

International Network to Encourage the Use of Monitoring and Forecasting Dust Products

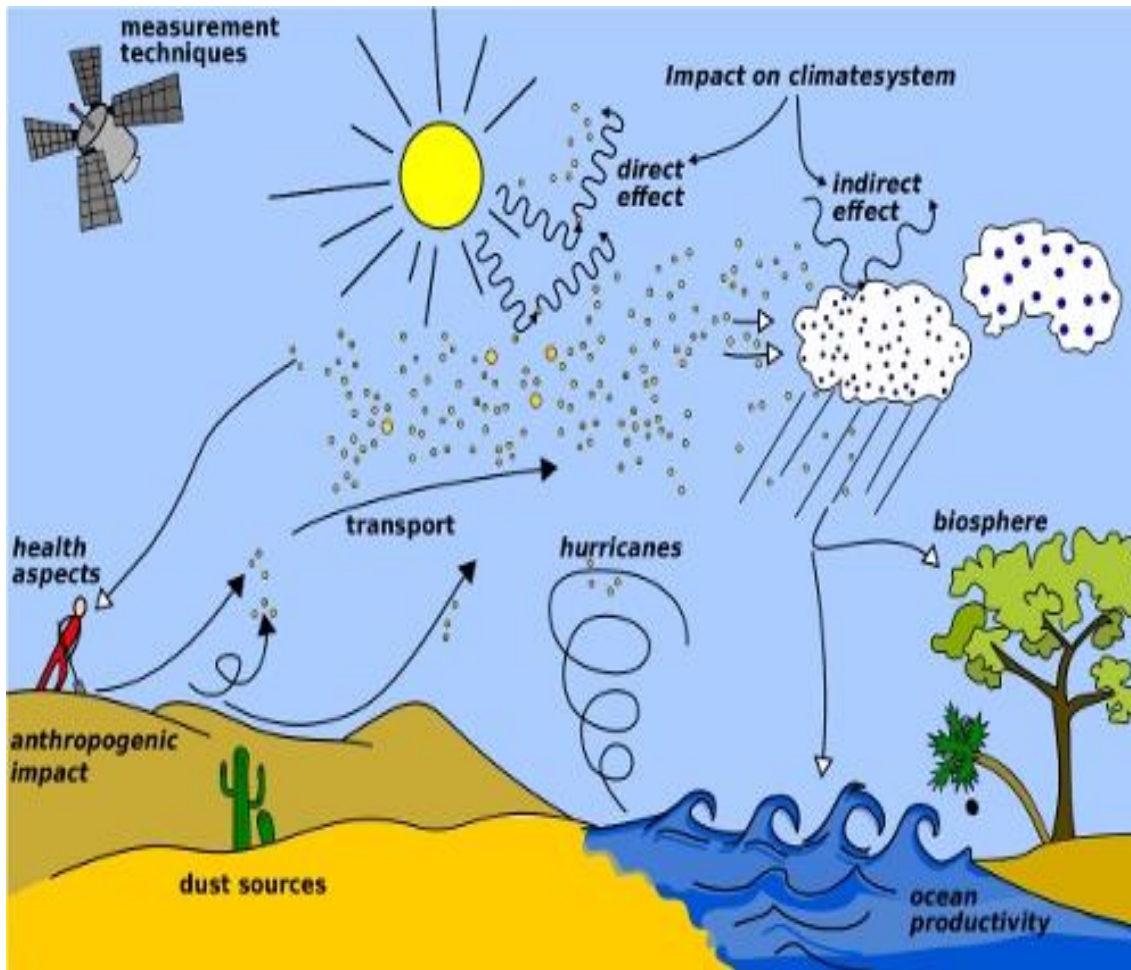
Indust

COST Action CA16202

Chair: Sara Basart (Spain, sara.Basart@bsc.es)

Vice-Chair: Slobodan Nickovic (Serbia)

Motivation – Dust impacts



Ecosystems, meteorology and climate

Air Quality and Human Health

Aviation and Ground Transportation

Energy and industry

Agriculture and fishing

Astrophysics

Image from WMO website
(<http://www.wmo.int/pages/prog/arep/wwrp/new/hurricanes.html>)

Earth Sciences Department

Environmental modelling and forecasting, with a particular focus on weather, climate and air quality



Service Users Sectors



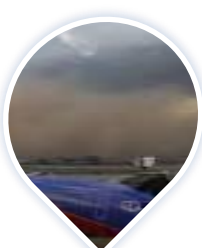
Infrastructures



Solar Energy



Urban development



Transport



Wind Energy



Agriculture



Insurance



Barcelona
Supercomputing
Center
Centro Nacional de Supercomputación

www.bsc.es/ess/

Mineral dust Services at BSC

BSC dust operational forecast (global and regional domains)

<http://www.bsc.es/ESS>

- ✓ Contribution to the **ICAP** multi-model ensemble (global) <http://icap.atmos.und.edu>

WMO Dust Centers

Barcelona Dust Forecast Center.

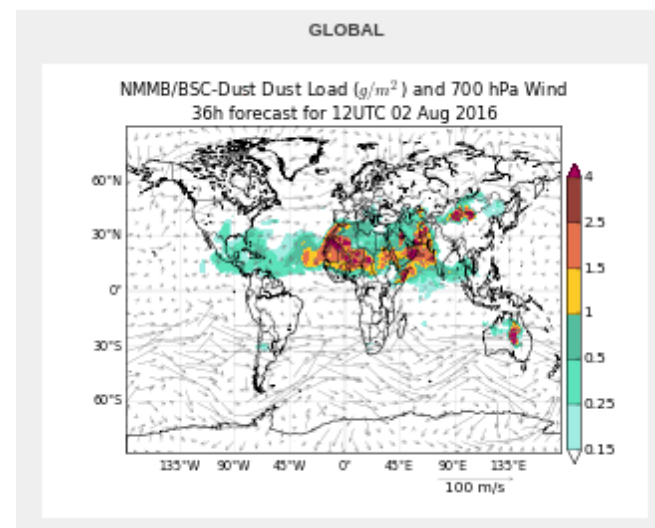
First specialized WMO Center for mineral dust prediction.

<http://dust.aemet.es> started in 2014 - **Operational**

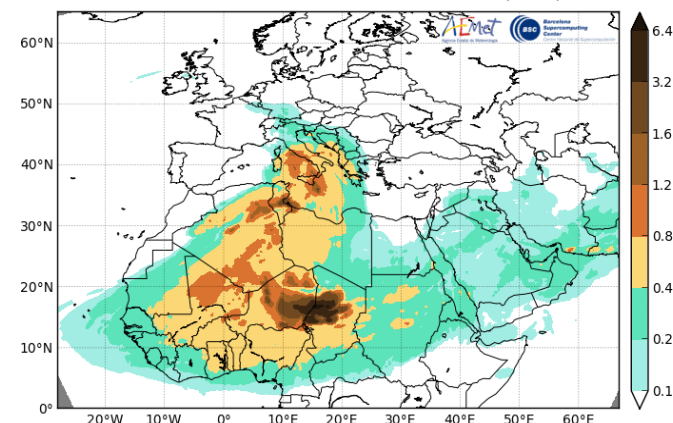
SDS-WAS. North Africa, Middle East and Europe

Regional Center. <http://sds-was.aemet.es>

started in 2010 – **Research**



Barcelona Dust Forecast Center - <http://dust.aemet.es/>
NMMB/BSC-Dust Res:0.1°x0.1° Dust AOD
Run: 12h 11 MAY 2016 Valid: 12h 11 MAY 2016 (H+00)

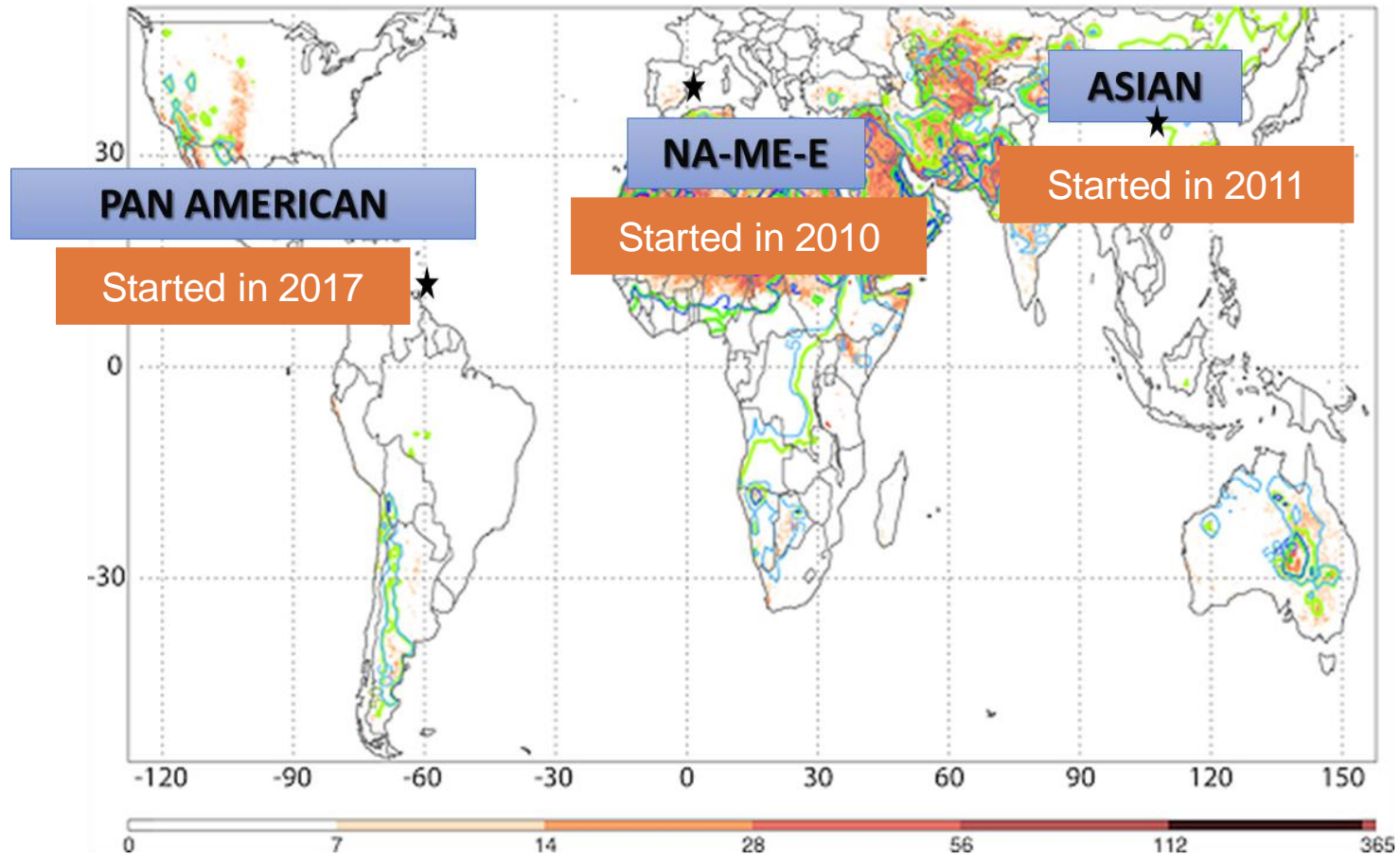


WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

- 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.



SDS-WAS and the Regional Nodes/Centers



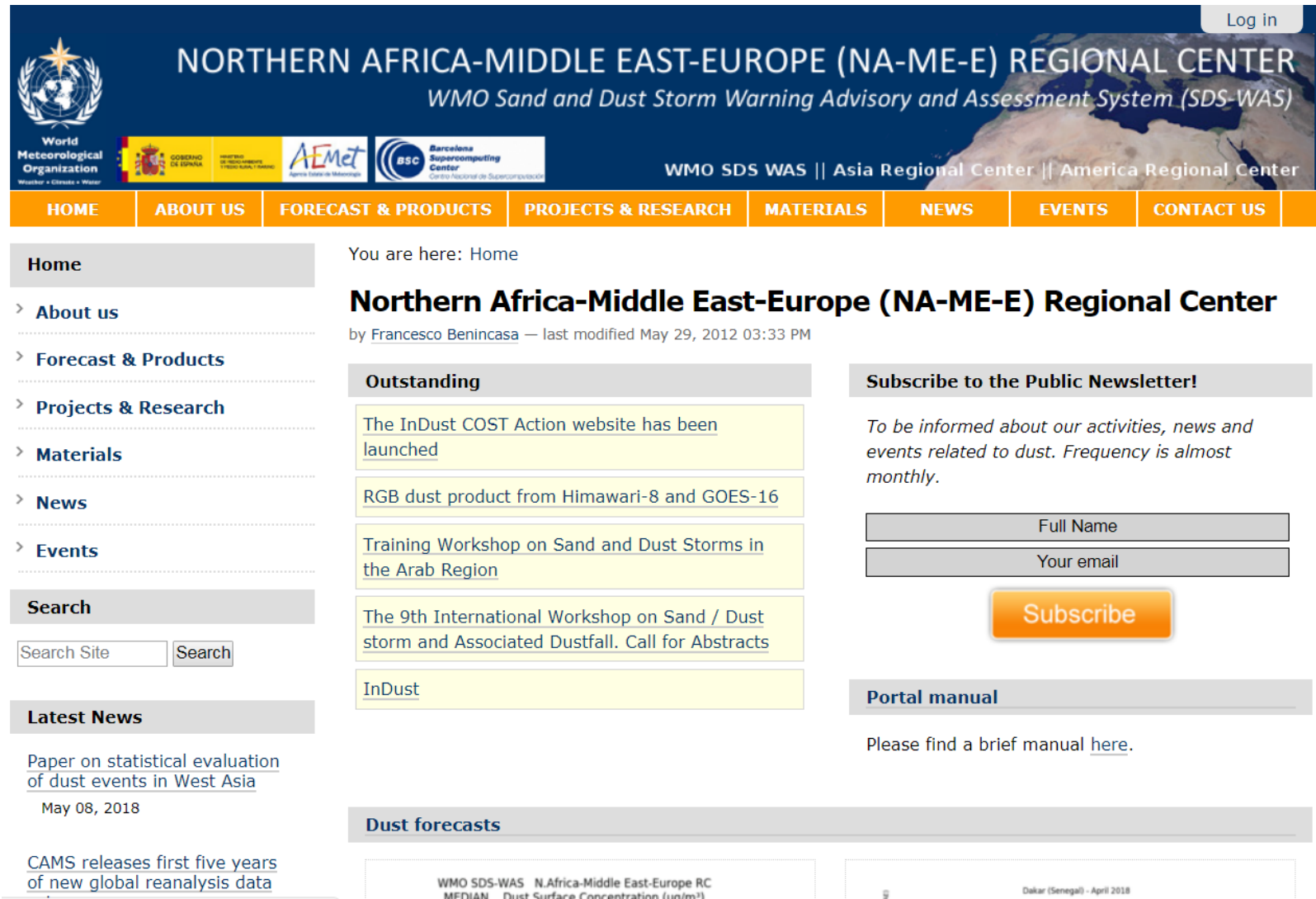
Annual mean frequency distribution of M-DB2 (2003–2009) DOD > 0.2 (red), TOMS (1980–1991) aerosol index ≥ 0.5 (blue), and OMI (2004–2006) aerosol index ≥ 0.5 (green). The isocontours of TOMS and OMI have been removed over oceans for clarity.

Extracted from Ginoux et al. (2012, Rev. Geophys.)



WORLD
METEOROLOGICAL
ORGANIZATION

SDS-WAS and the NAMEE Regional Center



The screenshot shows the homepage of the Northern Africa-Middle East-Europe (NA-ME-E) Regional Center for the SDS-WAS system. The header includes the WMO logo, the center's name, and logos for the World Meteorological Organization, the Spanish Government, AEMet, and BSC. A navigation menu is located below the header. The main content area features a breadcrumb trail, a title for the page, a list of 'Outstanding' news items, a 'Subscribe to the Public Newsletter!' form, a 'Portal manual' link, and a 'Dust forecasts' section with a map of Dakar, Senegal.

Log in

NORTHERN AFRICA-MIDDLE EAST-EUROPE (NA-ME-E) REGIONAL CENTER
WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

World Meteorological Organization
GOBIERNO DE ESPAÑA
AEMet
BSC Barcelona Supercomputing Center

WMO SDS WAS || Asia Regional Center || America Regional Center

HOME ABOUT US FORECAST & PRODUCTS PROJECTS & RESEARCH MATERIALS NEWS EVENTS CONTACT US

Home

You are here: Home

Northern Africa-Middle East-Europe (NA-ME-E) Regional Center

by Francesco Benincasa — last modified May 29, 2012 03:33 PM

Outstanding

- [The InDust COST Action website has been launched](#)
- [RGB dust product from Himawari-8 and GOES-16](#)
- [Training Workshop on Sand and Dust Storms in the Arab Region](#)
- [The 9th International Workshop on Sand / Dust storm and Associated Dustfall. Call for Abstracts](#)
- [InDust](#)

Subscribe to the Public Newsletter!

To be informed about our activities, news and events related to dust. Frequency is almost monthly.

Full Name

Your email

Subscribe

Portal manual

Please find a brief manual [here](#).

Dust forecasts

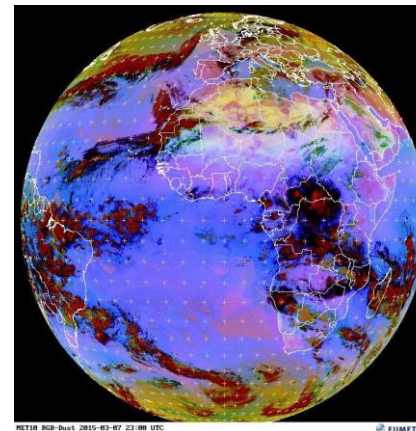
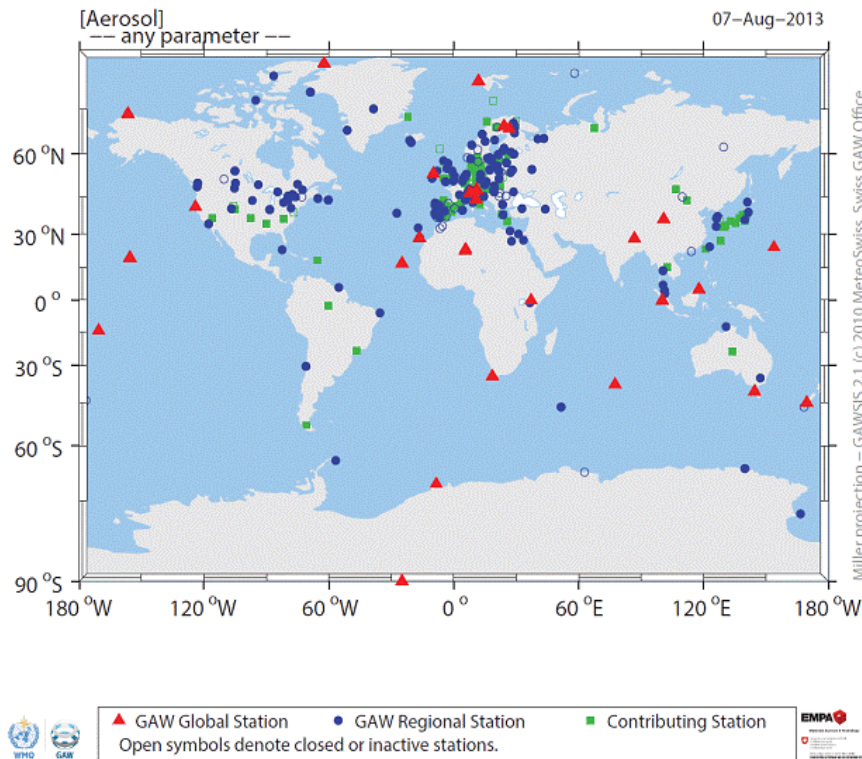
WMO SDS-WAS N.Africa-Middle East-Europe RC
MEDIAN Dust Surface Concentration ($\mu\text{g}/\text{m}^3$)

Dakar (Senegal) - April 2018

SDS-WAS and the NAMEEE Regional Center

■ Observations

- Better understanding and track of SDS → **Dust-filtered observations**
- Used for model evaluation and data assimilation
- **Lack of observations**, particularly in Africa

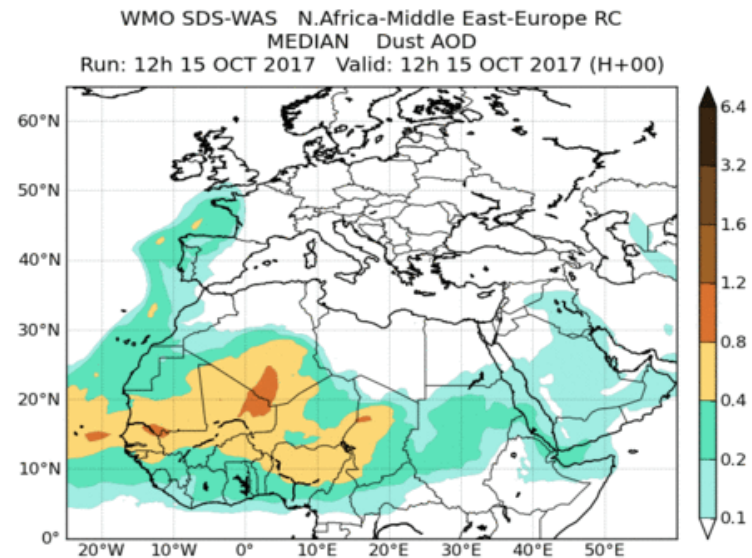


<http://sds-was.aemet.es/>

SDS-WAS and the NAMEEE Regional Center

■ Modelling

- Products: **surface concentration** and **DOD maps**, the SDS-WAS multi-model product.



12 Global – Regional models from ~ 100 to 10 km

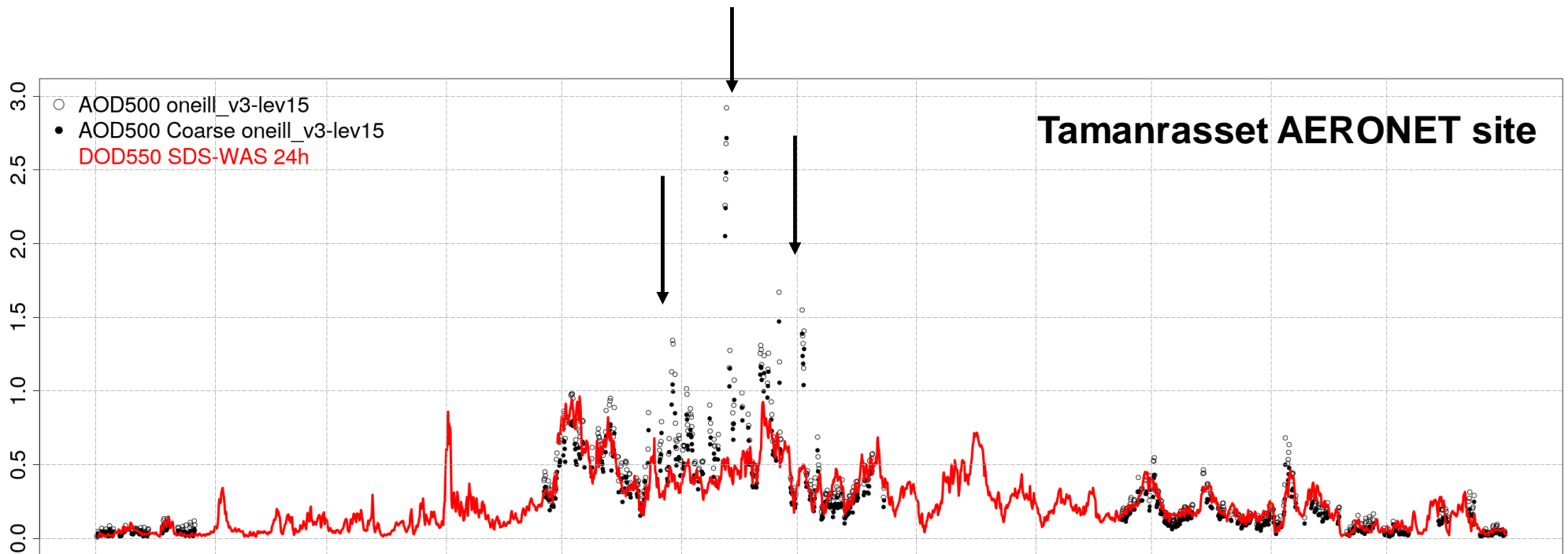


(<http://sds-was.aemet.es/>)

SDS-WAS and the NAMEEE Regional Center

■ Modelling

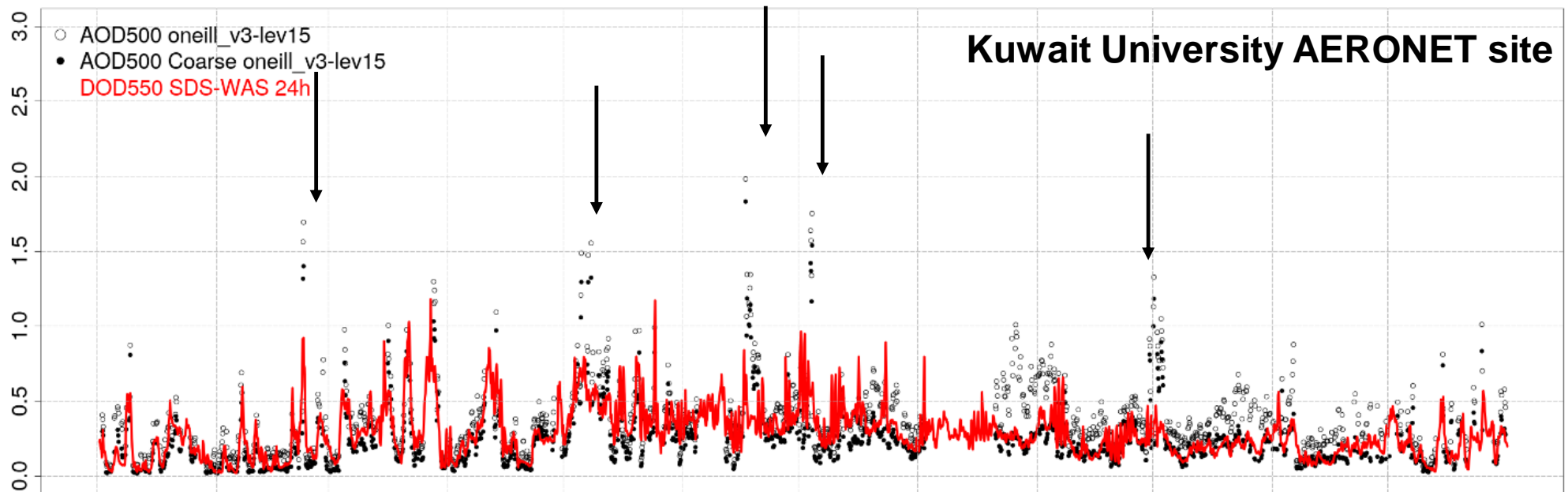
- The current state-of-the art operational dust models are not able to reproduce **smaller scale SDS** → High-resolution simulations



SDS-WAS and the NAMEEE Regional Center

■ Modelling

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SDS-WAS and the NAMEEE Regional Center

■ Capacity building

- Trainings focusing on the **weather** community and PhD Students



Accra
Addis-Ababa
Ankara
Antalya
Ahvaz
Aveiro
Barcelona
Cairo
Casablanca
Istanbul
Madrid
Muscat
Niamey
Ouagadougou
Tehran
Tbilisi



<http://sds-was.aemet.es/>

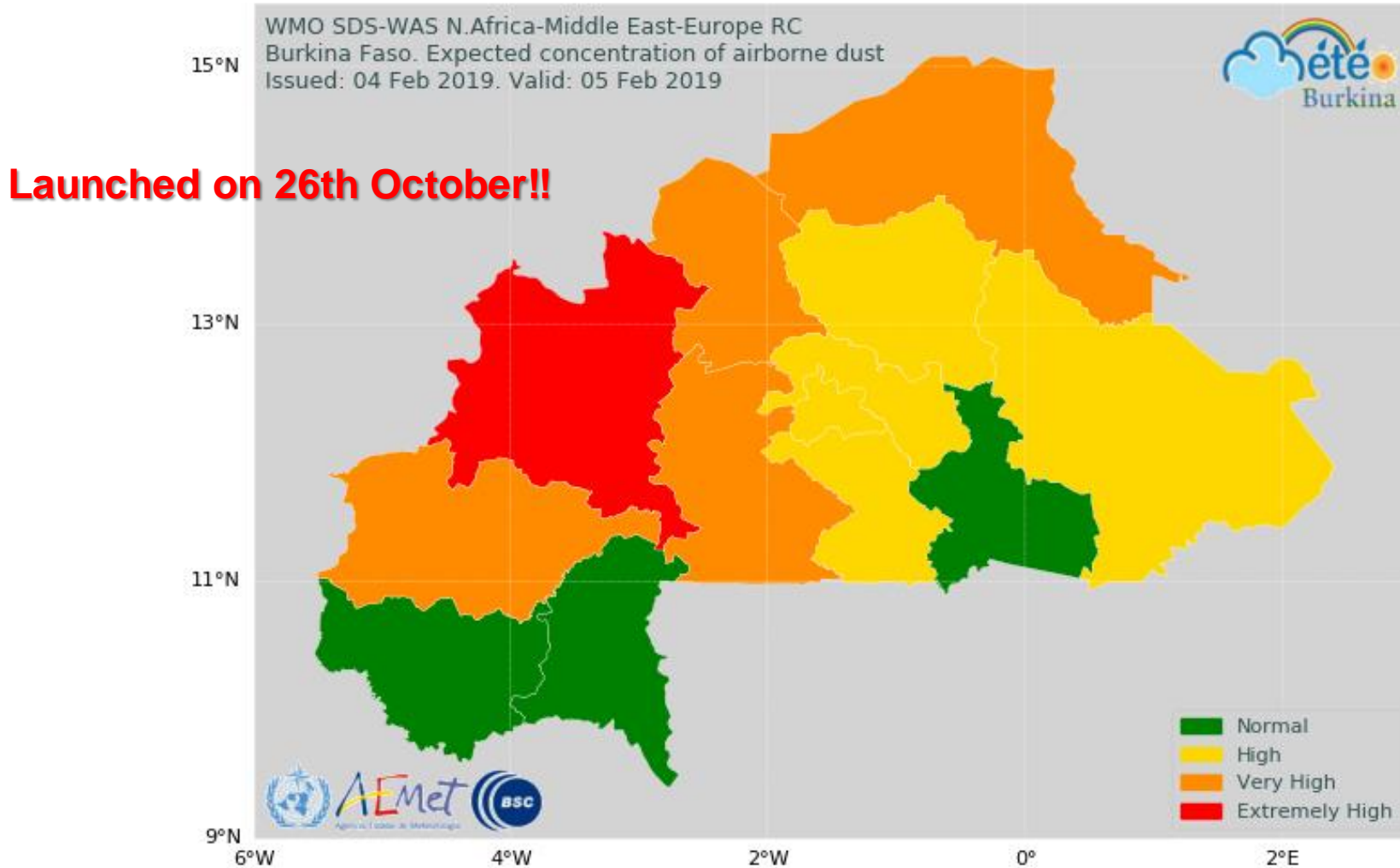
SDS-WAS NAMEE: Lessons learnt

- **Lack of coordination between measurement and modelling groups.**
 - Measurement products **lack harmonised quality controls, data formats and measurements schedules**
 - This is more dramatic when you consider Northern African and the Middle East where we find the deserts
- **Advertise about Sand and Dust Storms**
 - Sand and Dust Storms (SDS) play a significant role in different aspects of weather, climate and atmospheric chemistry and represent a serious hazard for life, health, property, environment and economy.
 - Enhance the **visibility of the dust impacts** to the society at large and the most affected socio-economic sectors
- **Not “really” tailored user-oriented products**
 - Understanding, managing and mitigating SDS risks and effects requires fundamental and cross-disciplinary knowledge.
 - Few existing channels of **communication between scientific research and user (socio-economic) communities.**



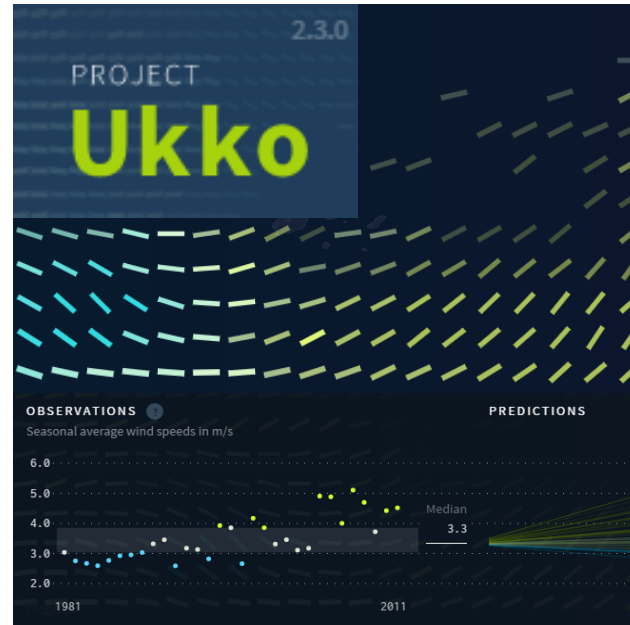
<http://sds-was.aemet.es/>

SDS-WAS NAMEE: Services Early Warning System for Burkina Faso



<https://sds-was.aemet.es/forecast-products/burkina-faso-warning-advisory-system>

Services – Examples in Climate



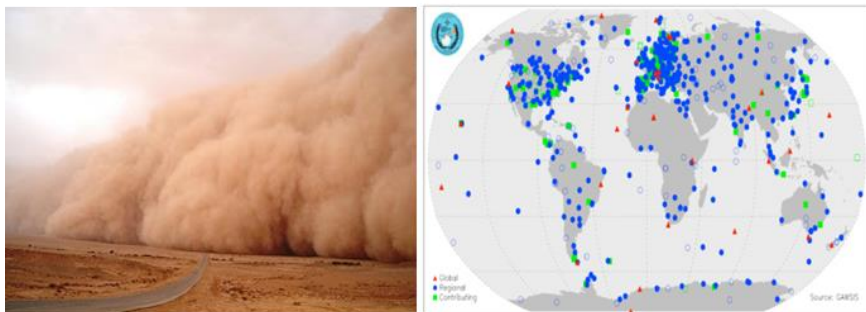
<http://www.seasonalhurricanepredictions.org>

<http://www.project-ukko.net>

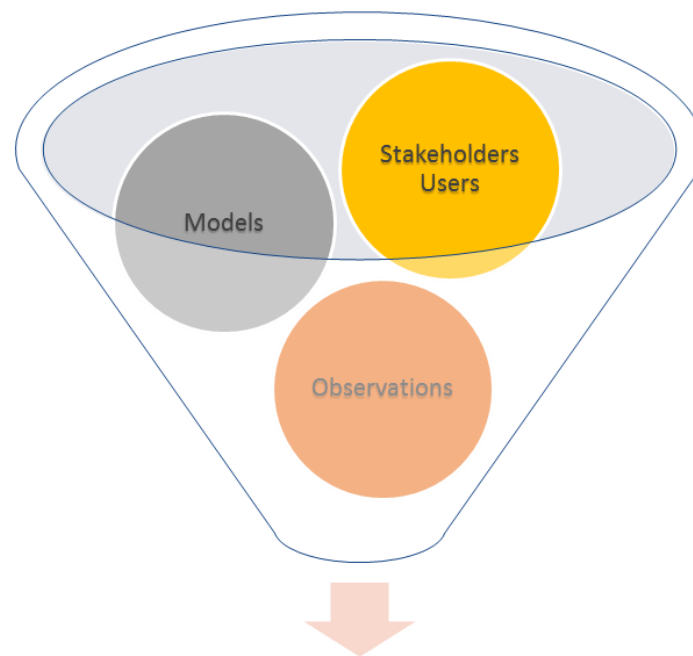
<https://ahv718.axshare.com>

Dust Storms Assessment for the development of user-oriented **C**limate Services in Northern Africa, Middle East and Europe

- SDS is a serious hazard for life, health, environment and economy
- Lack of dust observations (past trends and current conditions)



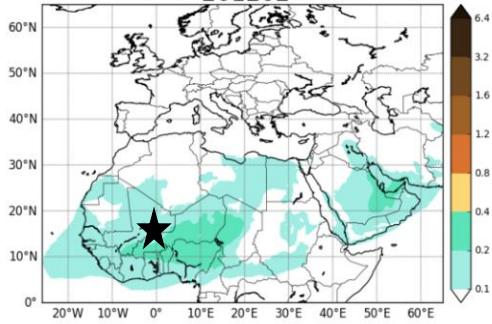
GOAL: Develop dust-related services to specific socio-economic sectors based on an advanced **dust reanalysis** for the NAMEE region



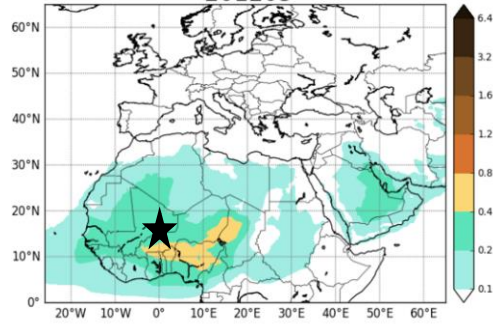
Dust-related Climate Services



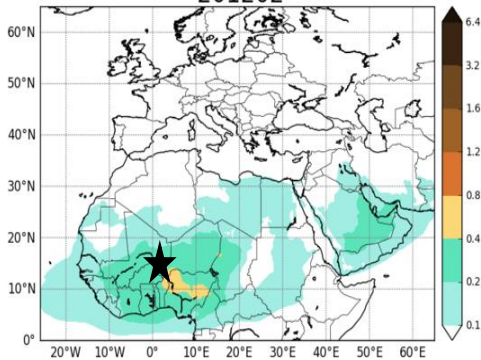
Dust AOD (550nm), ctl_forecast
201202



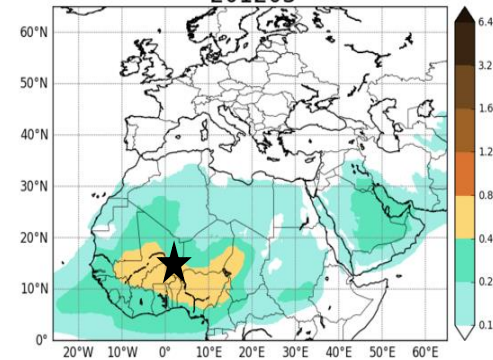
Dust AOD (550nm), ctl_forecast
201203



Dust AOD (550nm), ens_analysis
201202

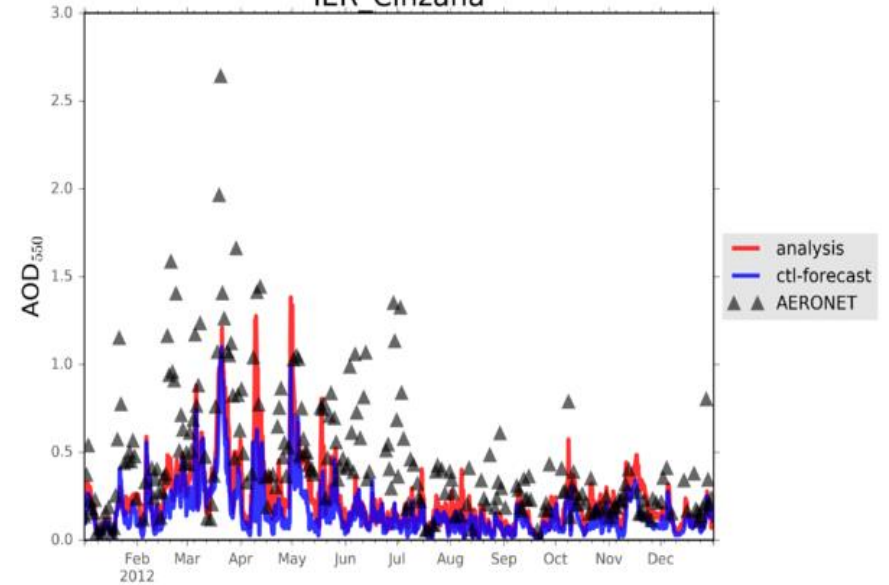


Dust AOD (550nm), ens_analysis
201203



Assimilating MODIS AODcoarse Land product (Courtesy P. Ginoux, NOAA)

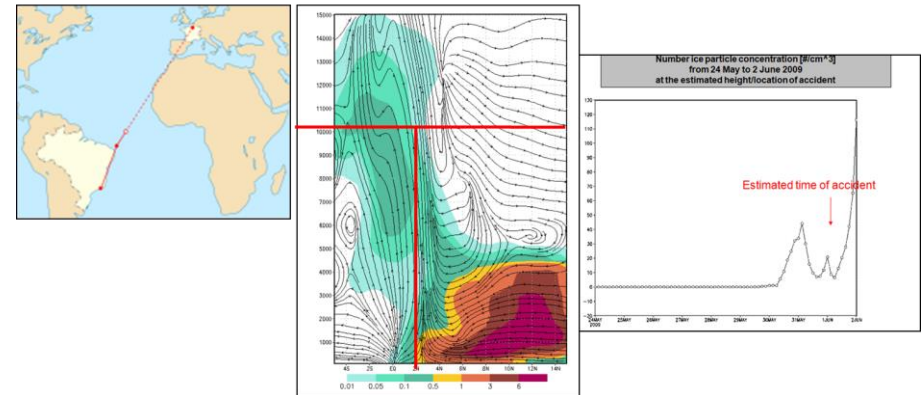
IER Cinzana



■ Aviation

- Visibility
- Ice nucleation
- Dust melting in turbines
- Turbine abrasion

AirFrance 2009 accident (icing due to dust?)



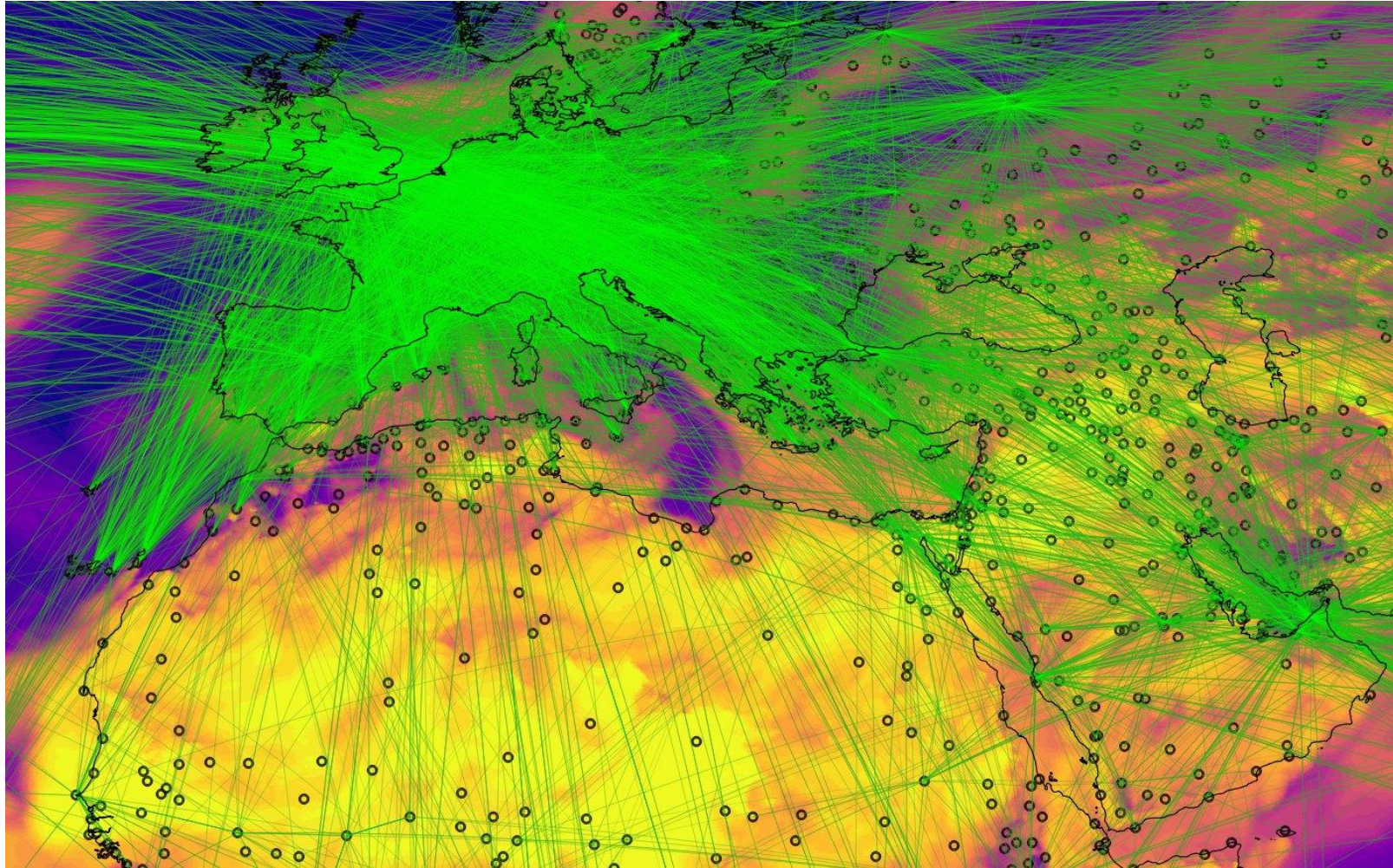
EGYPTAIR - ACCIDENT CAUSED BY DUST STORM

<http://edition.cnn.com/2002/WORLD/africa/05/07/tunis.crash/index.html>
TUNIS, Tunisia (CNN) 7 May, 2002, 17:44 GMT -- An EgyptAir jet crashed on a hillside outside Tunisia's capital Tuesday as the pilot attempted to make an emergency landing, killing at least 18 people, a government official said...

...Weather was foggy and rainy at the time, with sandstorms blowing in from the Sahara Desert. ...



AVIATION: Dust model outputs vs airport and flight routes



(Courtesy A. Votsis, FMI)

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[THE ACTION](#) ▾ [PEOPLE](#) ▾ [GRANTS](#) ▾ [EVENTS](#) ▾ [MEDIA ROOM](#) ▾ [GET IN TOUCH](#) [MEMBERS AREA](#) ▾

InDust

COST ACTION CA16202





Our goals

- To **establish a network** involving research institutions, service providers and potential end users of

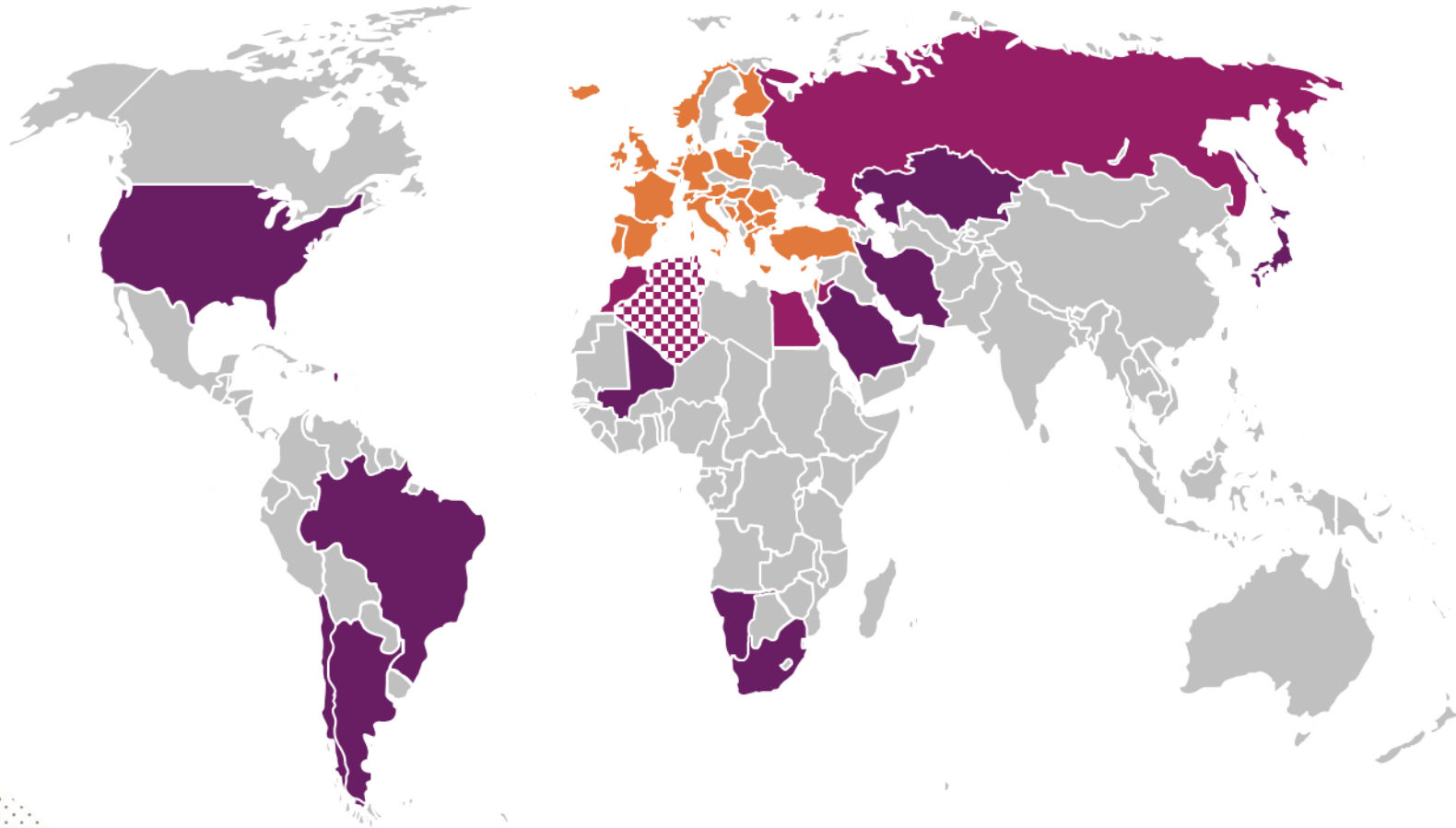
**inDust is looking for
dust user-oriented
services**

- T
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- T
by the presence of high concentrations of airborne
mineral dust.



inDust Countries



- COST countries (in total 29)
 - Near-Neighbour Countries (Egypt, Jordan, Lebanon, Morocco, Russia, *Algeria*)
 - International Partner Countries
- International organisation (WMO, *ECMWF*)



inDust Network

Researchers on:

- Satellite products
- Ground observations
- Dust forecasting models
- Climate
- Socio-economic impacts

Users:

- Solar energy
- Aviation
- Air Quality
- Health
- International bodies (WMO, UNCCD, ...)





Summarising

- Sand and Dust Storms (SDS) play a significant role in different aspects of weather, climate and atmospheric chemistry and represent a **serious hazard** for life, health, property, environment and economy.
- Understanding, managing and mitigating SDS risks and effects requires fundamental and cross-disciplinary knowledge.
- **inDust** searches to build a community of researches and users that can start to design the strategy to develop **dust services**.



Tehran, Iran, June 2014

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