



MACCLIMA

Sistema de observación meteorológica y oceánica como herramienta para el fomento de la resiliencia y adaptación al cambio climático en el espacio de cooperación (MAC-CLIMA)

(MAC2/3.5b/254)

1er encuentro presencial MAC-CLIMA

1 y 2 de diciembre de 2021

Las Palmas de Gran Canaria (España)

PROYECTO COFINANCIADO AL 85% POR LA UNIÓN EUROPEA



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Countries

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01

Introduction: AEMET and the WMO SDS-WAS



AEMET

Meteorological State
agency of Spain

Izaña Atmospheric
Research Center (CIAI)



The main goal of **AEMET** is the development, implementation and provision of **meteorological services** within the competence of the State and support for the exercise of other public policies and private activities, contributing to the **safety of people and property**, and the **well-being** and **sustainable development** of Spanish society.

AEMET supports international development cooperation programs that promote the institutional strengthening of the NMHS, capacity building and service delivery. As an example, in 2007 AEMET established the **Conference of Directors of the Services Meteorological and Hydrological of West Africa (AFRIMET)** in which 16 countries of the region are integrated, to coordinate AEMET's cooperation program in Africa.

The Izaña Atmospheric Research Center (CIAI) of AEMET conducts observations and research related to atmospheric constituents that are **capable of forcing change in the climate of the Earth** and play key roles in **air quality** from local to global scales. The IARC has contributed to the **WMO Global Atmosphere Watch (GAW)** Programme since its establishment in 1989.



WMO SDS-WAS

Sand and Dust
Storm Advisory and
Assesement System

Barcelona Dust
Regional Center
(BDRC)

The WMO SDS-WAS mission is to enhance the ability of countries to deliver timely and quality **sand and dust storm forecasts, observations, information and knowledge** to users through an international partnership of research and operational communities.

Barcelona Dust Regional Center, jointly managed by **AEMET** and the **BSC-CNS** (Barcelona Supercomputing Center- Centro Nacional de Supercomputación), coordinates the activities of the WMO SDS-WAS for the **NAMEE** region (North Africa, Middle East and Europe) and provides daily SDS forecast and observational products for the NAMEE region.



World
Meteorological
Organization
Weather · Climate · Water



**Barcelona
Supercomputing
Center**
Centro Nacional de Supercomputación



AEMET and MAC-CLIMA:

Objective and Activities

Specific Objective 1:

Promote and develop a joint strategy that allows the climate change phenomenon to be monitored in a coordinated and precise manner within the cooperation space and to promote the production of scientific knowledge that helps to understand this phenomenon with the utmost precision.

Activity 2.1.2:

Increase the technical and human training of the actors responsible for the meteorological and oceanographic observation of the climate change phenomenon in the cooperation space.





02 SDS Warning Advisory System for West Africa Countries:

Senegal, Mauritania and Cape Verde





MAIN TASKS

- 1 Development and Evaluation of an SDS Warning System for Senegal, Mauritania and Cape Verde**
- 2 Installation of a PM sensor and measurements with a hand-held sun-photometer**
- 3 Online training workshops**





03

Senegal



Forecast Products: Test phase!



MACCLIMA

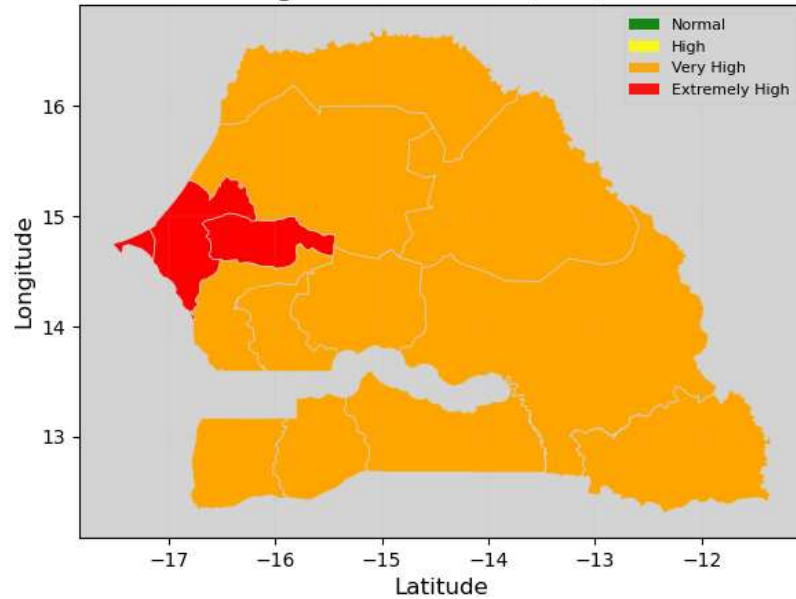
Interreg



MAC 2014-2020
Cooperación Territorial

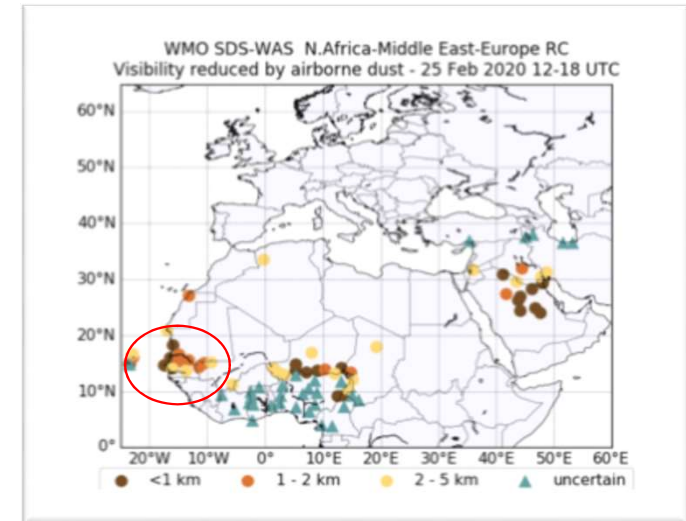


Senegal SDS-WAS: 25/Feb/2020



Warning
Advisory
System

Visibility
reduction:
SYNOPS and
METARS



- Thresholds for the 1st Administrative Division
- Calculated from time series of the multimodel median: percentile approach

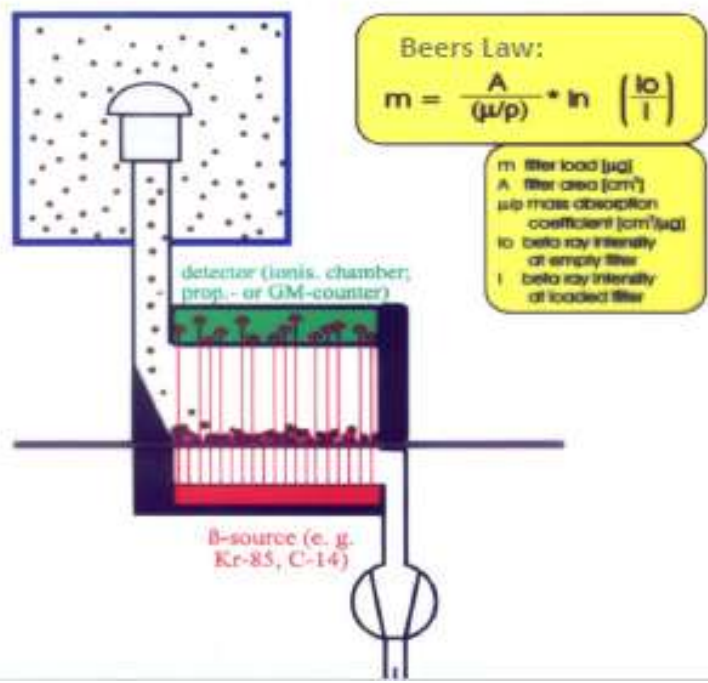
	Diourbel	Fatick	Kaffrine	Kaolack	Kedougou	Kolda	Louga	Matam	Saint Louis	Sedhiou	Tambacounda	Thies	Ziguinchor
50% méd.	236	202	206	177	146	150	403	392	465	147	243	201	159
80% Jaune	383	320	316	274	235	245	590	577	677	233	372	340	246
90% Orange	488	424	425	356	302	296	728	717	819	295	463	441	309
97.5% Rouge	661	566	560	491	430	420	969	969	1061	421	613	638	425



IMDS PM10 sensor: calibration and installation (Izaña CIAI)



**Beta Attenuation:
β-Ray Absorption in Matter**

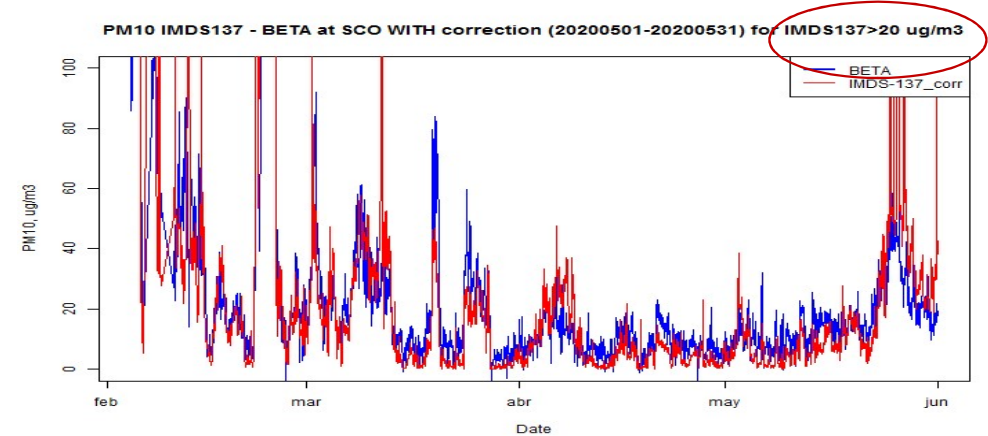
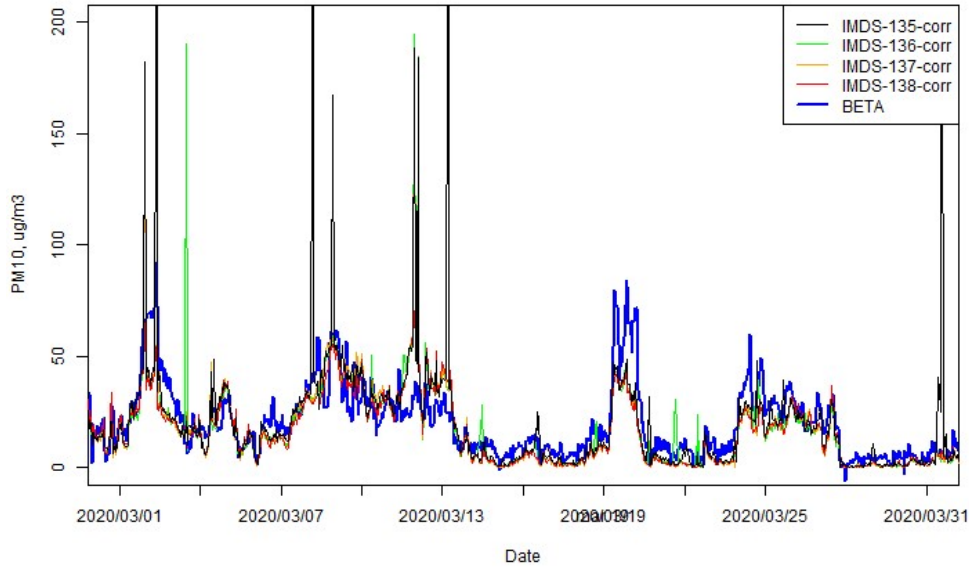


IMDS sensor installed on ANACIM Headquarters (Dakar)

Example comparison with correction (March 2020): WORK in PROGRESS!



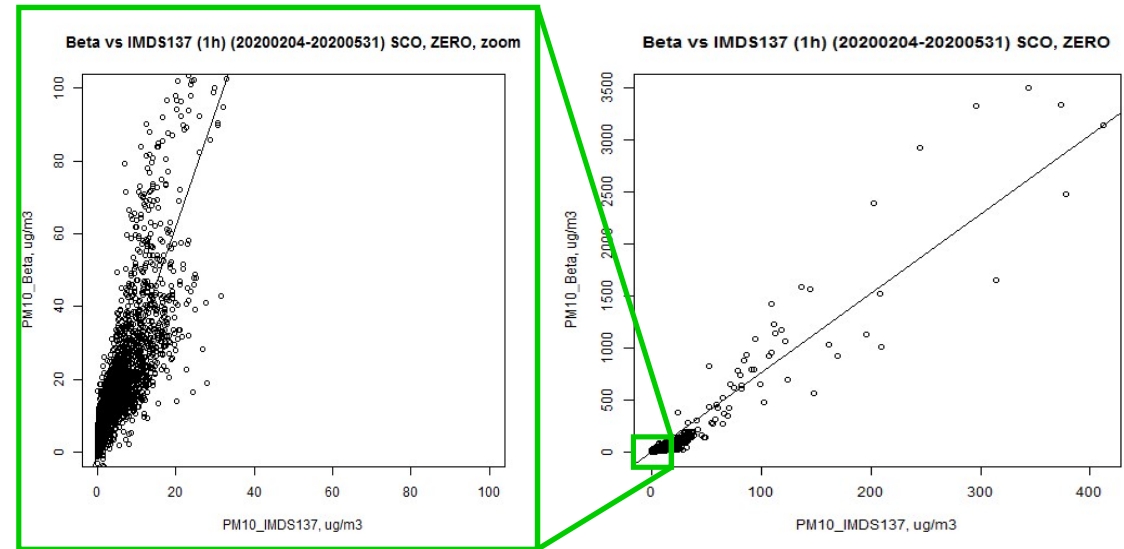
PM10 IMDs - BETA at SCO WITH correction (20200301-20200331)



PM10 IMDS137	Y=Ax	R2
Caja 2 Senegal	(PROVISIONAL)	
< 20 ug/m3	3.056273	0.8082672
> 20 ug/m3	7.986222	0.9107489
Without filter	7.616111	0.8836679









In principle, we will use the adjustment of all data, without filters



Online Training Workshop



     			
<h2>Atelier SDS-WAS Afrique de l'Ouest</h2> <h3>Sénégal, 3-4 Mars 2021</h3>			
	Mercredi 3 Mars – Produits & Guide Prévision SDS		Jeudi 4 Mars – Instrumentation
9-10	Introduction WMO SDS-WAS	9-10	*Installation et utilisation d'instrumentation 1
10-11	Produits & Guide Prévision SDS	10-11	*Installation et utilisation d'instrumentation 2
11-11:30	<i>Pause</i>	11-11:30	<i>Pause</i>
11:30-12:30	*Méthodes d'observation	11:30-12:30	*Installation et utilisation d'instrumentation 3
12:30-13:30	*Vérification Produits	12:30-13:30	*Tutoriel et doutes

8 Attendants:

- Weather forecasters
- Technicians

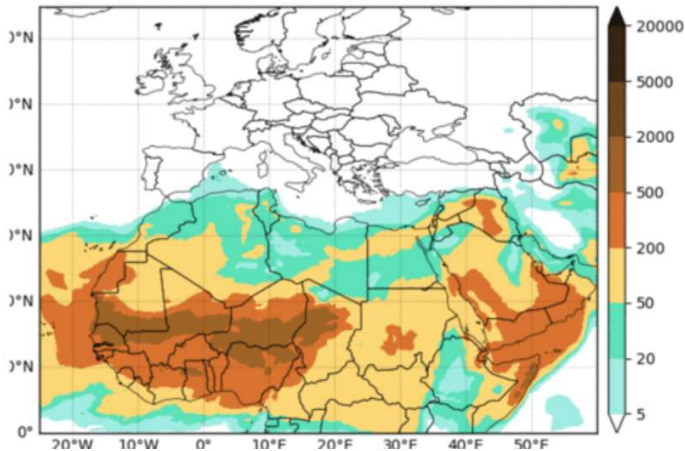
*Cours en anglais



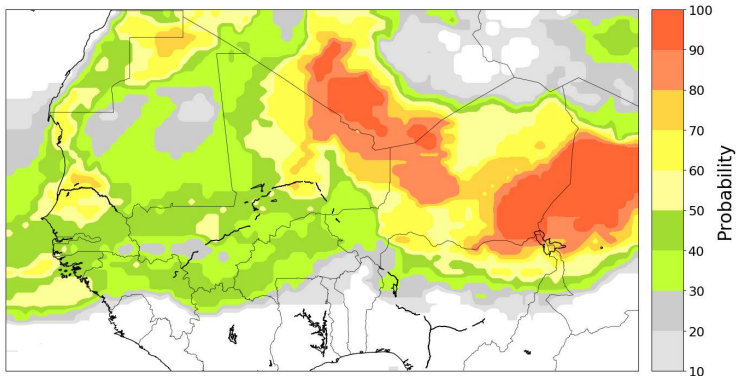
Workshop: Forecast Products



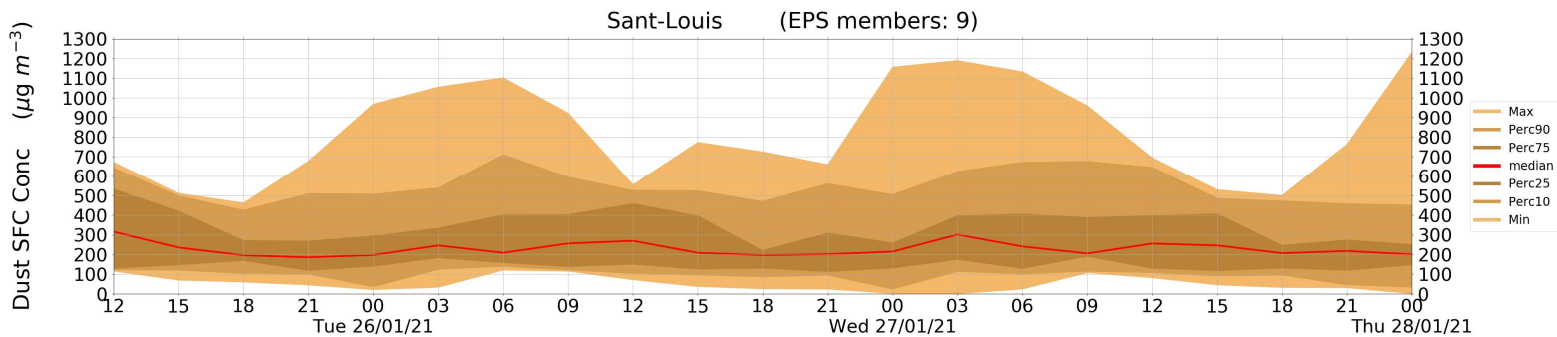
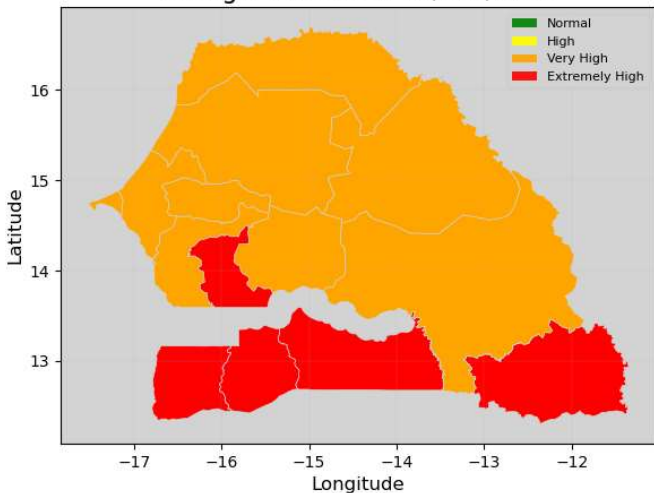
WMO SDS-WAS N.Africa-Middle East-Europe RC
 MEDIAN Dust Surface Concentration ($\mu\text{g}/\text{m}^3$)
 Run: 12h 13 FEB 2020 Valid: 12h 13 FEB 2020 (H+00)



Daily Mean of **Dust SFC Concentration**
 Probability of exceeding **150 $\mu\text{g}/\text{m}^3$**
 ENS members: **10** Run: 25/11/2020 Valid for: **26/11/2020**



Senegal SDS-WAS: 13/Feb/2020



Workshop: Equipment

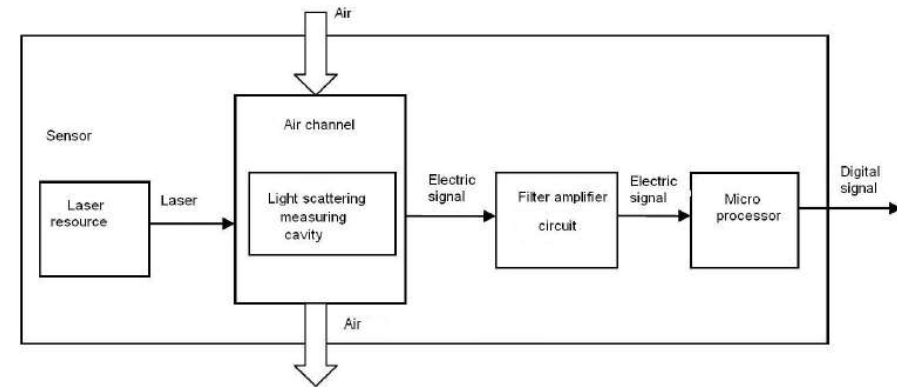
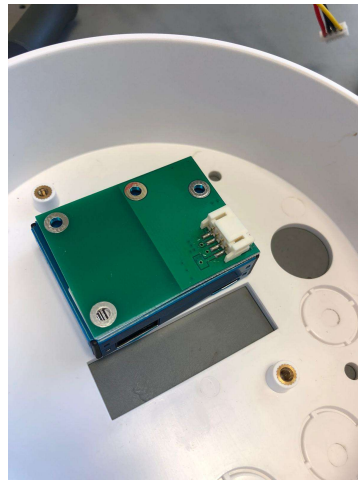
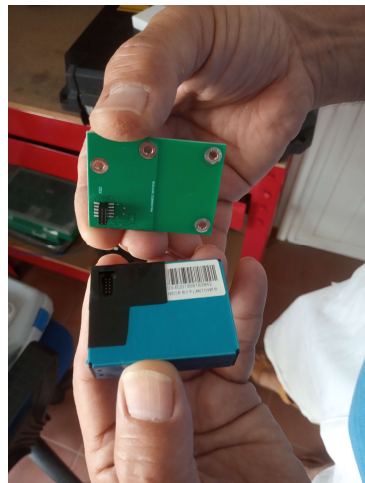
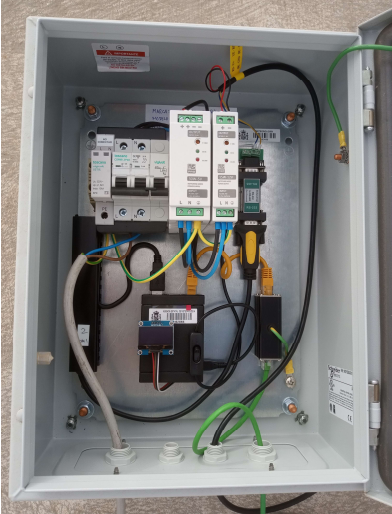


Figure 1 Functional block diagram of sensor



Calitoo
Sunphotometer:
AOD measurements
three times a day





04

Cape Verde and Mauritania



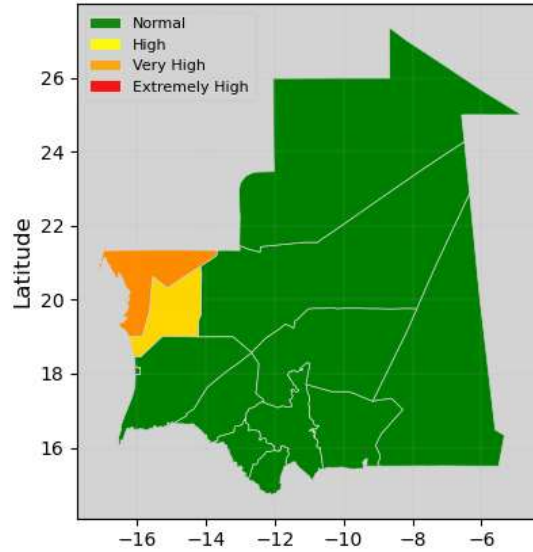
Mauritania and Cape Verde:

Forecast products

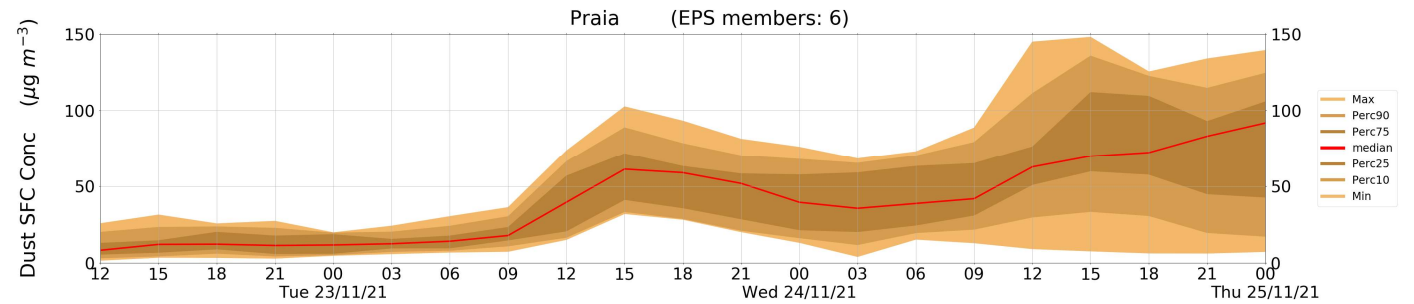
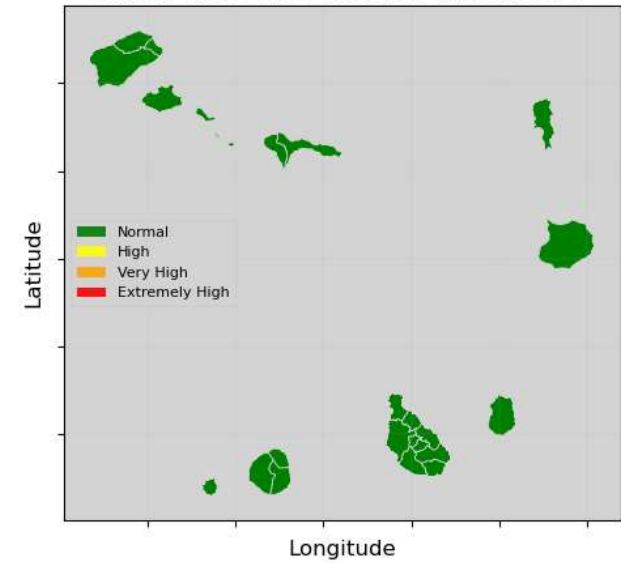
Forecast Products: Test phase



Mauritania SDS-WAS: 07/Oct/2021



CaboVerde SDS-WAS: 24/Nov/2021



05 Mauritania and Cape Verde

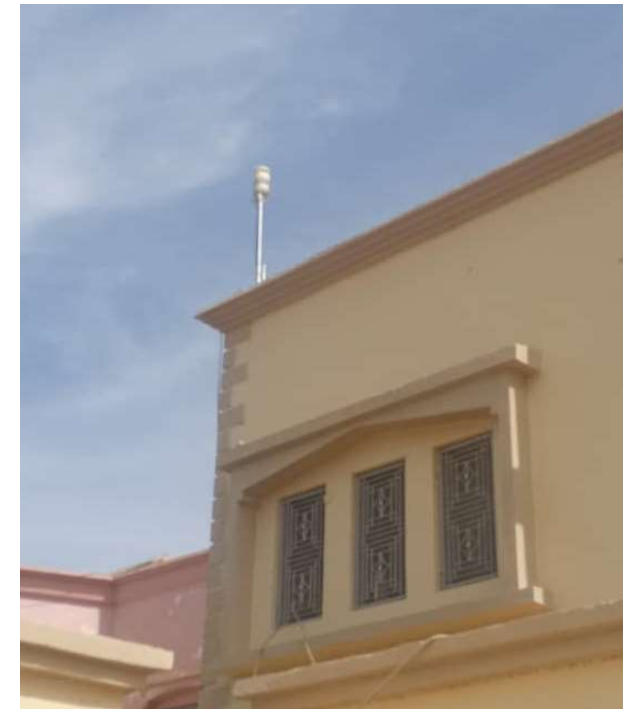
Tasks:

Mauritania:

- PM10 sensor and Calitoo received and installed (24/11/2021)
- Workshop: 26/01/2022 (to be confirmed)

Cape Verde:

- PM10 sensor and Calitoo to be shipped on 10/12/2021 (to be confirmed)
- Workshop: after installation



IMDS sensor installed on top of
ONMM building (Nouakchott)





Gracias

Obrigado

Merci Beaucoup

THANK YOU

