 µg/m3, which exceeds the recommended maximum of 10 µg/m3 (WHO, 2024).

MAIN POLLUTANTS AND AIR QUALITY MONITORING STATUS IN GUINEA

❖ Outdoor air pollution:

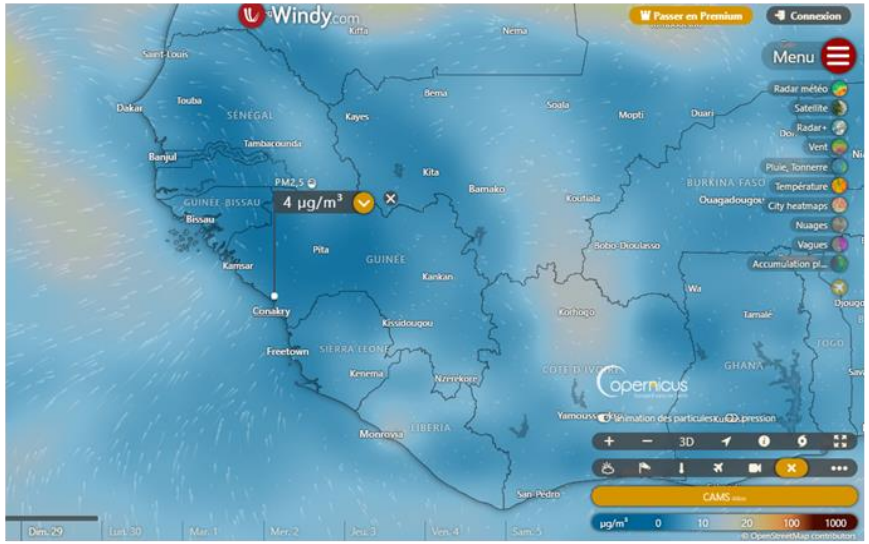
❖ indoor air pollution:

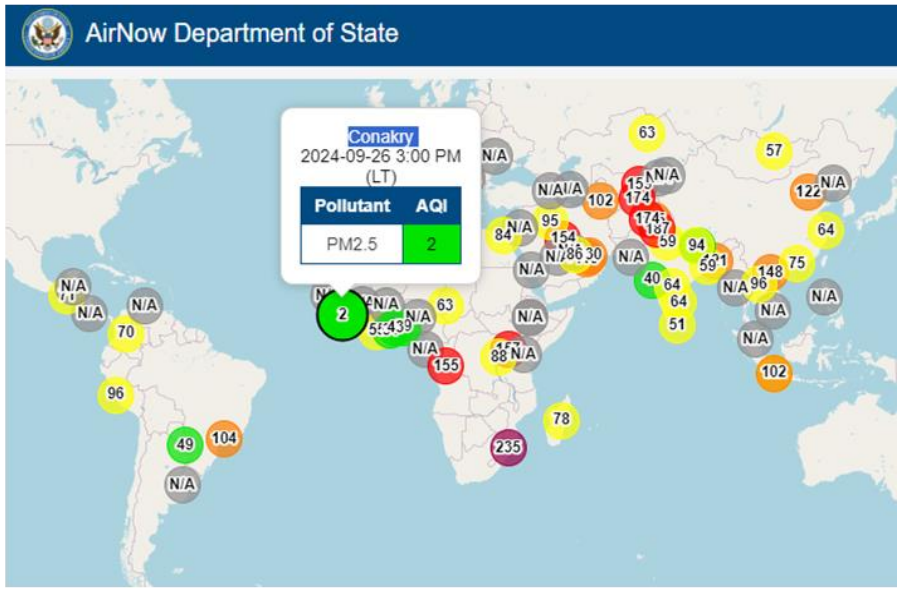


❖ There are no **AQM stations or sensors** established by ANM in Guinea. It's under Development by ANM and M.En

AIR QUALITY MONITORING IN GUINEA

- Online AQM websites: **Windy.com**, **IQAIR**, **U.S AQI**, etc….





12. Kenya

Name: DORCUS KALONDU MULE

Affiliation: KENYA METEOROLOGICAL DEPARTMENT

AIR QUALITY MONITORING IN KENYA

Kenya has several air quality monitoring initiatives driven by both government and non-governmental organization.

- Kenya Meteorological Department (KMD)
-
- National Environmental Management Authority (NEMA)
- African cities for Clean Air project (Breath Nairobi Initiative) C_{40} cities network
- Airqo Project (Makerere University)- operates low- cost air quality sensors in Nairobi (45) and Kisumu (16). These sensors provide data on air pollution trends.

Global Atmospheric Watch

KMD in collaboration with WMO operates two GAW Stations in Kenya. These are Nairobi GAW Station and Mt. Kenya GAW Station.

Mt. Kenya GAW station is a global station and it was started in the year 1999. It is responsible for the measurements of surface Ozone, weather parameters, black carbon, carbon monoxide,Nitrous Oxide, Sulpur dioxide and aerosols(PM10, PM2.5)

Nairobi GAW Station - Mmeasurements for vertical profile ozone started in the year 1998, and for Total column ozone in the year 2005.

Currently there is no forecasting system running operationally.

Currently we are not using any of the products because we have no forecasting system running.

Thank you.

13. Libya

Name:*Dr, Khalid Ibrahin El Fadli*

Affiliation:*Director of Research & Studies Department*

Libyan National Meteorological Center

Current status of the air quality management strategy of Libya (air quality monitoring, forecasting and priorities)

30 Sep 2024-El Cairo

By

Dr, Khalid Ibrahin El Fadli

Director of Research & Studies Department

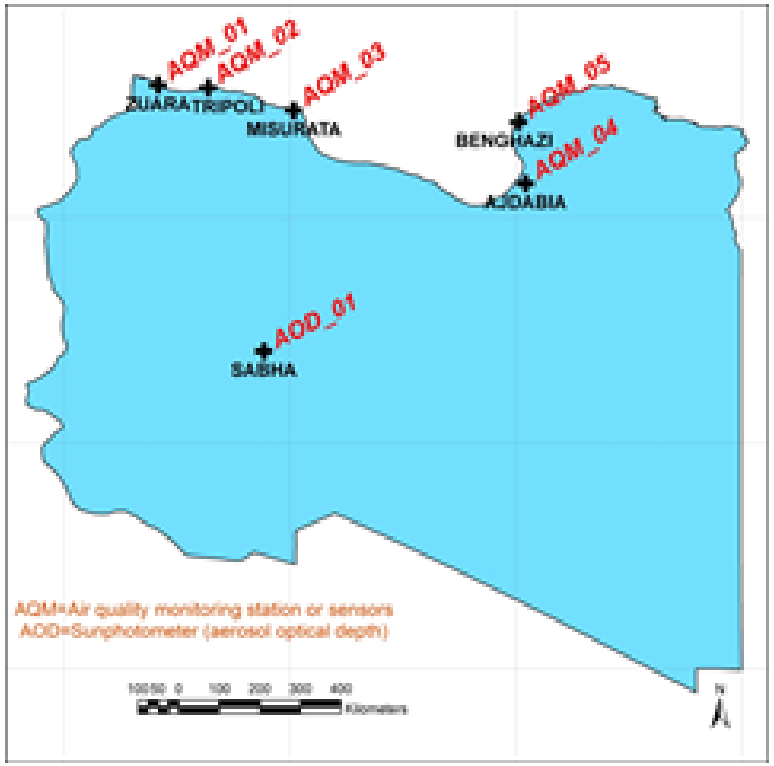
Climate and climate change consultant

K_elfadli_met@lttnet.net

30 Sep 2024

- It can be said that there are no activities in the field of air quality management in Libyaat the present
- We intend, within the next three years, to begin installing or establishing a network specialized in managing and monitoring air quality (AQM) at the national level
- The first phase aims to install five stations according to international standards, which will be distributed to urban areas and some industrial complexes
- We will cooperate in developing this network with the relevant programmes (i.e GAW) of the World Meteorological Organization (WMO) and the parties interested in such activities
- In the coming few months, one Cimel photometer will be installed on Libyan territory within AERONET stations network in North Africa in cooperation with AERONET project
- A bilateral technical and scientific cooperation protocol will soon be signed between Egyptian and Libyan Met services. Among the items of this cooperation will be the special activity in forecasting of air pollution field (AQF) in both countries.

Proposed air quality monitoring and management network in Libya in the first phase



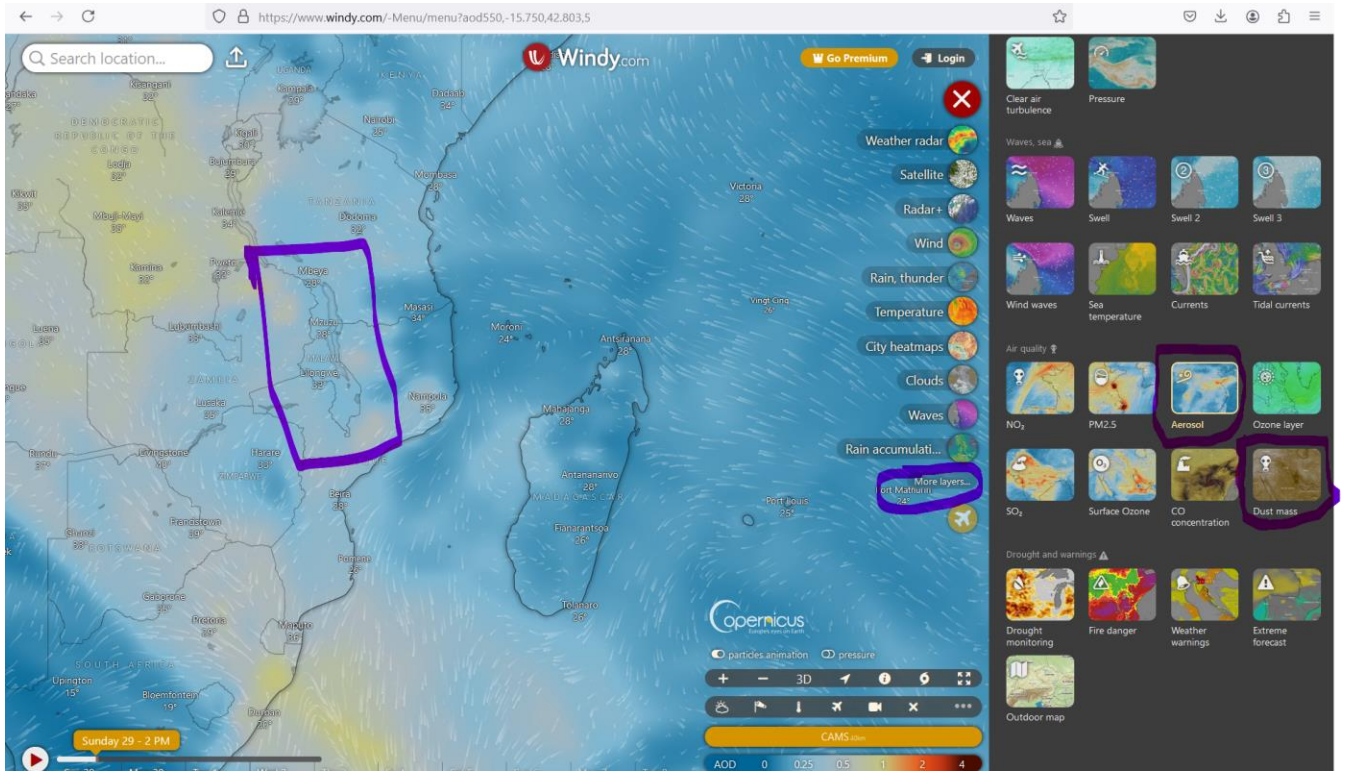
14. Malawi

Name: Hussein Milanzi
Affiliation: Department of Climate Change and Meteorological Services (DCCMS)

AIR QUALITY MONITORING

- During the 1990s and before, the department operated one air quality monitoring station at Chileka International Airport
- The station was closed due to technology migration challenges.
- The plans are in place to procure, install and operationalize Air quality monitoring systems in the country. The National Framework for Water and Climate Services (NFWCS) for Malawi (2024) highlighted Air quality monitoring and forecasting as one of the priority areas.
- DCCMS has submitted a proposal under the Malawi Digital project to procure and Install the air quality monitoring system in 3 major cities in the Country

AIR POLLUTION FORECASTING AND TOOLS



- **Currently we are using windy.com, with emphasis is on**
  - **Aerosol**
  - **Dust Mass**
- **The forecasts are done during winter along side mwera winds and Chiperoni weather and at the beginning of summer where whirlwinds are common**
- **The target is Central Areas of country mainly Lilongwe city where dust is always a problem**

Thank you !!

15. Namibia

Name:
Affiliation:

CANCELLED

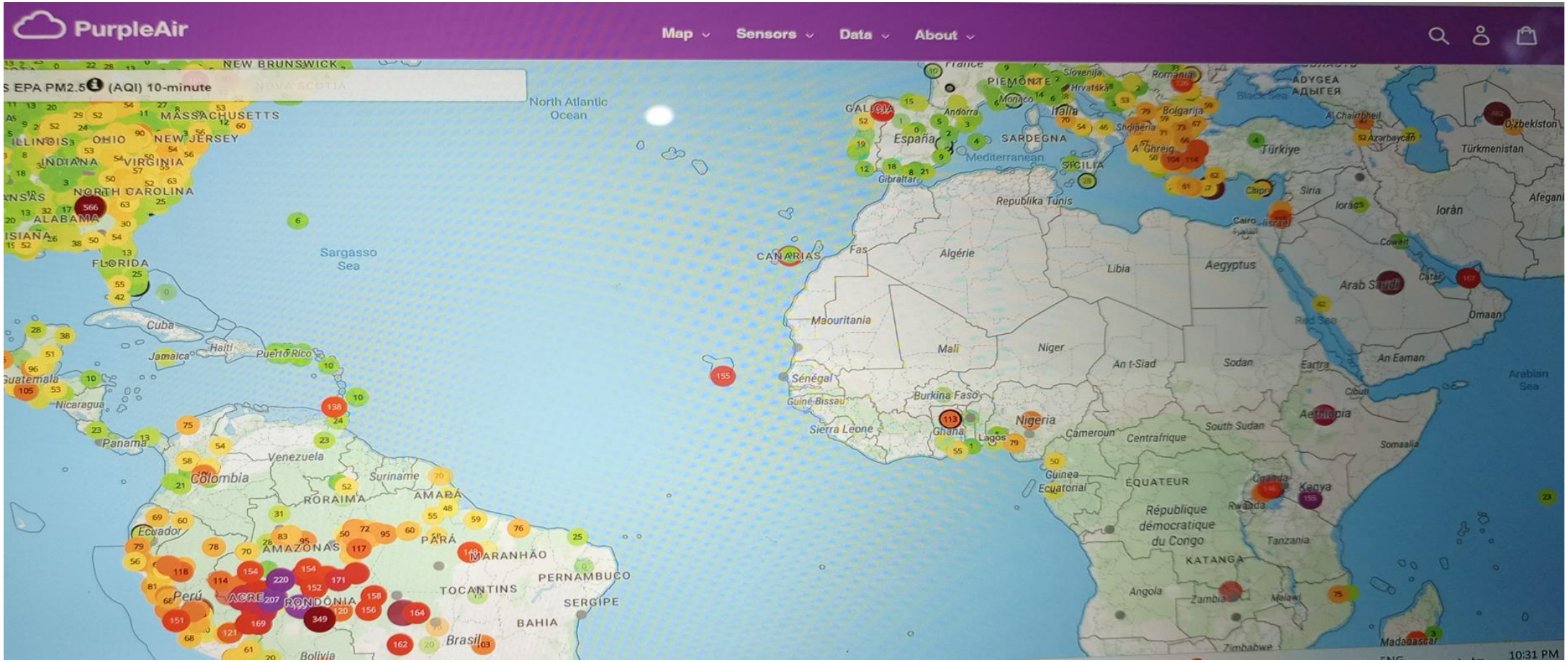
16. Nigeria

Name:
Affiliation:

AIR QUALITY MONITORING NETWORK IN NIGERIA.

- Nigeria as a country is in its initial stage to establish more air quality monitoring network across the country to generate reliable dataset for sound policy making aimed at ensuring clean air.
- Also, to ensure viable environmental management by deploying mobile App that would give real time air quality index for every major city in Nigeria.
- NiMet is planning to have air quality stations across the country to allow uninterrupted collection of data for the estimation of emission and trends from different parts of the country.
- Implementation of acquiring low cost devices such as purple air has been in place, and as soon as all the processes are completed more devices will be acquired to complement the ones already on ground.

REGIONAL AIR QUALITY FORECASTING SYSTEM.



Air Quality Forecast

❖Daily air quality forecast at the national level are been provided operationally by the use of global models such as Copernicus Atmosphere Monitoring Service (CAMS), EUMESAT and NOAA.

❖As we are all aware, air quality observations are necessary for air quality forecast evaluation to obtain a more accurate forecast. Therefore, more air quality devices are needed more than ever.

https:nimet.gov.ng/

NIGERIAN METEOROLOGICAL AGENCY

NiMet Nigerian Meteorological Agency

AIR QUALITY FORECAST

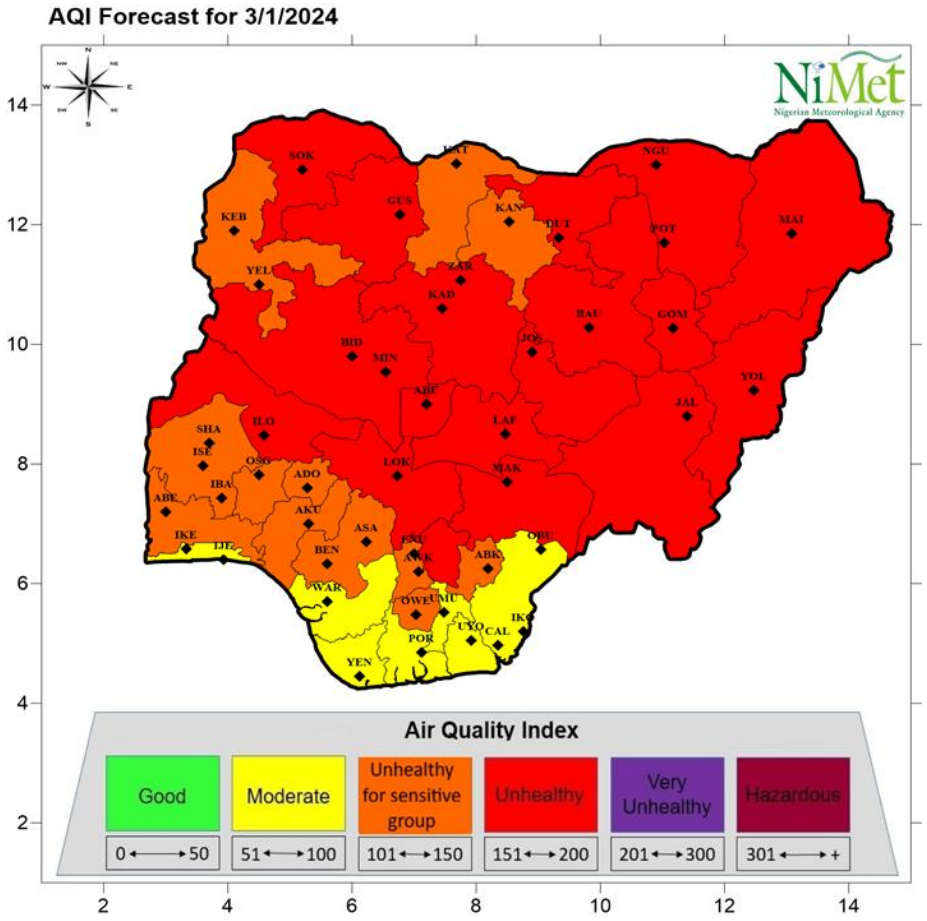
ISO 9001 2015 AEROMET

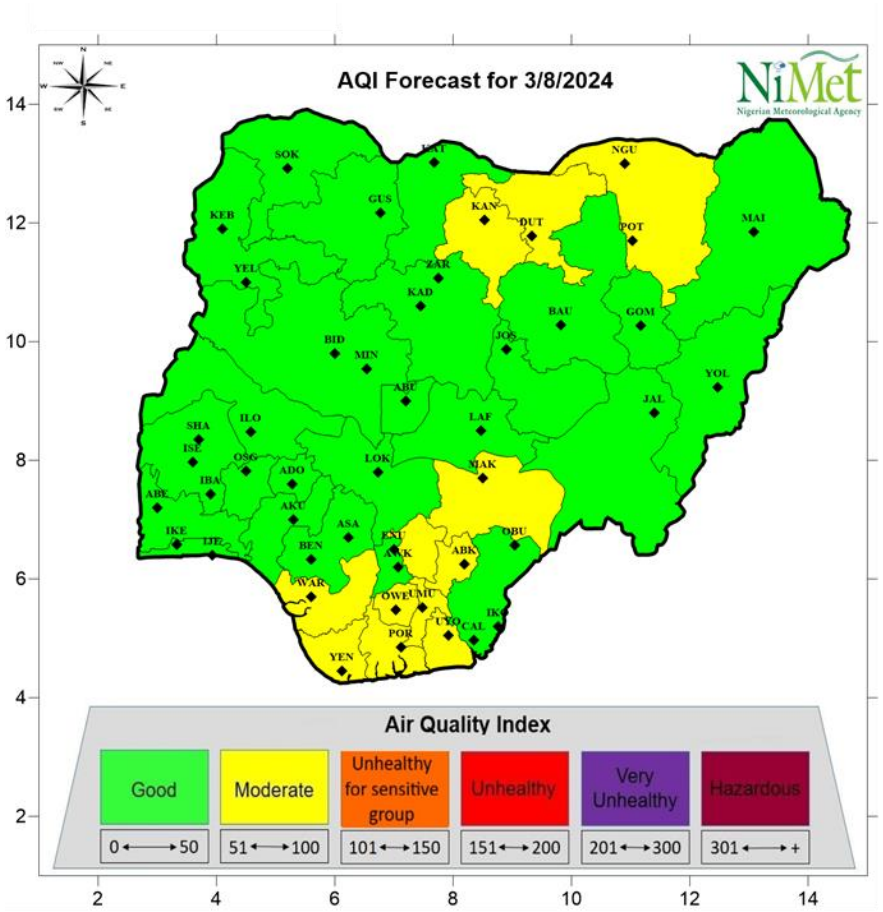
Issued on 16052024 valid till 2359Z 18052024

DATE	17/05/2024	18/05/2024
CITIES	AIR QUALITY	AIR QUALITY
ABEOKUTA	MODERATE	MODERATE
ABUJA	MODERATE	MODERATE
ADO-EKITI	Good	Good
AKURE	Good	Good
ASABA	MODERATE	MODERATE
BENIN	MODERATE	MODERATE
CALABAR	MODERATE	Good
ENUGU	MODERATE	MODERATE
IBADAN	MODERATE	MODERATE
ILORIN	MODERATE	MODERATE
JOS	MODERATE	MODERATE
KADUNA	MODERATE	MODERATE
KANO	UNHEALTHY	UNHEALTHY
KATSINA	UNHEALTHY	UNHEALTHY
KEBBI	MODERATE	MODERATE
LAGOS	MODERATE	MODERATE

AIR QUALITY ADVISORY	
AQI = 1-50 Good	Good Air Quality.
AQI = 51-100 Moderate	Unusually sensitive individuals should avoid Extensive outdoor activities.
AQI = 101-150 Unhealthy for Sensitive group	Outdoor activity should be minimized for the elderly, children, and individuals with heart and lung diseases.
AQI = 151-200 Unhealthy	Avoid prolonged exposure to prevent breathing difficulties which may be more severe in sensitive populations.
AQI =201-250 Very Unhealthy	People should minimize time spent outdoors especially children, asthmatics, and people with cardiovascular or respiratory diseases.
AQI = 251-500 Hazardous	Hazardous for everyone and may prompt emergency condition alerts.

Air Quality Forecast





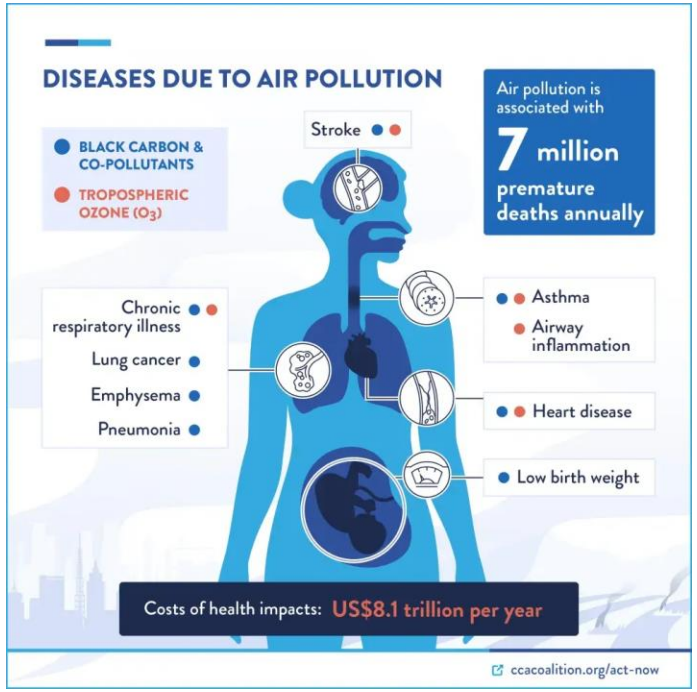
17. Rwanda

Name:Pie Celestin HAKIZIMANA
Affiliation: Rwanda Environment Management Authority

2021-2023 Annual Air Quality Status for Rwanda

Sources of Air pollution and their effects

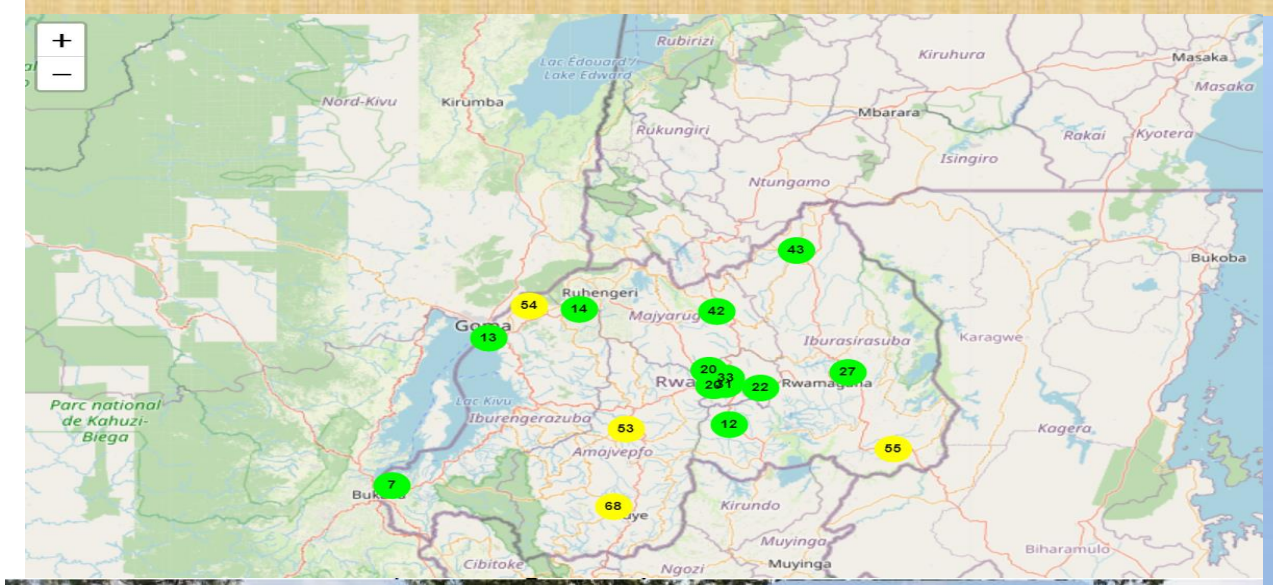
Air pollution is Global Issues !!!



Climate

Some air pollutants such as short-lived climate pollutants contri bute more to Global Warming

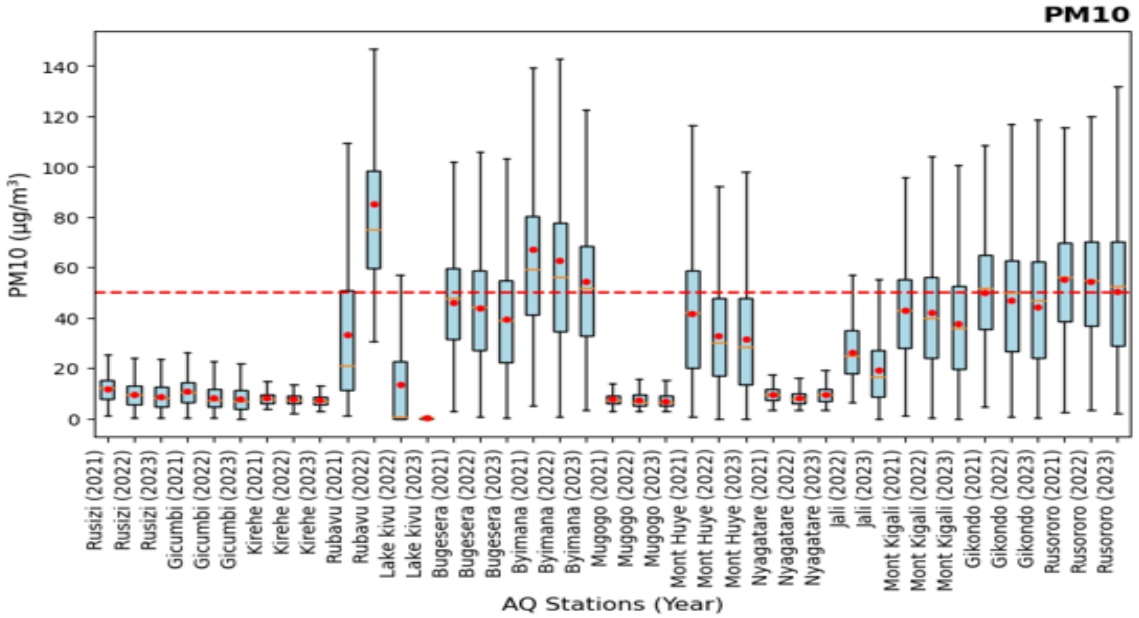
AQ Monitoring in Rwanda

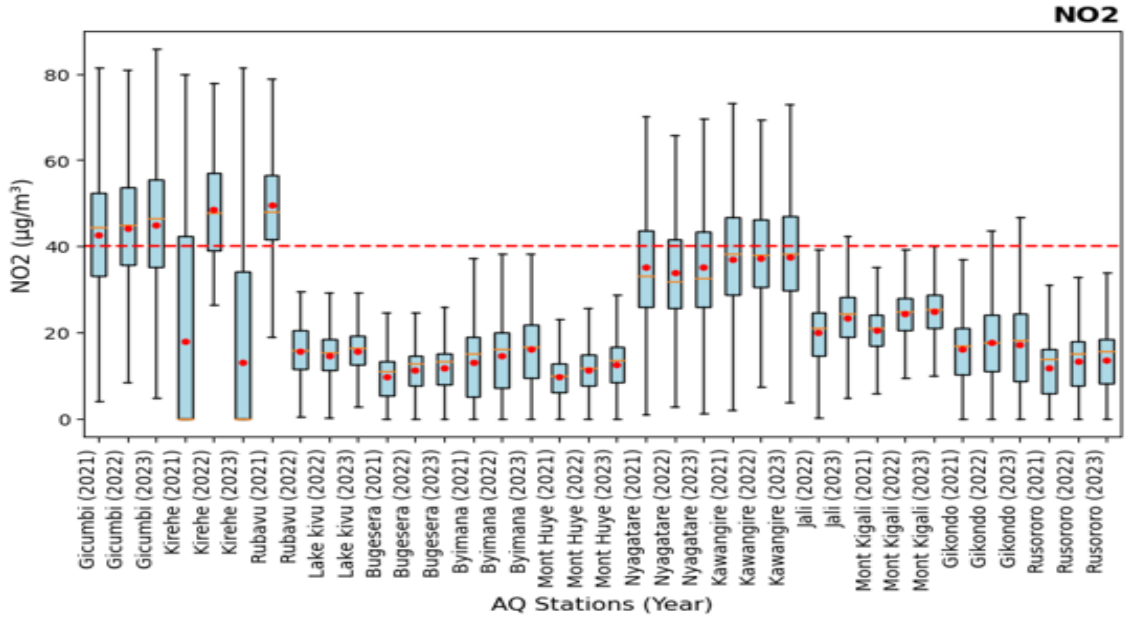


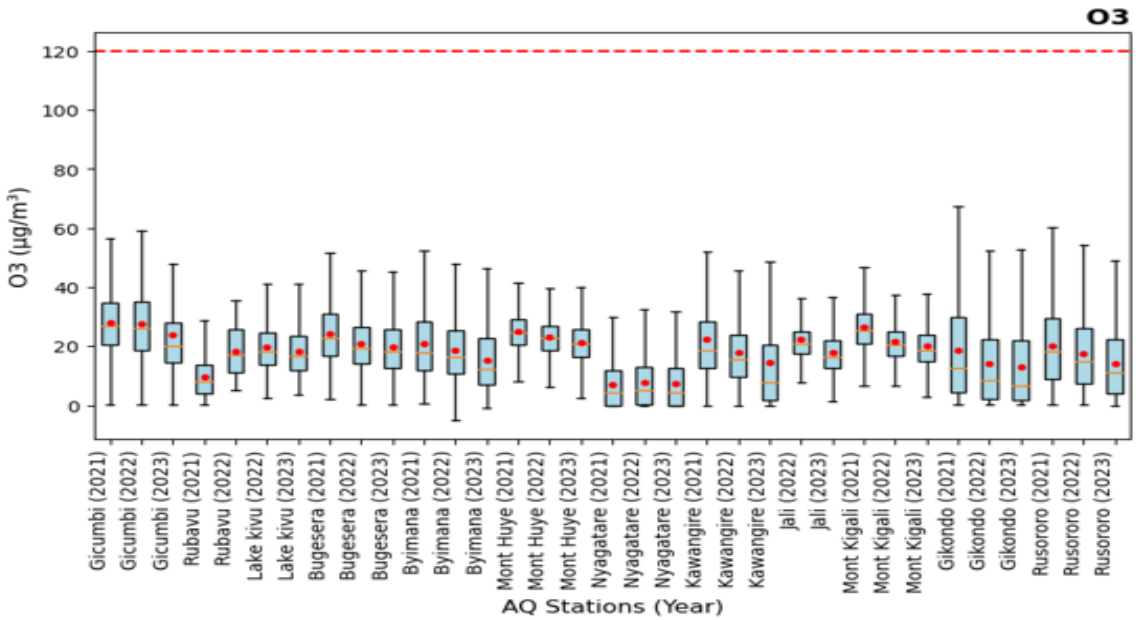
Real time air quality data:

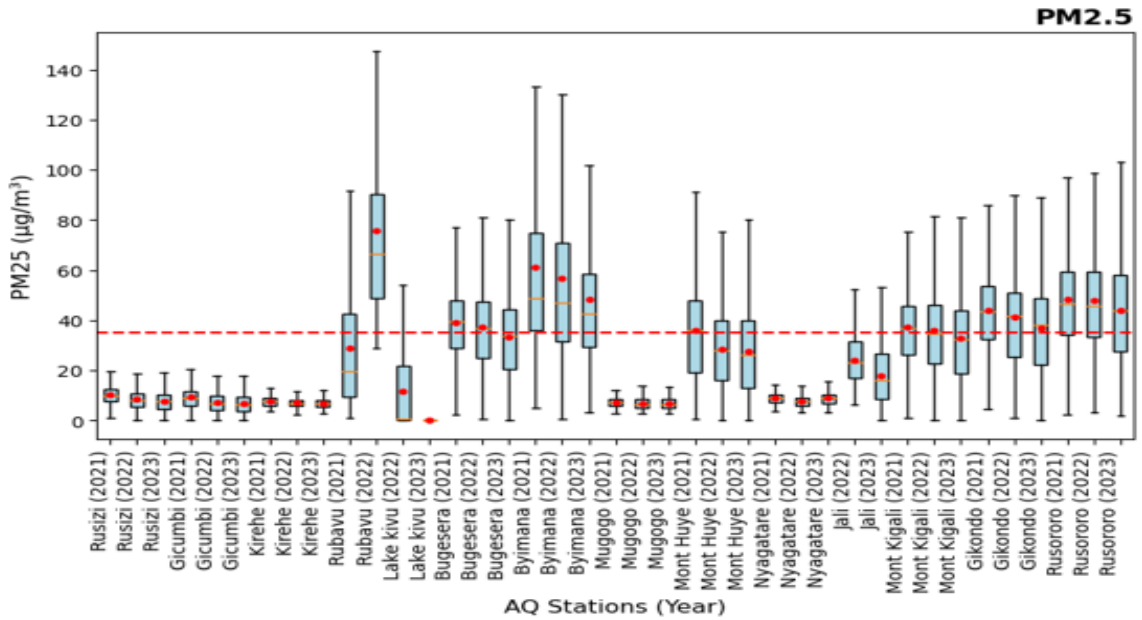
*C*an be accessed via (https://aq.rema.gov.rw/).

Variability of air pollutants across AQ monitoring Stations.

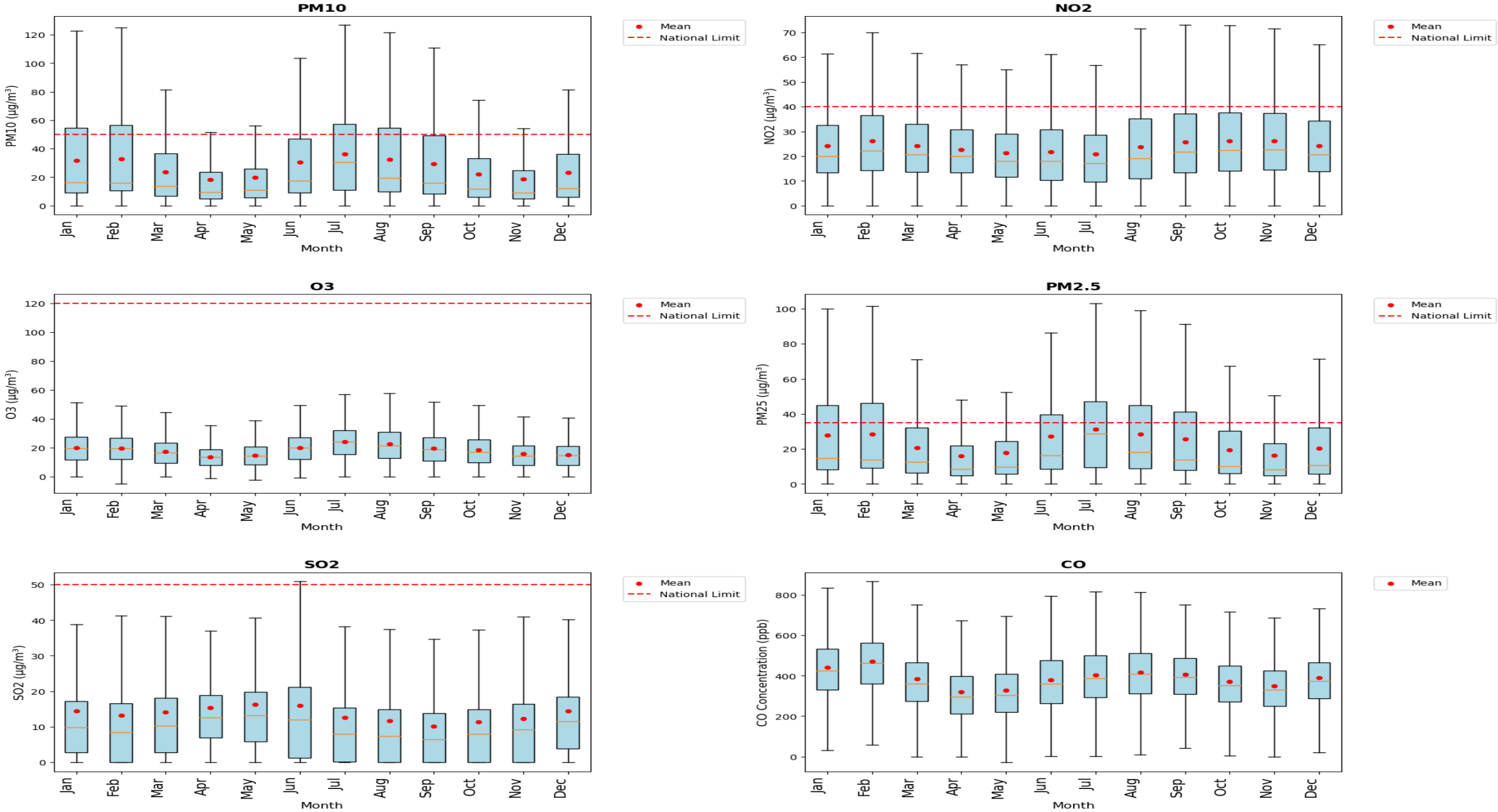




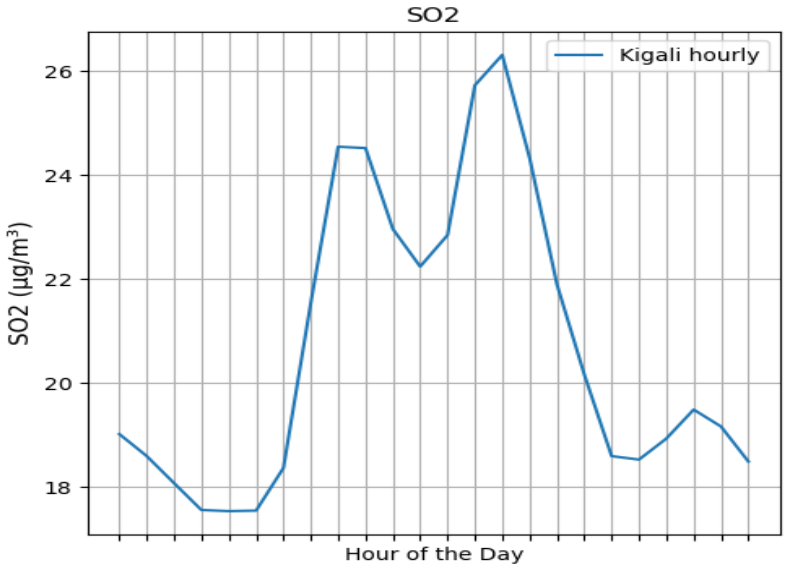


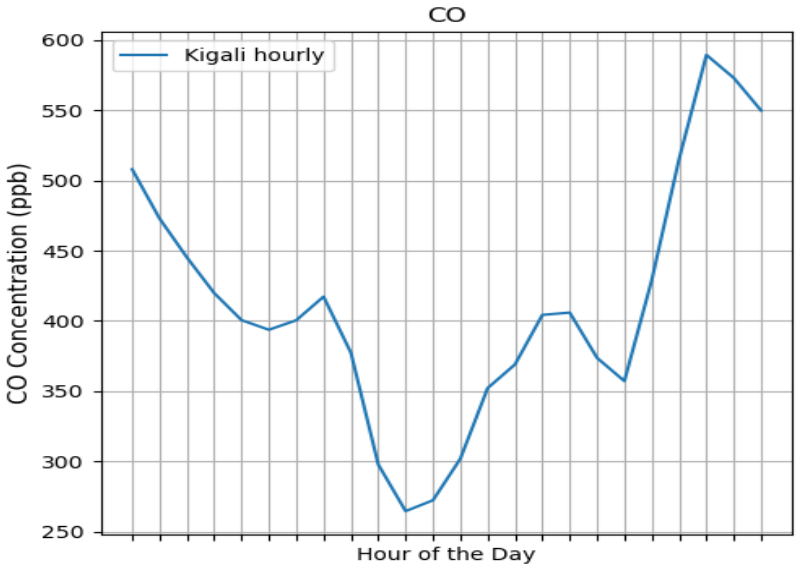


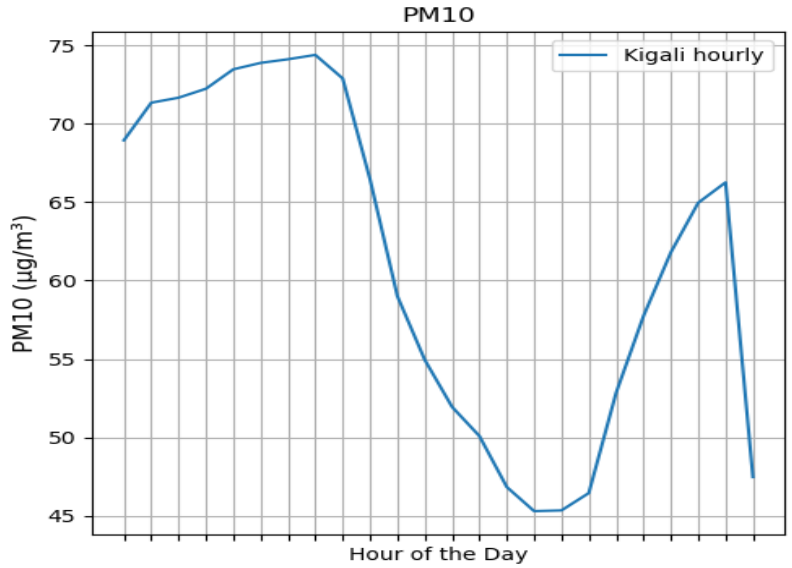
Monthly variation of pollutant concentration

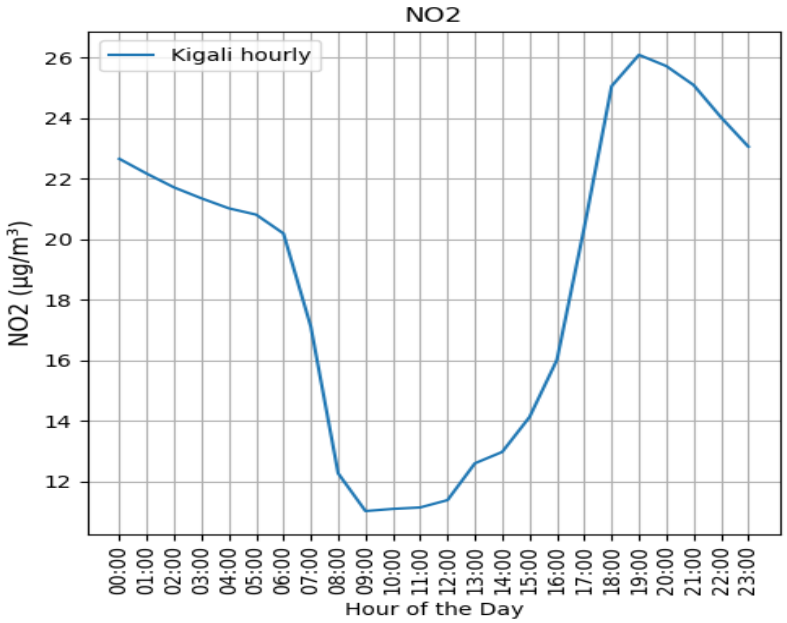


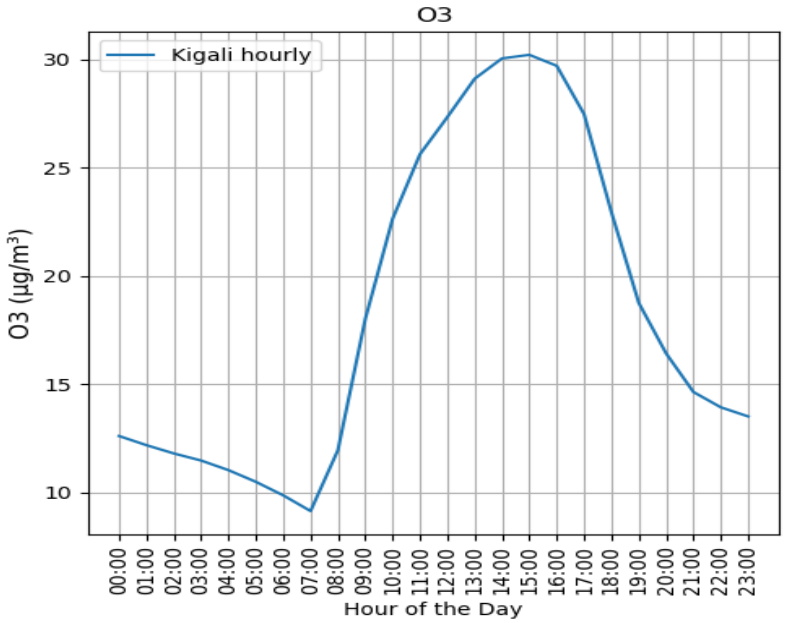
Diurnal variation of air pollutants in Kigali

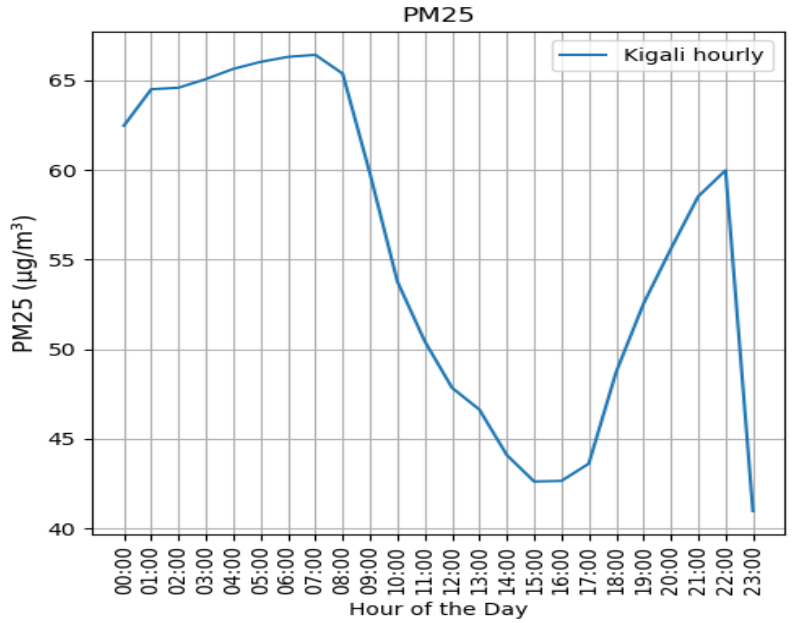




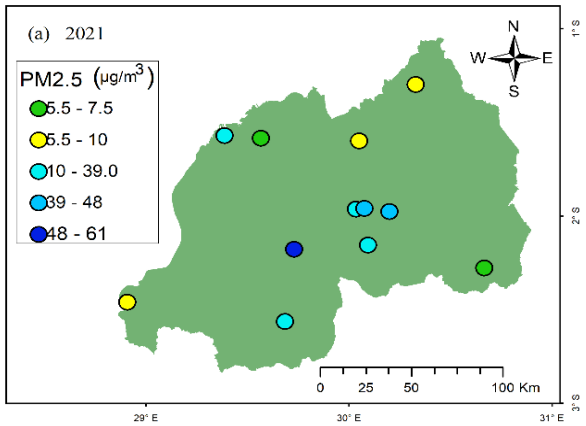


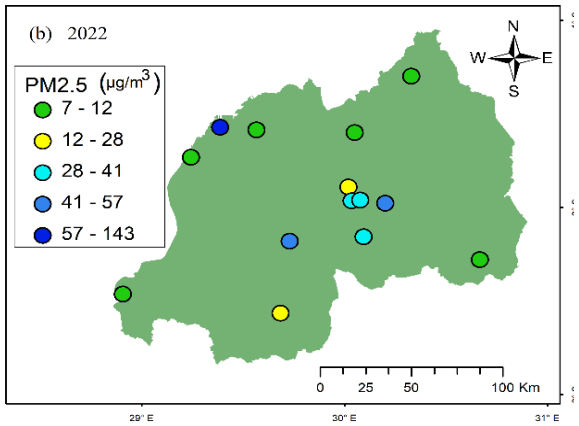


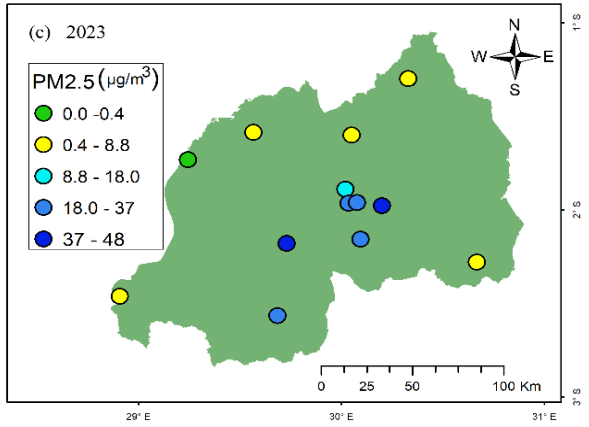


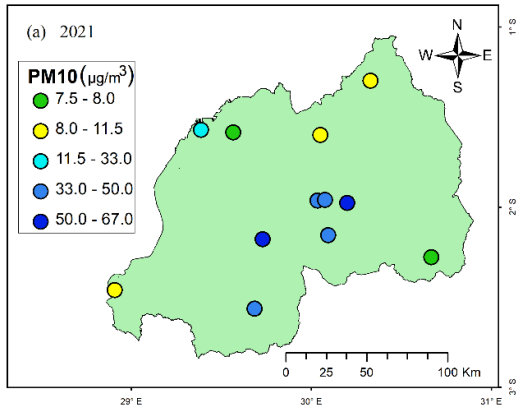


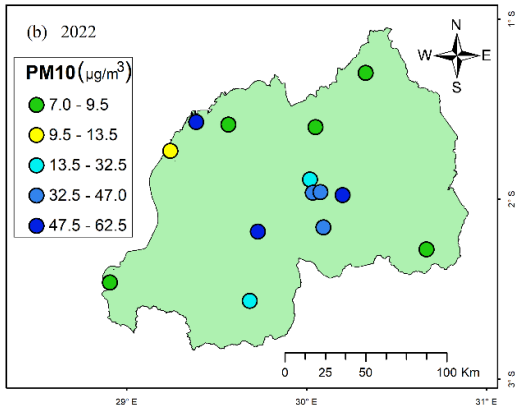
Spatial Distribution of air pollutants

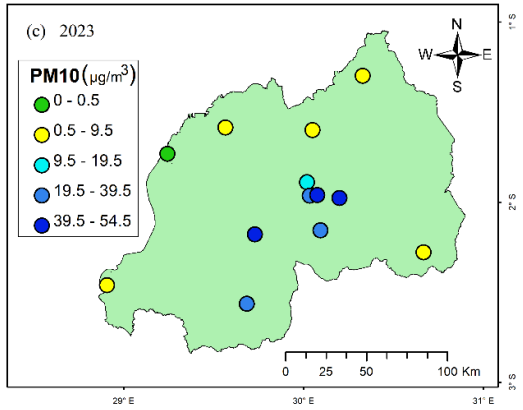




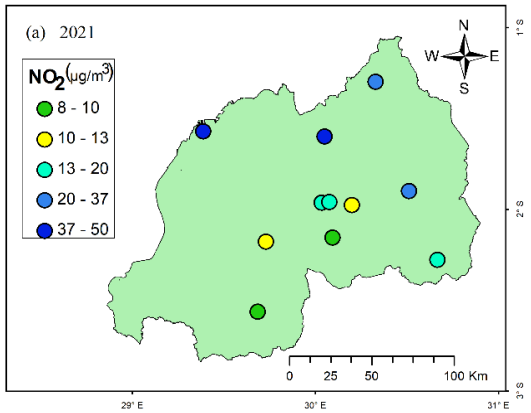


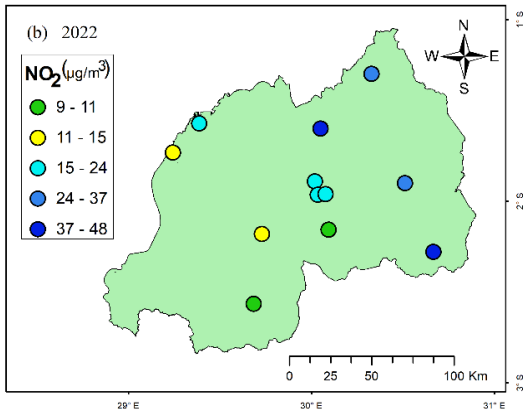


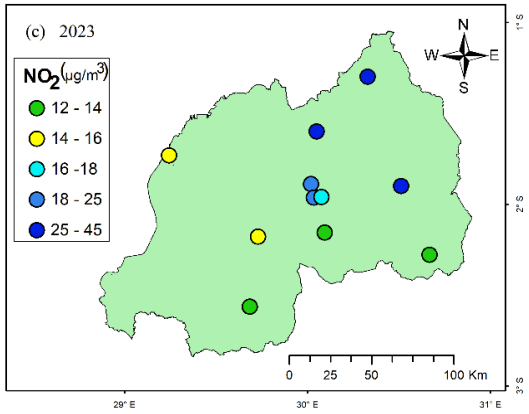


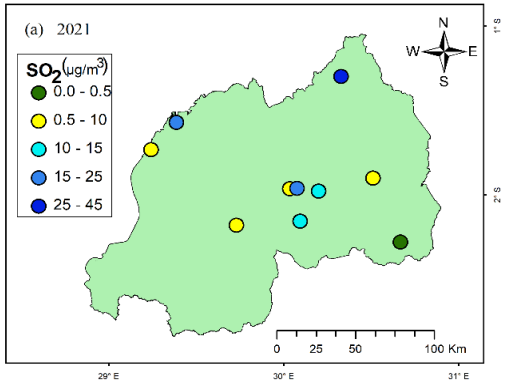


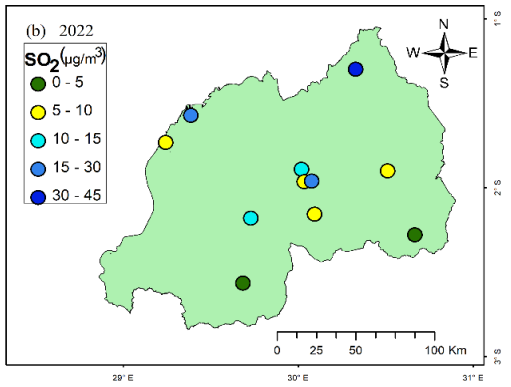
Spatial Distribution of air pollutants

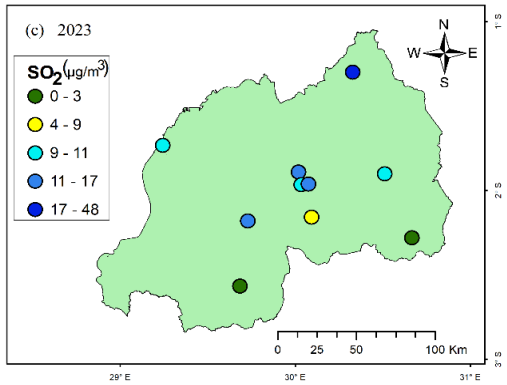




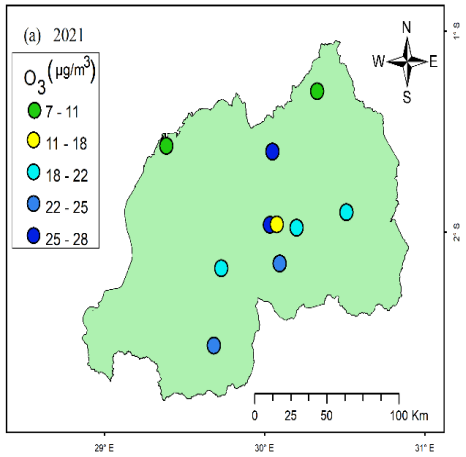


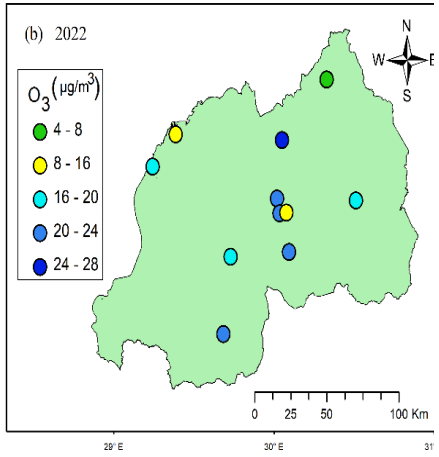


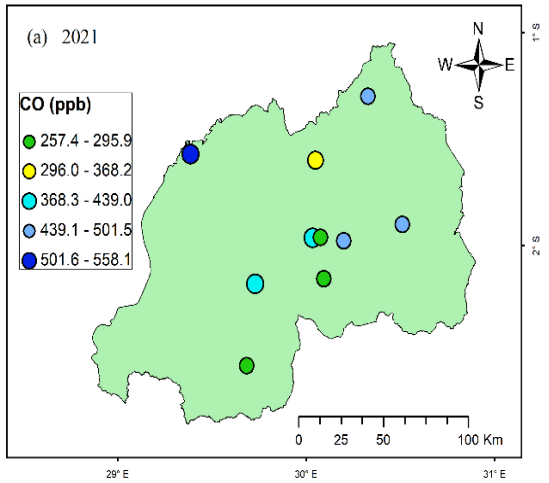


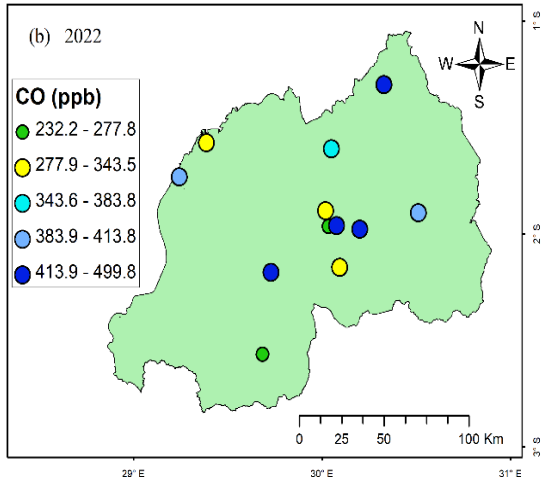


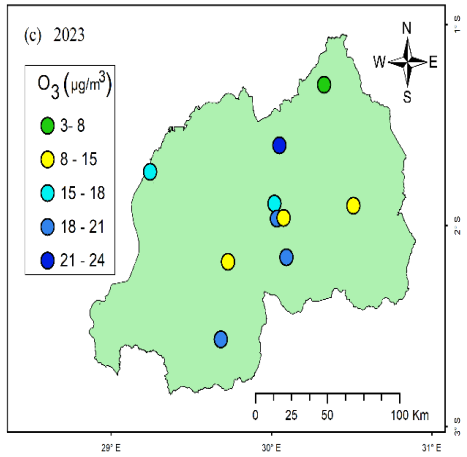
Spatial Distribution of air pollutants

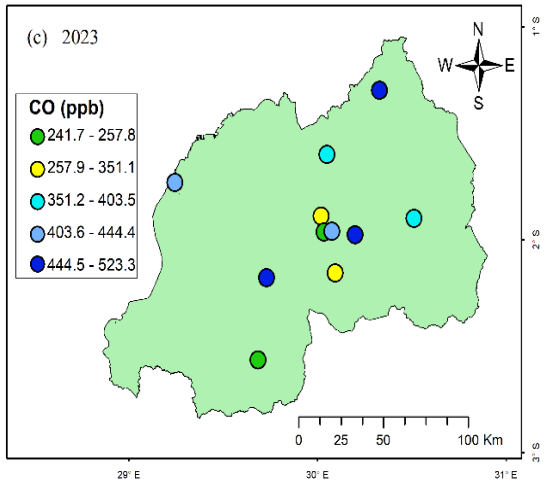












Summary of Results

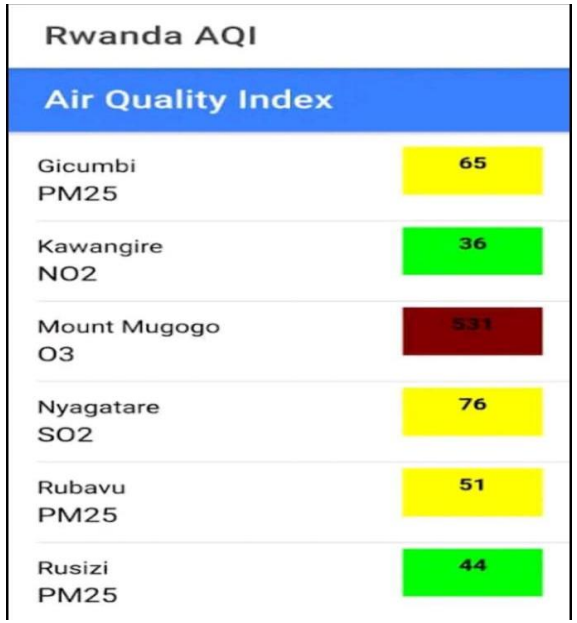
- Most of air pollutants are below the National air quality standard Limit
- Monthly variation of pollutant concentration showed an increase in Dry season
- High concentration of air pollution is most found during rush hours and low concentration in busy working hours and night time
- These results show the current status and need for continuous monitoring and improvement of air quality in Rwanda


KEY
ACHIEVEMENTS

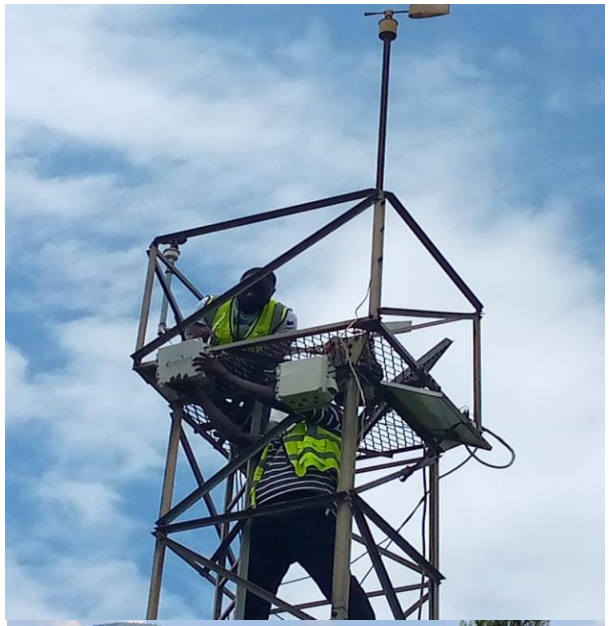
ADOPTION AND IMPLEMENTATION OF NATION AND REGIONAL STANDARDS RELATED TO AIR POLLUTION CONTROL:

1. *RS EAS 750 2010 –Emissions by Cement factories*
2. *RS EAS 751 2010 – Air quality specification*
3. *RS EAS 752 2010 – Tolerance limits of emissions discharged to the air by factories*
4. *EAS 1047 :Air quality vehicular exhaust emission limit*
5. *RS 407-1: Emission limits — Performance evaluation Road vehicles ; Among others. (This is the current and it refers to the Euro 4 and emission standard)*

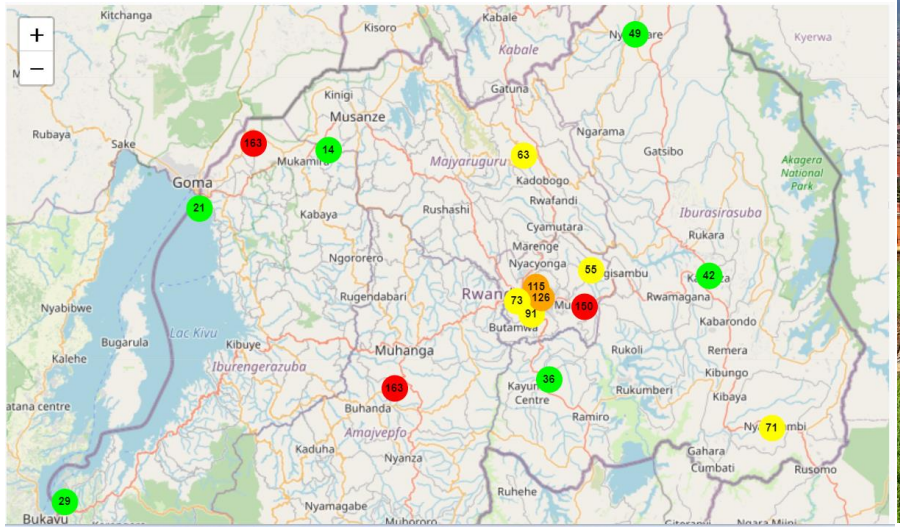
Air Quality Monitoring



Can be accessed via https://aq.rema.gov.rw/).



AQ monitoring station installed



Regular Vehicle inspection

❑Regular road vehicle emission inspections

- ✓*REMA with Rwanda National Police (RNP) conduct regular vehicle emission inspections countrywide;*
- ✓*Enforce the compliance of air pollution related laws, regulations and vehicle emission standards*

GOVERNMENT EFFORTS

- Promotion of public transport
- Vehicle maintenance and inspection program
- Adoption of low sulfur fuel on EAC level
- Promotion of non-motorized transport such as , bicycle lanes
- Car free zones and car free days
- Tax waiver for electric vehicles
- Promotion of renewable energy for cooking
- All industries have been relocated from residential area to Special Economic zone
- Going forward, each emitting industry is required to have a regular reporting framework and Monitoring system in place

GOVERNMENT EFFORTS

Tax waiver for electric vehicles

Assembling of new electric motorcycles and retrofitting of the existing fueled ones

RECOMMENDATIONS

We recommend to:

- Enhance public awareness on reducing vehicular emissions and promote sustainable industrial practices.
- Promote the use of cleaner energy sources and technologies.
- Expand the air quality monitoring network to improve Data coverage.
- Encourage community engagement in air quality monitoring and mitigation efforts.
- Prioritize green spaces and tree planting initiatives to mitigate pollution.
- Strengthen regulatory measures to curb biomass burning.
- Empower National Capacity in Monitoring, Modelling, and forecasting of Air Quality data,

THANK YOU!

18. Senegal

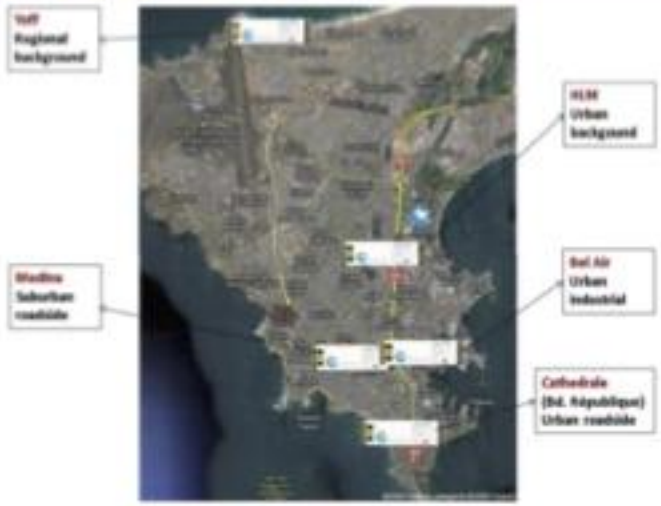
Name: Cheikh Tidiane CAMARA
Affiliation: Senegalese National Met Service (ANACIM)

~ 4 millions (the fifth of the country's population)

Highest density

NETWORK

Mobile monitoring van



5 monitoring stations through Dakar

AIR QUALITY MANAGEMENT CENTRE

- Monitoring air quality over Dakar,
- issueing reports of daily air quality based on the AQI
- Forecasting air quality for the next 48 hours

Measured pollutants

		Parameters							
	Site	SO2	NOx	NO2	PM10	PM2,5	O3	CO	Benz
1	Bd.Republique	X	X	X	X	X	X	X	
2	Medina		X	X	X			X	
3	HLM4	X	X	X	X		X		
4	BelAir	X	X	X	X	X			X
5	Yoff		X	X	X		X		

Source : Air quality management Centre (CGQA, Dakar, Senegal)

AIR QUALITY MANAGEMENT CENTRE

Dakar only

Box-Jenkins Model is used to forecast the air quality.

Data Source

Satellite data and measurements from network.

NATIONAL MET SERVICE

Whole Country

- Focus on dust particles (PM10)
- Forecast purely dynamic (taking into account wind parameter, soil moisture, …)
- No sensors available

Products used

- WIGOS
- Local meteorological network
- AEMET (Barcelona)
- Eumetsat (RGB Dust)
- ECMWF, ARPEGE, UK Met Office

République du Sénégal
Un peuple - Un but - Une foi

Ministère des Transports Aériens et du Développement des Infrastructures Aéroportuaires

Agence Nationale de l'Aviation Civile et de la Météorologie

Direction de l'Exploitation de la Météorologie

République du Sénégal
Un peuple - Un but - Une foi

Ministère de l'Environnement et du Développement Durable

Direction de l'Environnement et des Etablissements Classés

Centre de Gestion de la Qualité de l'Air

BULLETIN METEO - QUALITE DE L'AIR

Dakar, le 19/02/2024

AVIS SUR LA POUSSIERE ET LA QUALITE DE L'AIR

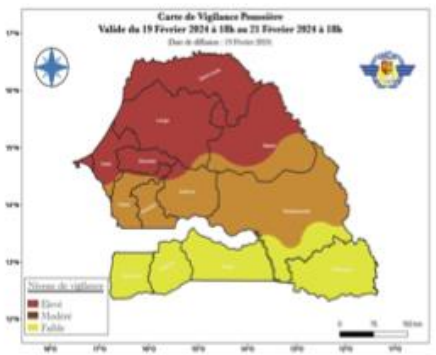
Validité : en cours jusqu'au Mercredi 21 Février 2024 à 18h

N° 002/2024

Au cours des prochaines 72 heures, une suspension de particules de poussière sera notée sur une bonne partie du territoire. Par ailleurs, ce phénomène de poussière va aborder le pays par les localités nord au courant de cette nuit avant de se généraliser progressivement sur l'ensemble du pays durant les journées du mardi et du mercredi.

Par conséquent, une forte réduction de la visibilité sera observée sur le territoire, bien que la partie sud soit relativement moins touchée.

Ci-dessous les cartes de vigilance sur la visibilité et la qualité de l'air



La réduction des visibilités est étroitement liée à la densité de la poussière qui dégrade à son tour la qualité de l'air.

La qualité de l'air à Dakar est mauvaise pour la journée du 19 février avec des concentrations de particules élevées dans l'air ambiant. Une très mauvaise qualité de l'air est prévue pour les prochaines 72 heures.

Il existe un risque sanitaire « élevé » pour les personnes particulièrement sensibles (les personnes souffrant de maladies respiratoires, jeunes enfants et personnes âgées).

Au vu du degré d'exposition aux concentrations élevées de particules, il est conseillé de ne pas trop s'exposer à l'air ambiant et d'éviter les activités sportives intenses à l'extérieur.

AGENCE NATIONALE de l'Aviation Civile et de la METEOROLOGIE DU SENEGAL, AEROPORT L.S.S
BP 8257 DAKAR YOFF, TEL: 00221 33 865 60 65 FAX: 00221 33 8203967/33 8200403

DIRECTION DE L'ENVIRONNEMENT ET DES ETABLISSEMENTS CLASSES/ CENTRE DE GESTION DE LA QUALITE DE L'AIR, 104 RUE CARNOT DAKAR , TEL: 00221 33 821 33 37

19. Seychelles

Name:Tarek Nourrice
Affiliation: Seychelles Meteorological Authority

Air Quality Monitoring Network

Private-public partnership between S4S and SMA

Stakeholders include: Public schools, UniSey, existing SMA stations at airports, MAECC office at Botanical Gardens and DICT

Air monitoring sensors at 13 locations on Mahe, Praslin and La Digue.

Air Quality Monitoring Network

WORLD METEOROLOGICAL ORGANIZATION

WCRP
World Climate Research Programme

Air Quality Products

WORLD METEOROLOGICAL ORGANIZATION

PROGRAMME OF THE EUROPEAN UNION

Copernicus

IMPLEMENTED BY EUMETSAT

WCRP World Climate Research Programme

GLOBAL ATMOSPHERE WATCH

WORLD METEOROLOGICAL ORGANIZATION

PROGRAMME OF THE EUROPEAN UNION

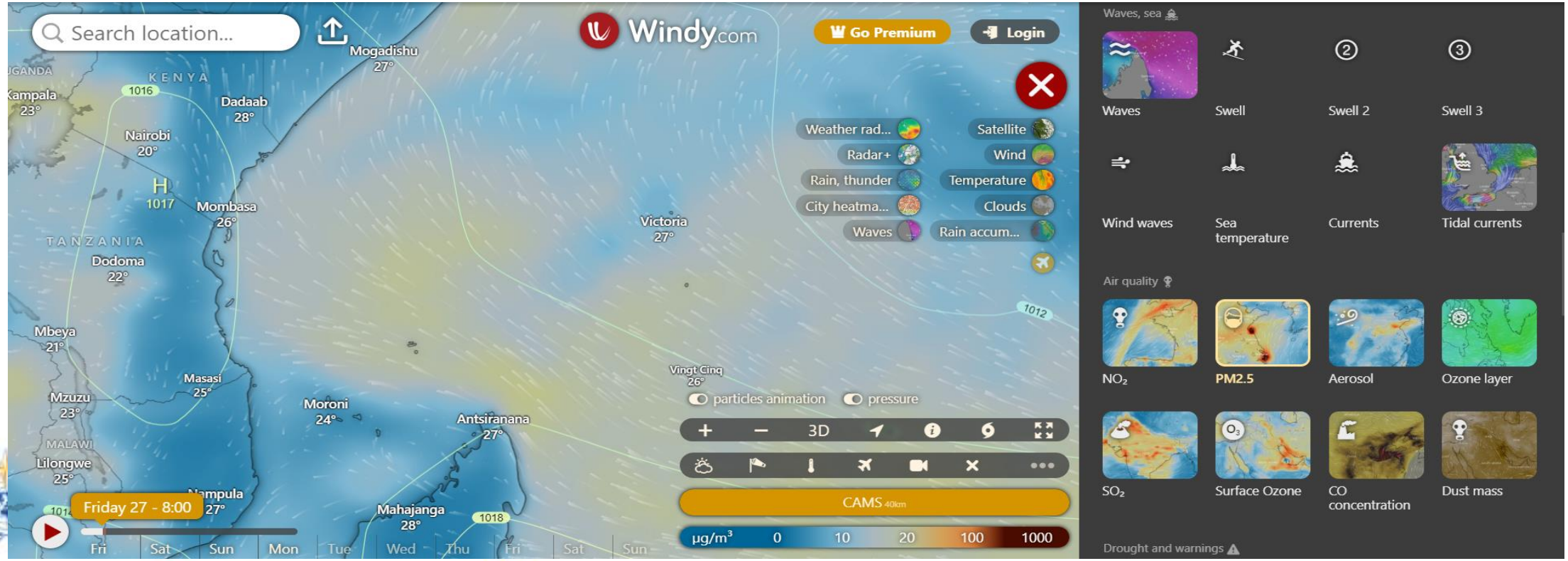
Copernicus

IMPLEMENTED BY EUMETSAT

WCRP World Climate Research Programme

GLOBAL ATMOSPHERE WATCH

Air Quality Products



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GLOBAL ATMOSPHERE WATCH

Air Quality Management in South Africa

Name: Marvin Qhekwana
Affiliation: DAERL - Northern Cape Province, South Africa
Email: mqhekwana@daerl.co.za

WORLD METEOROLOGICAL ORGANIZATION
PROGRAMME OF THE EUROPEAN UNION
Copernicus
IMPLEMENTED BY EUMETSAT
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GLOBAL ATMOSPHERE WATCH

agriculture, environmental affairs, rural development and land reform
Department: agriculture, environmental affairs, rural development and land reform .
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

Air Quality Monitoring in So

Ambient Air Qual

forestry, fisheries & the environment
Department: Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

SAAQIS South African Air Quality Information System

South African Weather Service

Background Information
Ambient Monitoring Data
Network Monitoring Reports
Emission Reporting & Licensing
Acts and Regulations
Municipal By-Laws
AQM Plans & Strategies
NEMA 3A Advisory Forum
Publications and Proceedings
AQ Governance Lekgotla
Learners' Resources
Report Event/Contact Official
About SAAQIS

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/09/2024

The Regulations For Implementing and Enforcing Priority Area AQMPs For Promulgation. Click HERE to view the document.

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Komani
Makhanda
Knysna
Jeffreys Bay
Bredasdorp
Swellendam
Oranjemund
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Springbok
Pofadder
Keetmanshoop
Luderitz
Sesriem
Mariental
Rosh Pinah
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Regional or Urban Air Quality Forecasting System in South Africa

(11 July 2014 – to date)

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

South African Weather Service

CSIR
Touching lives through innovation

SANSA
SOUTH AFRICAN NATIONAL SPACE AGENCY

NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT 39 OF 2004

(Gazette No. 27318, Notice No. 163. Commencement date: 11 September 2005 – save for sections 21, 22, 36 to 49, 51(1)(e), 51(1)(f), 51(3), 60 and 61 [Government Notice R898, Gazette No. 28016])

REGULATIONS REGARDING AIR DISPERSION MODELLING

Government Notice R533 in Government Gazette 37804 dated 11 July 2014.

Commencement date: 11 July 2014.

I, Bomo Edith Edna Molewa, Minister of Water and Environmental Affairs, hereby make the regulations regarding air dispersion modelling, in terms of section 53(f) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), set out in the Schedule hereto.

(Signed)

BOMO EDITH EDNA MOLEWA

MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

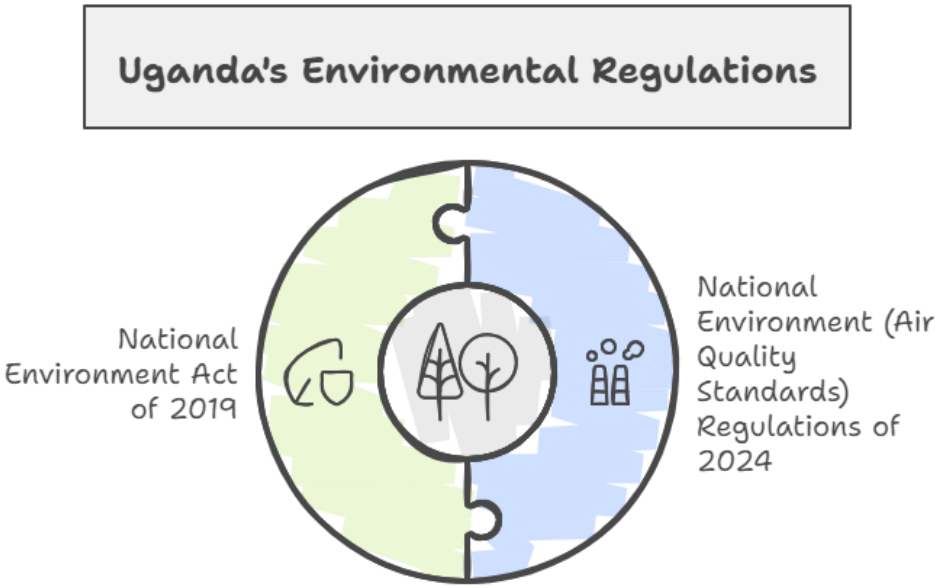
WORLD METEOROLOGICAL ORGANIZATION

WCRP
World Climate Research Programme

21. Uganda

Name: Wabinyai Fidel Raja, Mirembe Doreen
Affiliation: AirQo – Makerere University

Regulations and Environmental Protection Initiatives



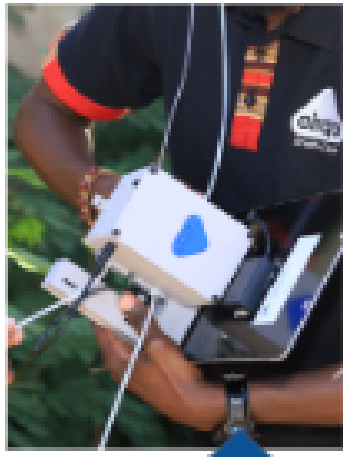
National Environment Act of 2019, aimed at enhancing environmental protection and management in the country.

NEMA(National Environment Management Authority) authored the National environment law 2024 (air quality standard)

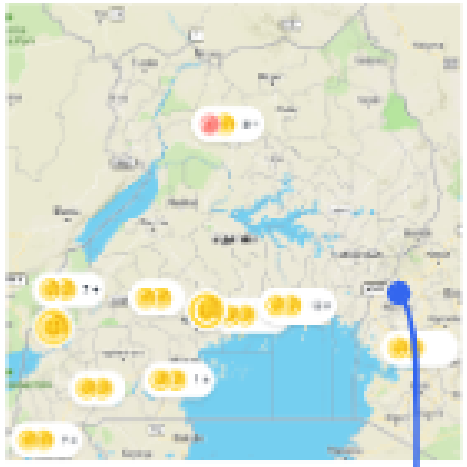
UNMA (Uganda National Meteorological Authority), does forecast regarding haze and fog, Have a spectrometer for monitoring CO2 conc. UNMA works in collaboration with AirQo to forecast $PM_{2.5}$ pollution

Other local govt authority such as **KCCA (Kampala Capital city Authority), Jinja, Fort Portal** have established local initiatives to manage pollution within their jurisdictions. They conduct assessments, in collaborating with stakeholders, work on public awareness campaigns.

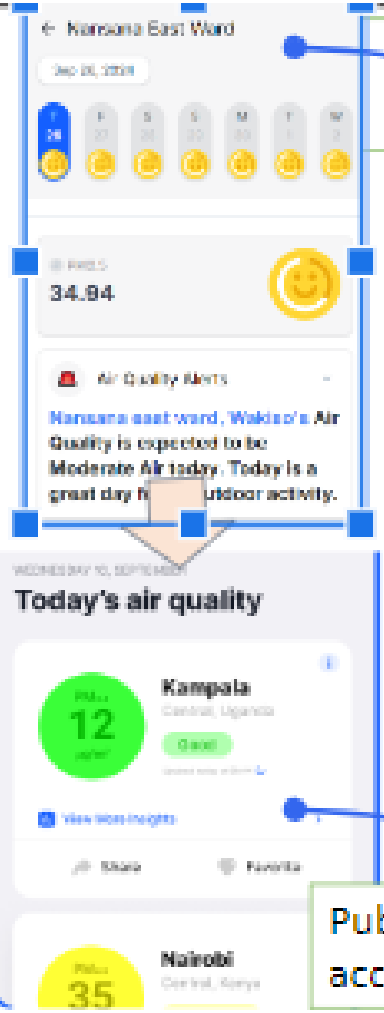
Air quality access and forecast



Bainos monitors



A network of over **140+** air quality sensors in **over**
We were able to **integrate** other **devices** i.e AirNow, purple air into the AirQo analytics platform



Forecast FOR each device

Automated tools to understand vehicular traffic in urban areas and their contribution to emissions

Public-facing data access channels

www.airqo.net