



Barcelona Dust Regional Center

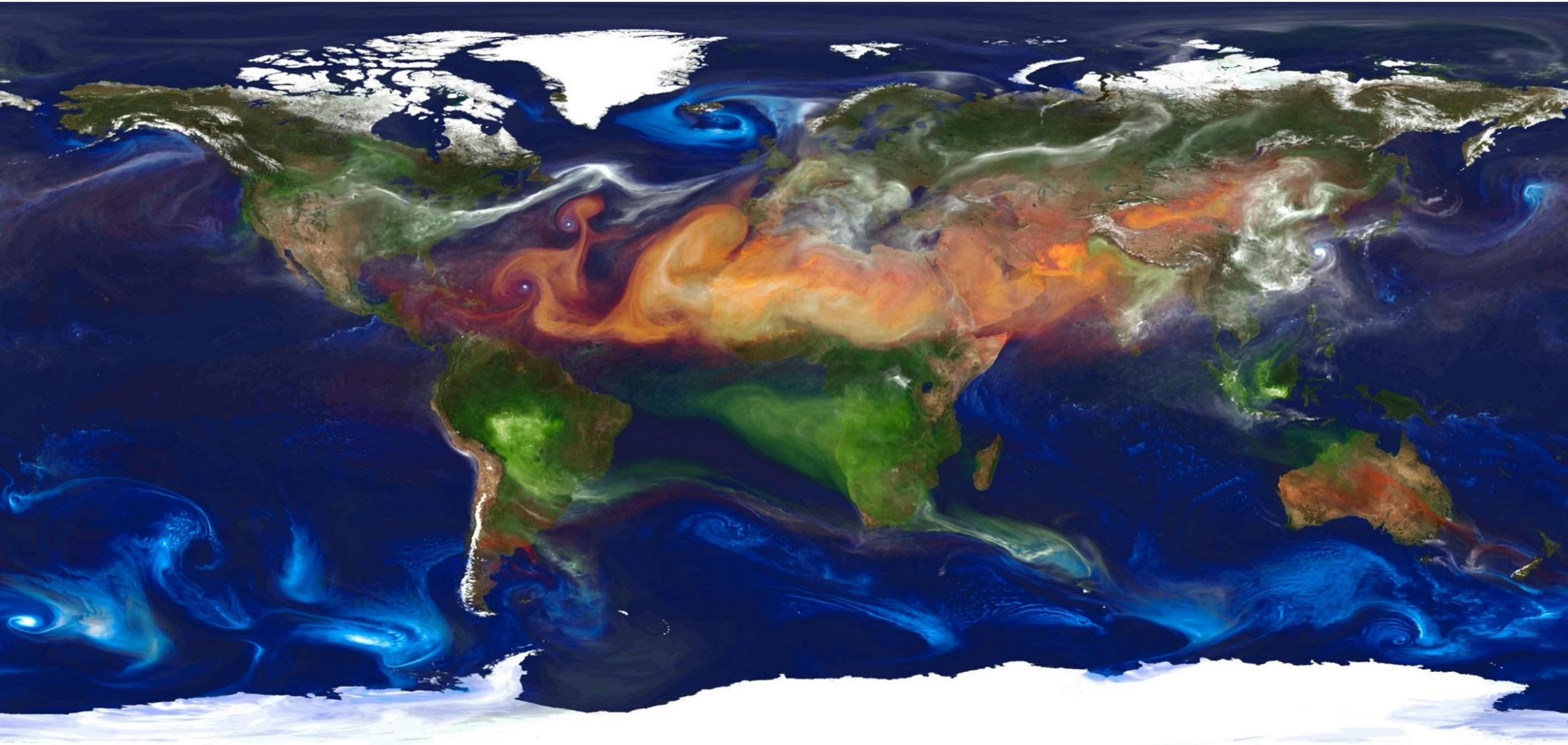
Sara.Basart@bsc.es

Earth Sciences Department

Barcelona Supercomputing Center (BSC)

on behalf of the WMO SDS-WAS NAMEE

Dust cycle and its extension



Organic Carbon + Elemental carbon

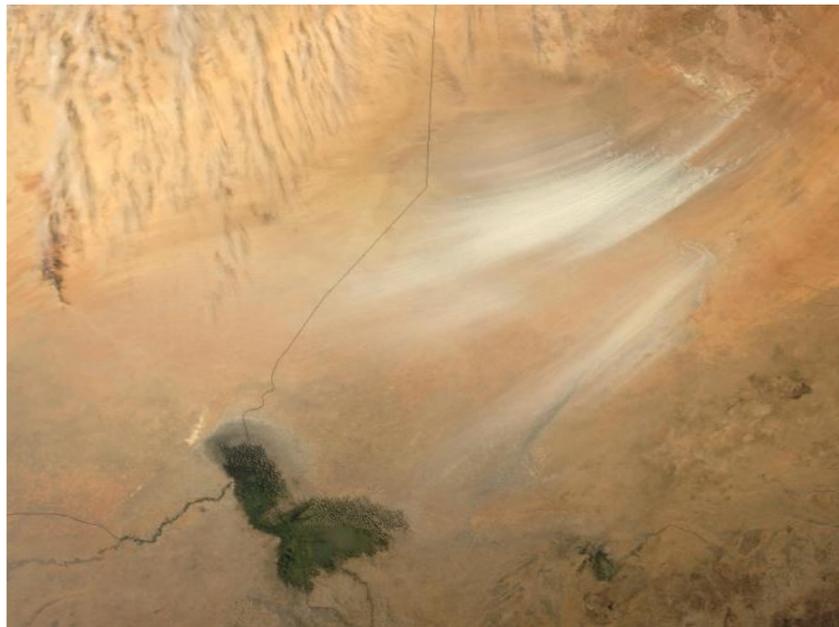
Dust

Sulfate

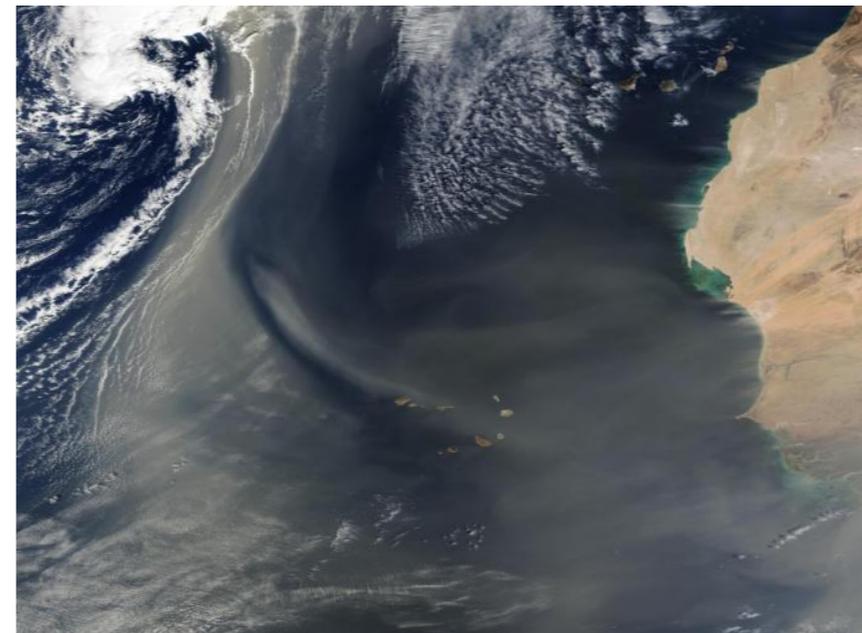
Sea salt

Dust cycle and associated processes

Dust transport is a global phenomenon. However, dust emission is a threshold phenomenon, sporadic and spatially heterogeneous, that is locally controlled on small spatial and temporal scales.



MODIS true colour composite image for March 2005 depicting a dust storm initiated at the Bodélé Depression (Chad Basin)

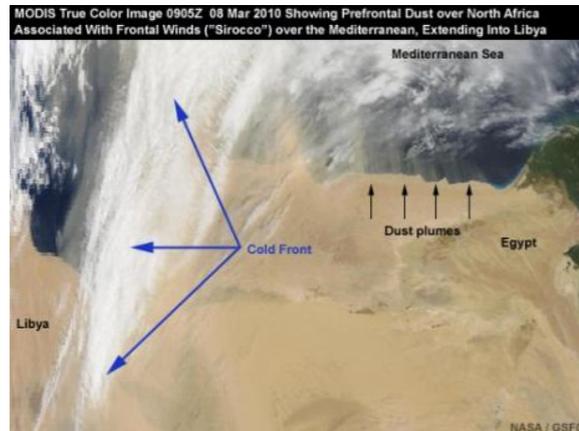


MODIS True color Western Africa – Atlantic Ocean

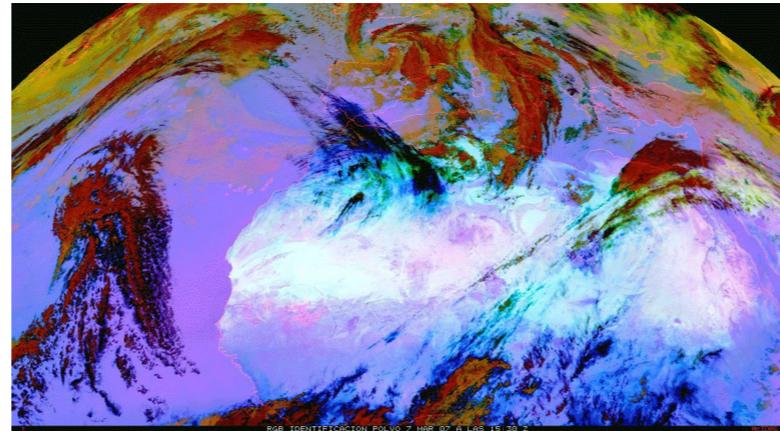
Dust emission, transport and deposition are sensitive to **surface wind speed** and precipitation, among other factors.

Sand and Dust Storms typologies

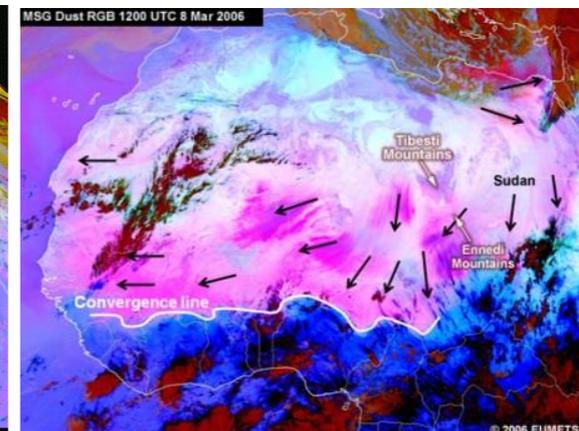
Synoptic dust storms (large scale weather systems)



Pre-frontal winds

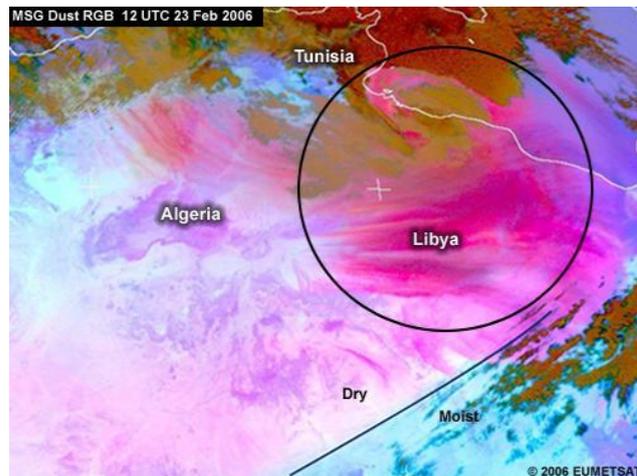


Post-frontal winds

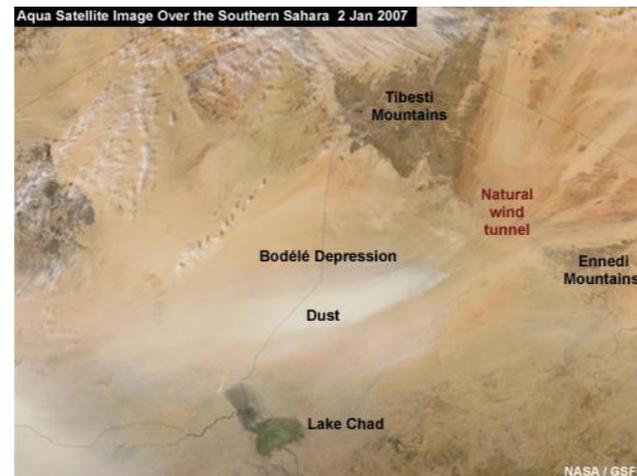


Large-scale trade winds

Mesoscale dust storms



Downslope winds



Gap flow



Dust devils

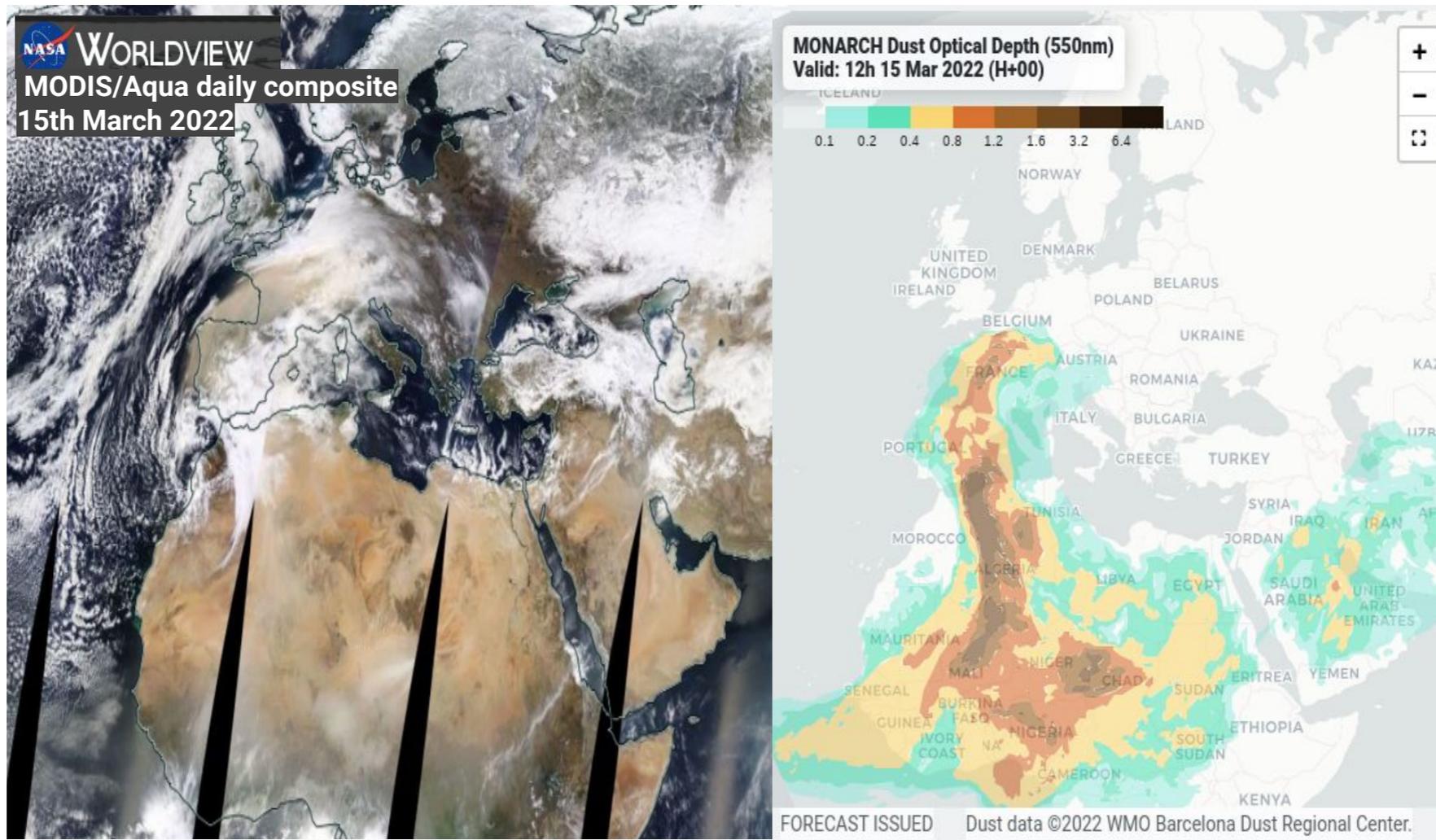


Haboobs

Aerosol (and Dust) Forecasting and Observations

Model Evaluation and Data Assimilation

Assessing the model uncertainty and identifying missing processes thanks to model **evaluation**



Improved dust and aerosol forecasting products through the **assimilation** of satellite retrievals

<https://dust.aemet.es/products/daily-dust-products>

Sand and Dust Storms Impacts

Weather and Climate

- Haboobs are extreme and short-lived sand and dust storms caused by strong winds resulting in a "wall of dust" that occur fairly regularly in isolated desert regions
- Dust interferes with the incoming solar irradiance which has a direct consequence in solar energy production
- Dust can contribute to cloud condensation and ice nucleation, affecting cloud formation and consequently altering precipitation patterns
- Dust can cause mechanical damages in planes during flight
- Dust introduces errors in remote sensing measurements from telescopes and satellites

Economy

- Exposure to moderate levels of particulate matter (PM) can cause respiratory and cardiovascular diseases
- Sand and dust storms have negative impacts on agriculture: reducing crop yields by affecting seedlings, causing loss of plant tissue, reducing photosynthetic activity and increasing soil erosion

Life and Health

- Dust deposition on ice and snow surfaces of Earth (the cryosphere) can reduce the amount of sunlight reflected (albedo), affecting climate
- Dust deposition over solar panels reduces their efficiency

Ecosystems

- Iron and phosphorous in mineral dust favors fertilisation of marine and continental ecosystems

Infrastructures

- Extreme events affect infrastructures by abrasion, and visibility reduction increases artificial lighting and electricity consumption
- Visibility reduction can cause traffic accidents

Deserts

- Weather, climate and ecosystems
- Aviation and ground transportation
- Solar energy

Oceans

- Weather, climate and ecosystems
- Aviation
- Fisheries

Land

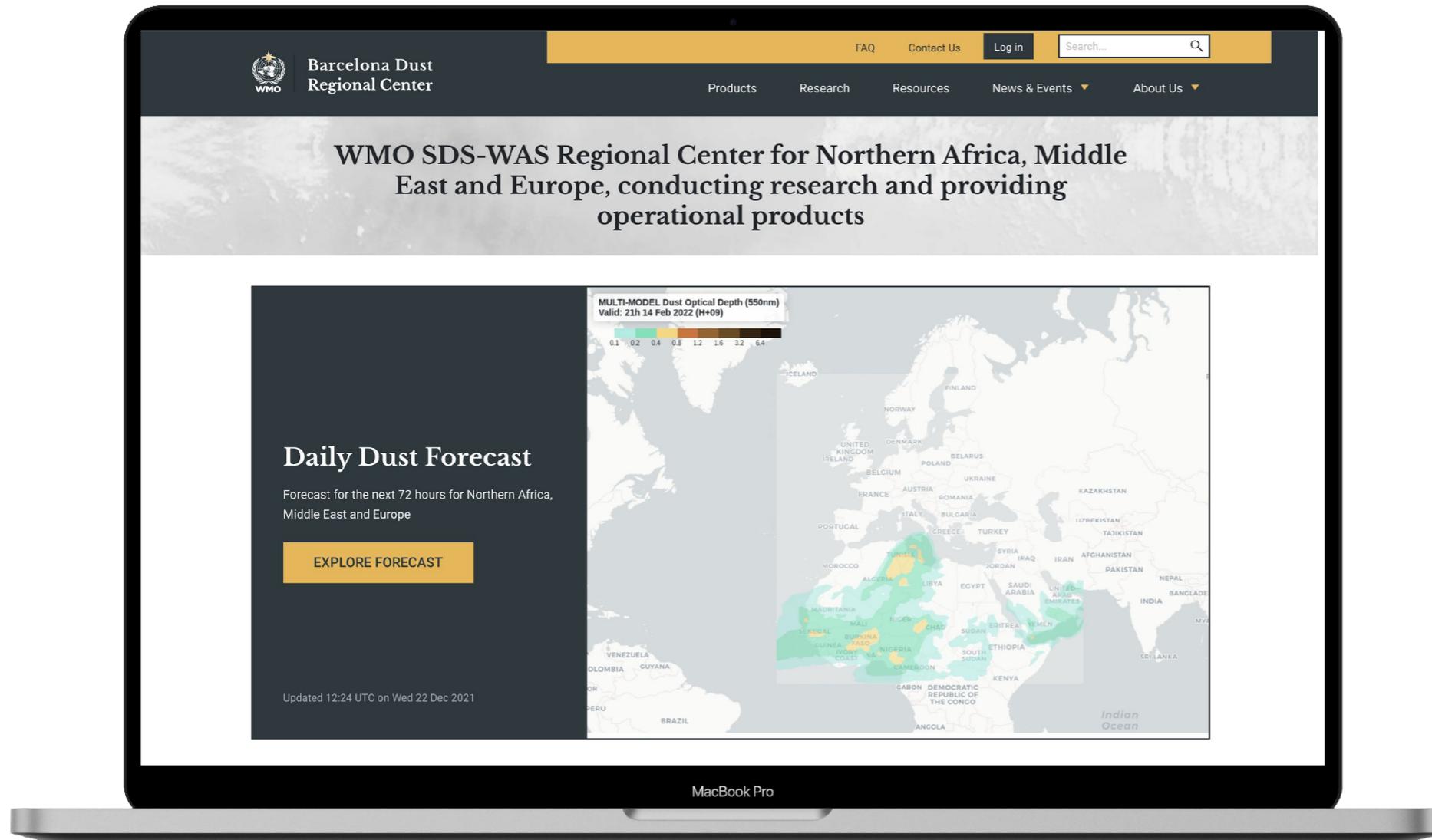
- Weather, climate and ecosystems
- Agriculture
- Solar energy
- Astrophysics and teledetection
- Health and air quality
- Aviation

inDust Leaflet available in www.cost-indust.eu/media-room

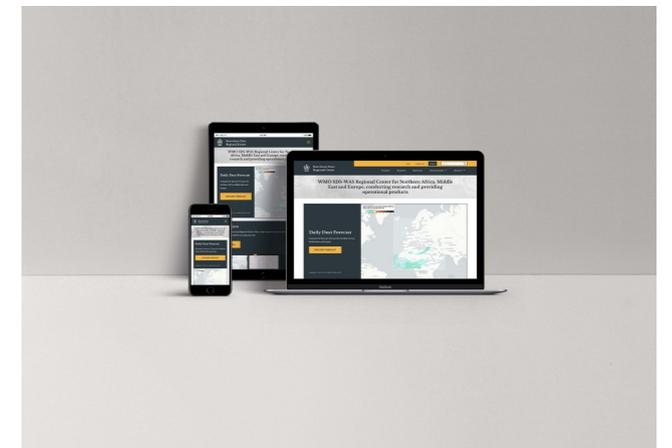
WMO Barcelona Dust Regional Center is coordinating the activities Northern Africa, the Middle East and Europe

New website launched in January 2022

<https://dust.aemet.es/>
[@Dust_Barcelona](#)



**Adapted for different
devices**



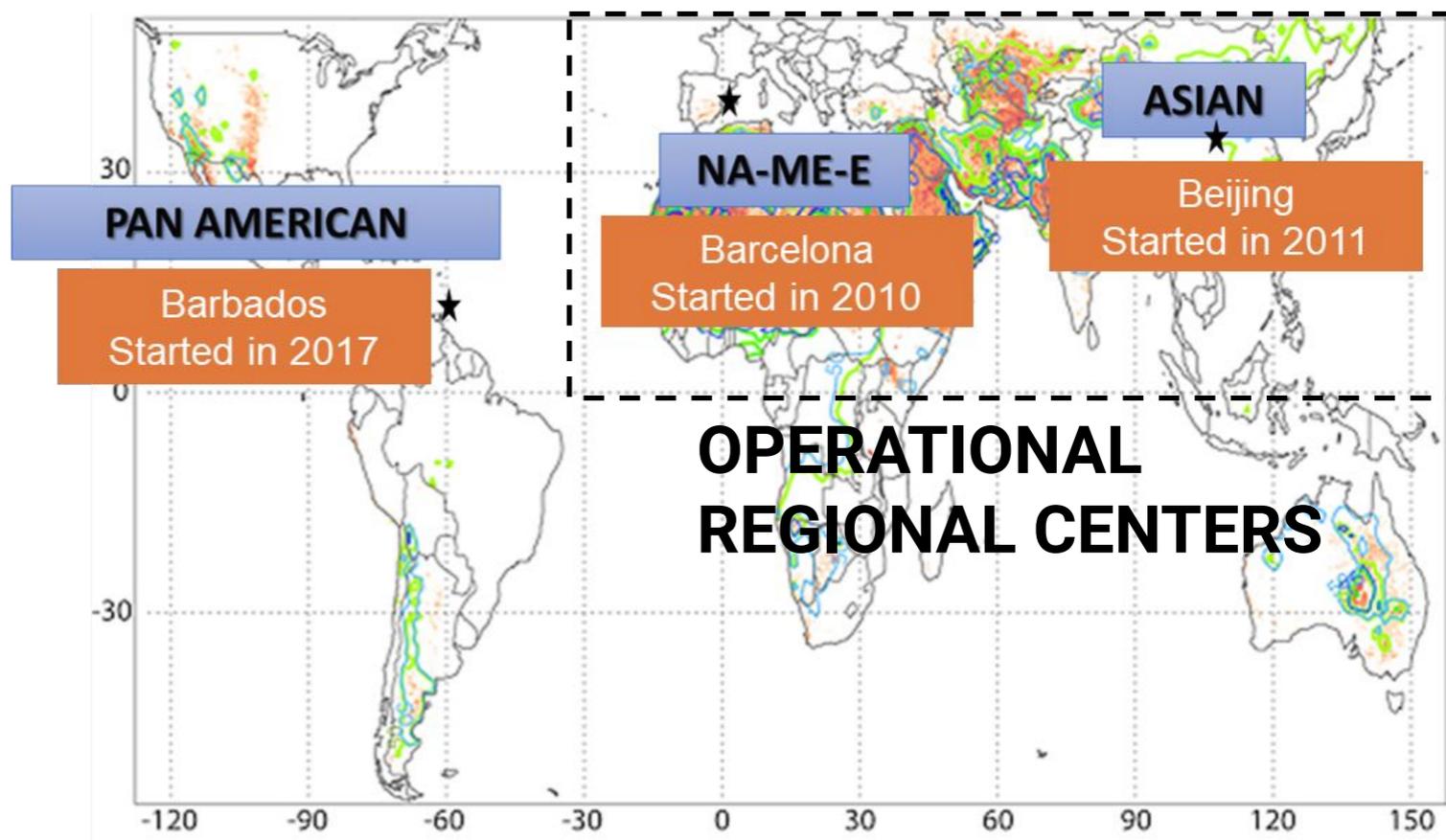
NOTE: <https://sds-was.aemet.es/> will be operative until Autumn 2022

WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

Objectives:

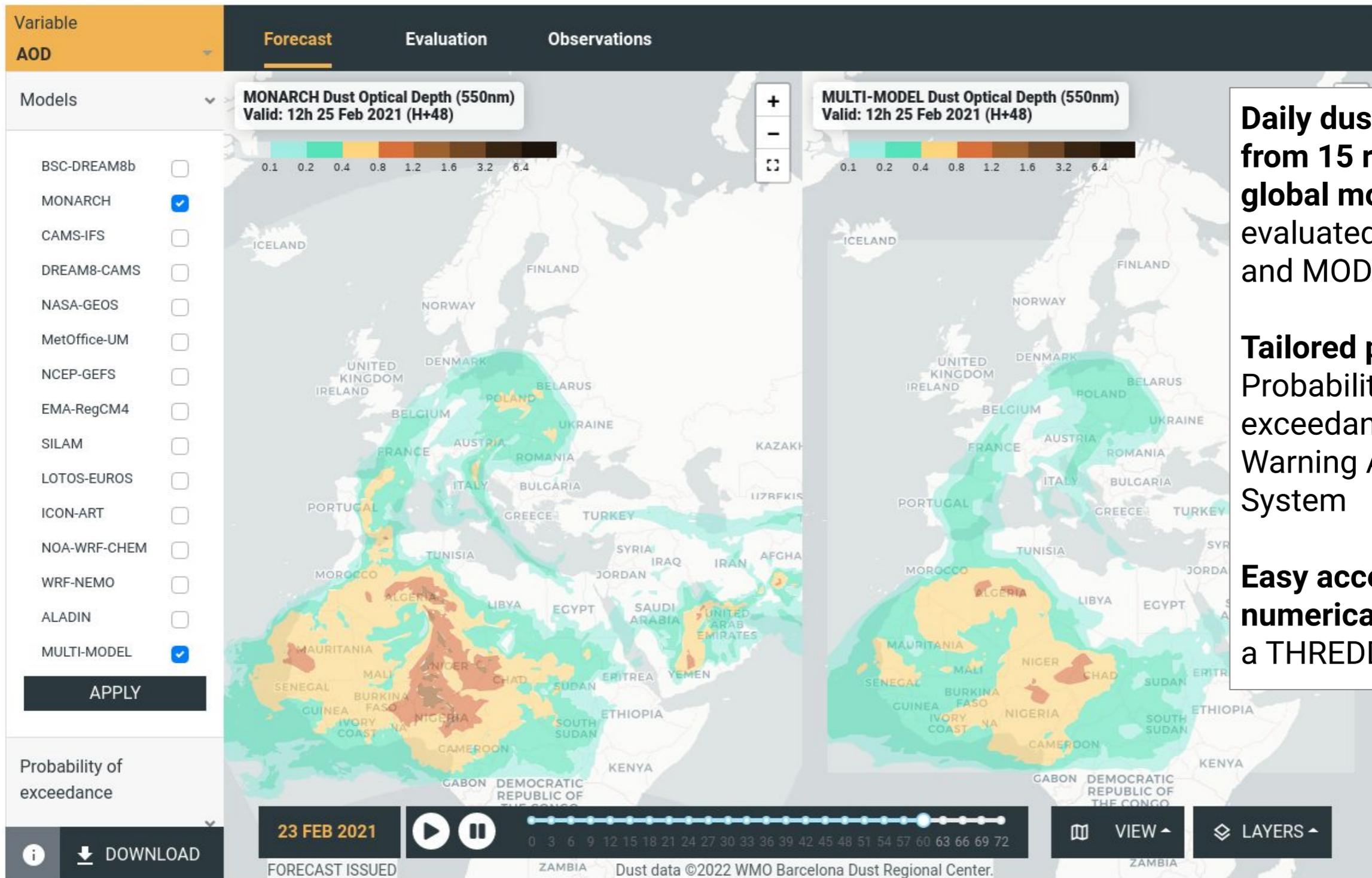
- Identify and improve products to monitor and predict dust by working with research and operational organizations, as well as with users.
- Facilitate user access to information.
- Strengthen the capacity of countries to use the observations, analysis and predictions provided by the WMO SDS-WAS.

Regional Nodes and Centers



<http://www.wmo.int/sdswas/>

Daily Dust Products



Daily dust forecasts from 15 regional and global models that are evaluated with AERONET and MODIS

Tailored products:
Probability of exceedance and Warning Advisory System

Easy access to numerical data through a THREDDS system

CAPACITY BUILDING

- Webinars starting on Jan 2021
 - 17 invited talks available in the website
 - Monthly frequency (except Aug)
- Trainings (virtual events)
 - Training School and Workshop on Dust Aerosol Detection and Monitoring
 - Organisers: EUMETSAT and WMO SDS-WAS NAMEE
 - **Two Editions:** Nov 2021 and Jan 2022
 - MAC-CLIMA Workshop on SDS-WAS West Africa: Mauritania
 - Organiser: AEMET, ONM
 - 26 Jan 2022
 - CREWS Workshop Burkina Faso: Calitoo sunphotometer
 - Organisers: CREWS, AEMET, ANAM
 - 15 Feb 2022

The screenshot shows the website of the Barcelona Dust Regional Center. The header includes the WMO logo and the text 'Barcelona Dust Regional Center'. Navigation links include 'Products', 'Research', 'Resources', 'News & Events', and 'About Us'. A search bar is also present. The main content area is titled 'Upcoming Events' and features a grid of six event cards. Each card includes a date, location, organizer, event title, and a 'READ MORE' link.

Date	Location	Organizer	Event Title
16 March 2022	Online	Angela Benedetti	Webinar on advances towards dust seasonal predictions
28 March 2022	Thessaloniki, Greece		13th International Conference on Air Quality – Science and Application
13 April 2022	Online	Jasper Kok	Webinar on the mysterious abundance of coarse desert dust in Earth's atmosp...
11 May 2022	Online		PACE Air Quality & Applied Atmospheric Sciences Focus Session
23 May 2022	Online		EGU2022
17 July 2022	Swakopmund, Namibia		International Conference on Aeolian Research (ICAR XI)

WEBINAR SERIES

13 APRIL 2022
17:00 - 18:00 CET

THE MYSTERIOUS ABUNDANCE OF COARSE DESERT DUST IN EARTH'S ATMOSPHERE

Jasper Kok
UCLA, USA



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