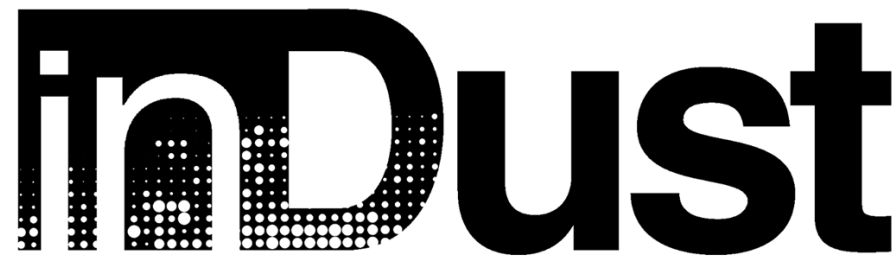


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 #COSTinDust



COST Action CA16202

User Workshop on Aviation

Cranfield, UK, 14-15 March 2019

Cranfield Global Research Airport





Agenda

Thursday, 14th March:

General Meeting – Day 1		
9:00	9:30	Registration – Welcome coffee
9:30	9:45	Meeting opening by the host; introducing AIRC, Cranfield University (I. Gray)
9:45	10:00	InDust and aims of the workshop (A. Durant / S. Basart)
10:00	10:25	Environmental impacts on gas turbine engines (R. Clarkson)
10:25	10:50	The importance of taking into consideration the impact of the environment in Safran after sale support (Kevin Galli)
10:50	11:10	Predicting time and location of melted dust in turbines (S. Nickovic)
11:10	11:30	Coffee Break
<i>Invited Speakers (Chair: S. Nickovic)</i>		
11:30	11:50	Decision intelligence for managing dust exposure impact on aircraft health (A. Durant/D. Simon)
11:50	12:10	AsSISt, Aircraft Support & Maintenance Services (CAMS-95, Capgemmini)
12:10	12:30	Design of user-oriented dust services based on dust forecasts: DustClim (S. Basart)
12:30	13:30	Lunch Break

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12:30	13:30	Lunch Break
13:30	14:30	Visit to NFLC (N. Lawson)
14:30	14:50	Introduction to FAAM (Alan Woolley)
14:50	15:10	Low-cost portable sensors: revolutionising the studies of air quality (Olalekan Popoola)
<i>Invited Speakers (Chair: S. Basart)</i>		
15:10	15:30	Cold cloud formation due to dust - implications for aviation (B. Cvetkovic)
15:30	15:50	Coffee Break
15:50	16:10	EUNADICS-AV: Desert dust as environmental emergency issue (B. Scherllin-Pirscher)
16:10	16:30	EUNADICS-AV: Alert system (H. Brenot)
16:30	16:50	EUNADICS-AV: Modelling aspects (M. Sofiev)
16:50	18:00	Discussion on specific topics
	18:00	Close
19:00	21:30	Networking Dinner

Friday, 15th March:

Day 2 – Discussion and Conclusions		
09:00	09:15	Welcome – last day
<i>Invited Speakers (Chairs: S. Nickovic and S. Basart)</i>		
09:15	09:45	Airport operations under intense dust storm conditions in Canary Islands (C. Gonzalez)
09:45	10:15	Airport operations under intense dust storm conditions in Egypt (H. Nasser)
10:15	10:45	Coffee Break
10:45	12:00	Final round table and conclusions
	12:00	Closure

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

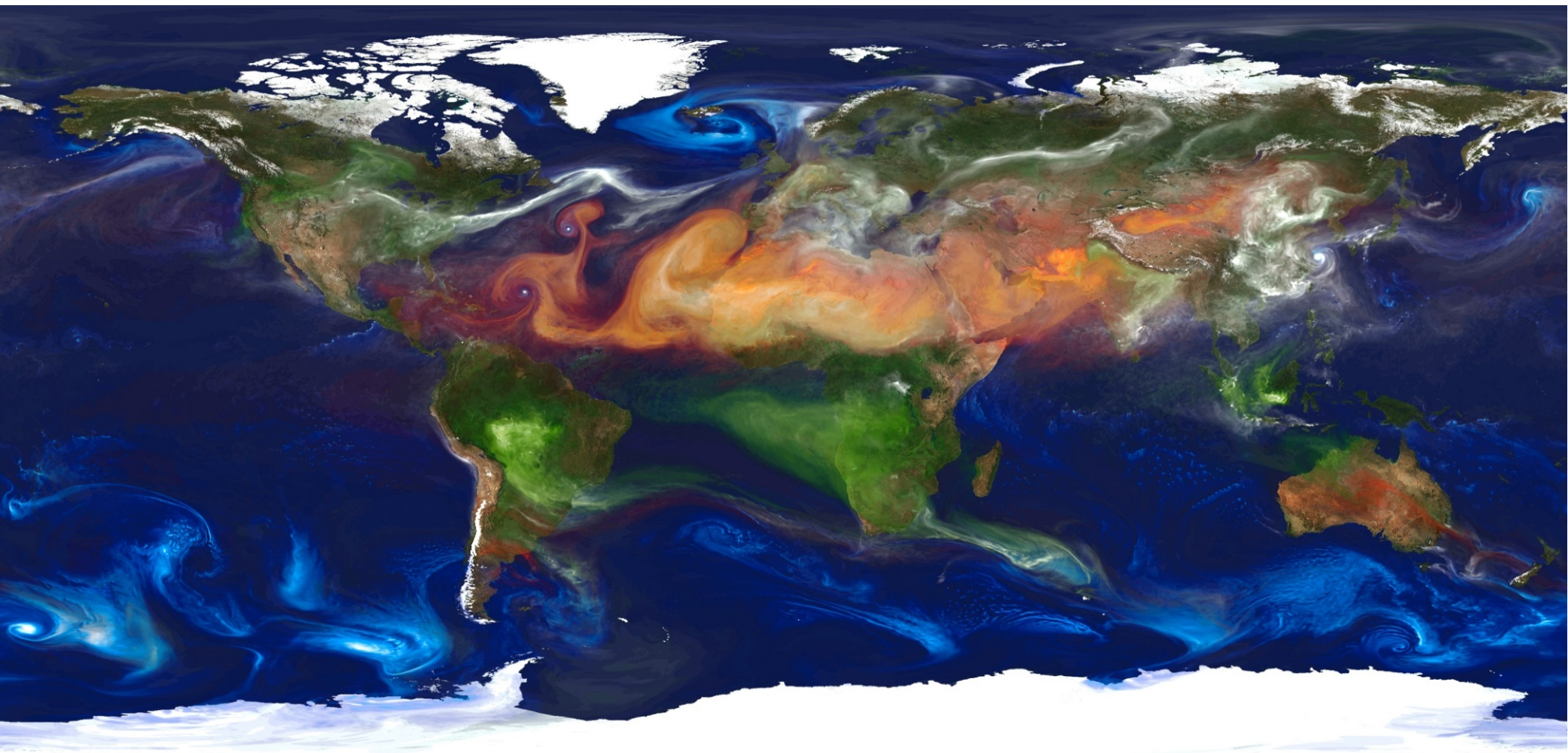


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Chair: Sara Basart (Spain, sara.Basart@bsc.es)

Vice-Chair: Slobodan Nickovic (Serbia)

Motivation – Dust impacts and its extension



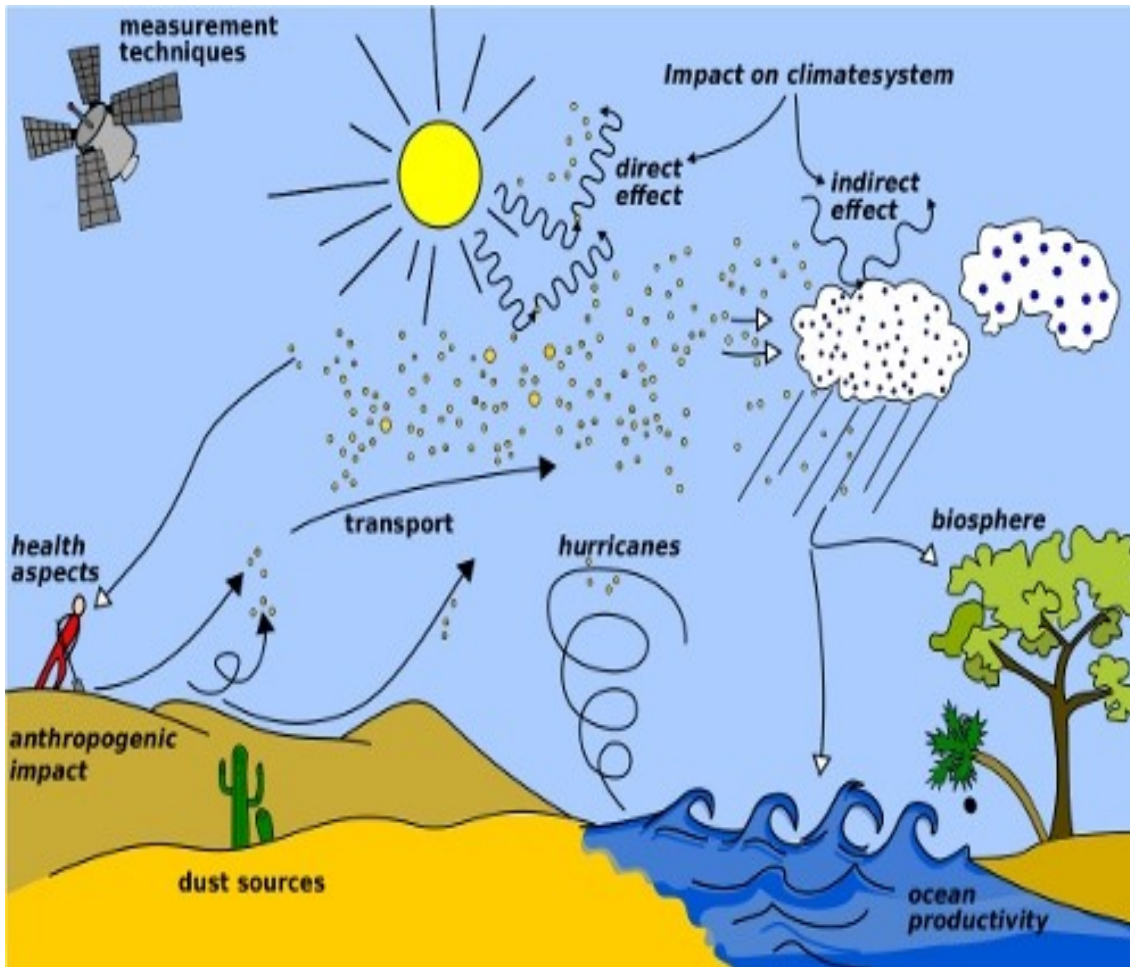
Organic Carbon + Elemental carbon

Dust

Sulfate

Sea salt

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>)

A piece of SDS history

- Late 80'es:
 - First demonstration that SDS dynamic simulations are possible
- 90'es:
 - First satellite products capable to detect SDS
 - First successful daily SDS forecast test
 - First long-term daily SDS forecasts
- 2000's:
 - Fast growth in dust observations and forecasting models
- 2010's:
 - Fast growth in user-oriented applications

Mineral Dust Services at BSC

BSC dust operational forecast (global and regional domains)

- Contribution to the **SDS-WAS** (regional) and **ICAP** (global) multi-model ensembles

WMO Dust Regional Centers

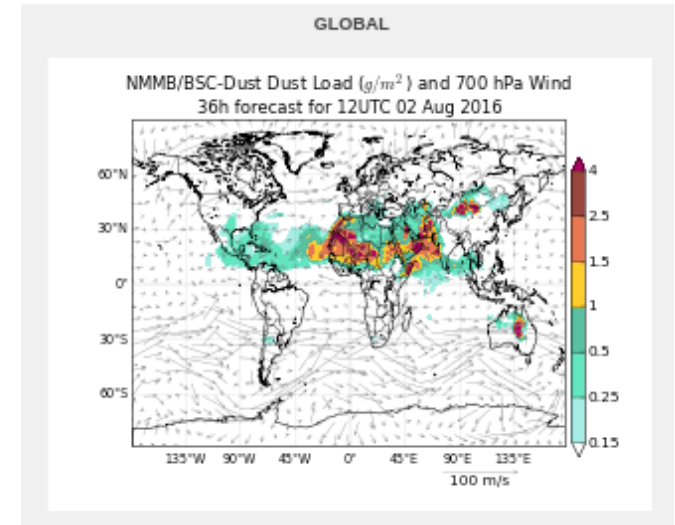
- Barcelona Dust Forecast Center.** First specialized WMO Center for mineral dust prediction. Started in 2014 - **Operational**

<http://dust.aemet.es>

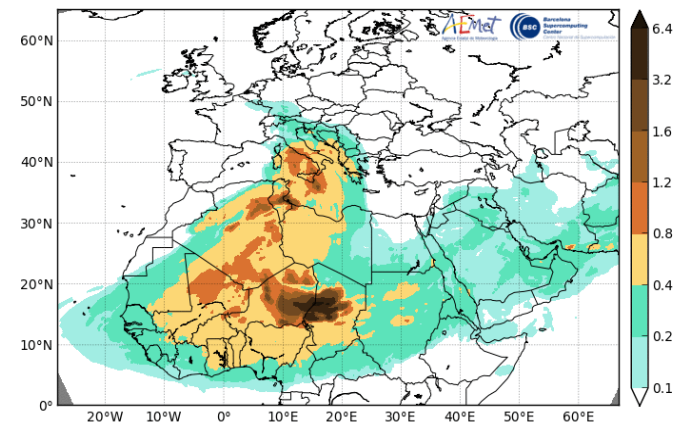
[@Dust_Barcelona](https://twitter.com/Dust_Barcelona)

- SDS-WAS Regional Center.** Sand and Dust Storm Warning Advisory and **Assessment System**. Started in 2010 – **Research**

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





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)



Barcelona Dust Forecasting Center

Log in

BARCELONA DUST FORECAST CENTER



WMO SDS-WAS || NA-ME-E Regional Center

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LATEST NEWS

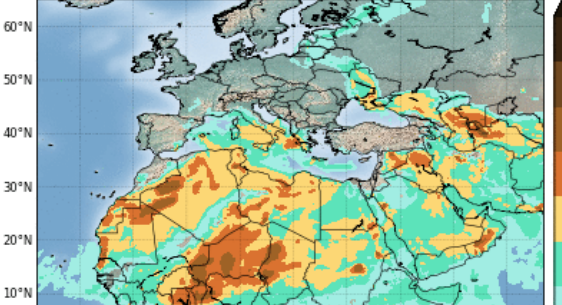
Barcelona Dust Forecast Center starts operations

The Center will release operational dust forecasts for Northern Africa, Middle East and Europe

[Read More](#)



Barcelona Dust Forecast Center
NMMB/BSC-Dust Res: 0.1°x0.1° Dust Surface Conc. (µg/m³)
Run: 12h 19 MAY 2014 Valid: 18h 20 MAY 2014 (H+30)



Dust forecast

Latest dust forecast for Northern Africa, Middle East and Europe

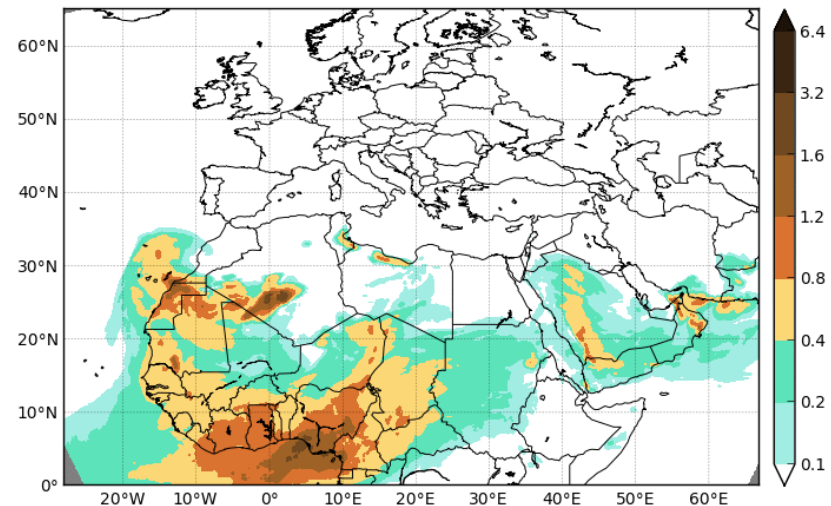
[Check it here](#)

Barcelona Dust Forecasting Center

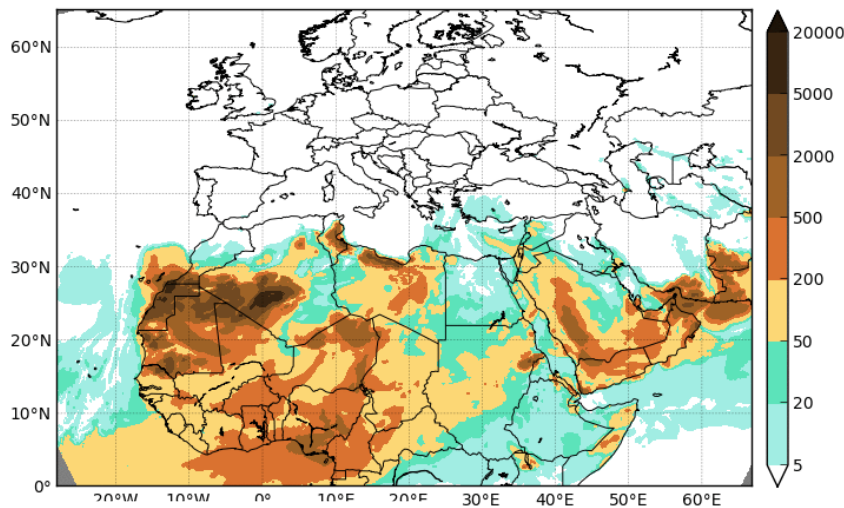
72-hours forecasts of:

- Dust Optical Depth at 550nm
- Dust Dry and Wet Deposition
- Dust Load
- Dust Surface Concentration
- Dust Surface Extinction at 550nm

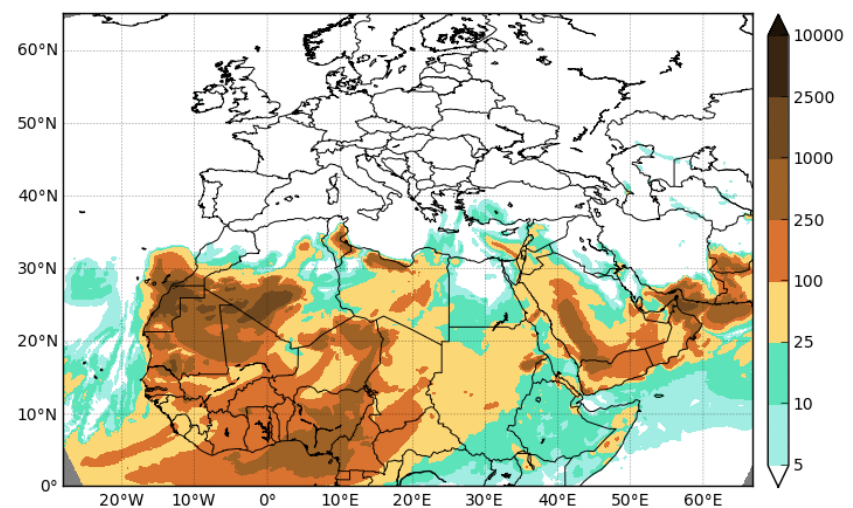
Barcelona Dust Forecast Center
NMMB/BSC-Dust Res:0.1°x0.1° Dust AOD
Run: 12h 07 MAR 2015 Valid: 12h 07 MAR 2015 (H+00)



Barcelona Dust Forecast Center
NMMB/BSC-Dust Res:0.1°x0.1° Dust Surface Conc. ($\mu\text{g}/\text{m}^3$)
Run: 12h 07 MAR 2015 Valid: 12h 07 MAR 2015 (H+00)



Barcelona Dust Forecast Center
NMMB/BSC-Dust Res:0.1°x0.1° Dust Surface Ext. (Mm^{-1})
Run: 12h 07 MAR 2015 Valid: 12h 07 MAR 2015 (H+00)



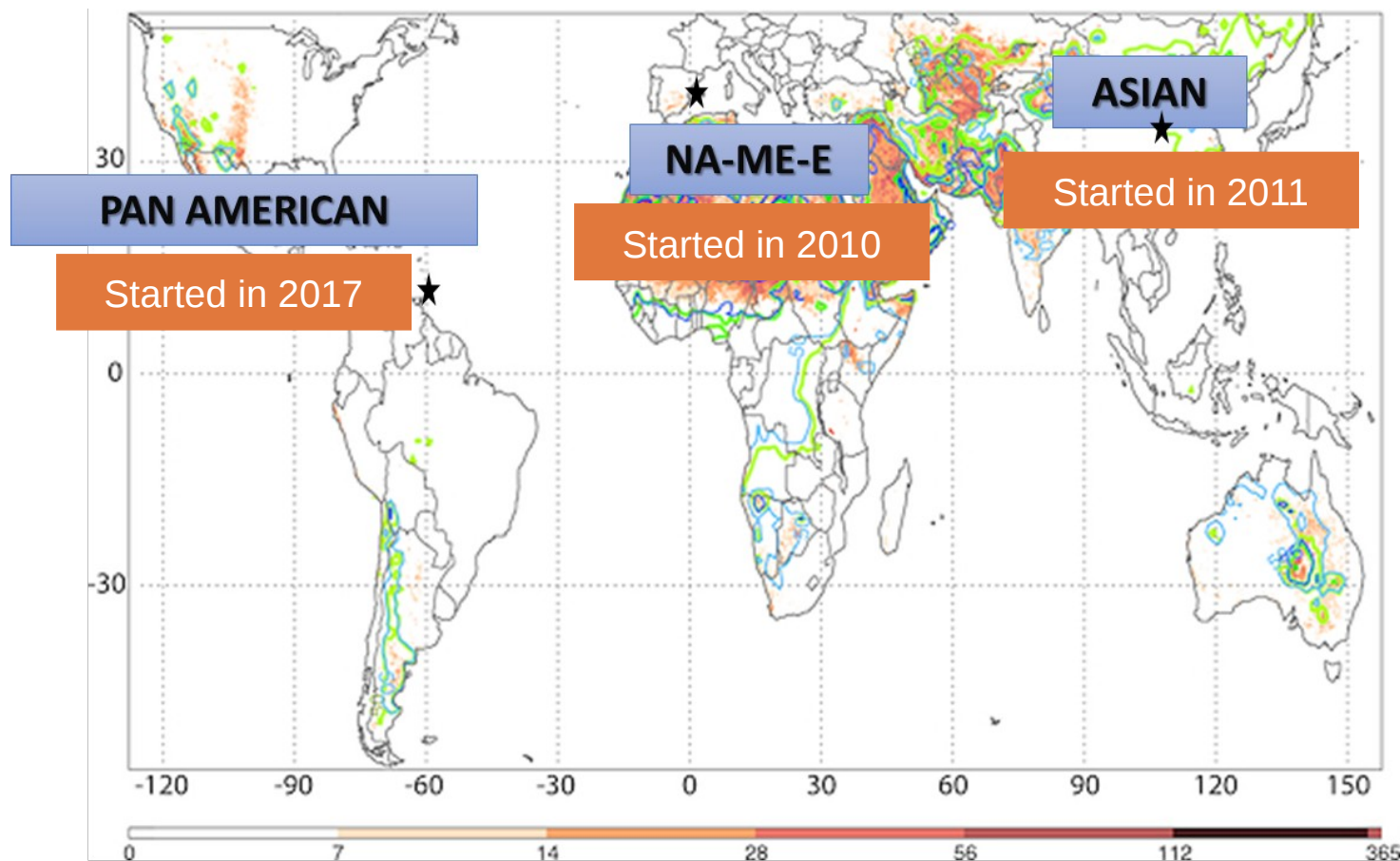
WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

■ 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.



WORLD
METEOROLOGICAL
ORGANIZATION


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

SDS-WAS and the NAMEE Regional Center




World
Meteorological
Organization
Weather • Climate • Water


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



GOBIERNO DE ESPAÑA
MINISTERIO DE MEDIO AMBIENTE, CLIMA Y TRANSICIÓN ENERGÉTICA



Aemet
Agencia Estatal de Meteorología



BSC
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

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

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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

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Portal manual

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

Latest News

[Paper on statistical evaluation of dust events in West Asia](#)
May 08, 2018

[CAMS releases first five years of new global reanalysis data](#)

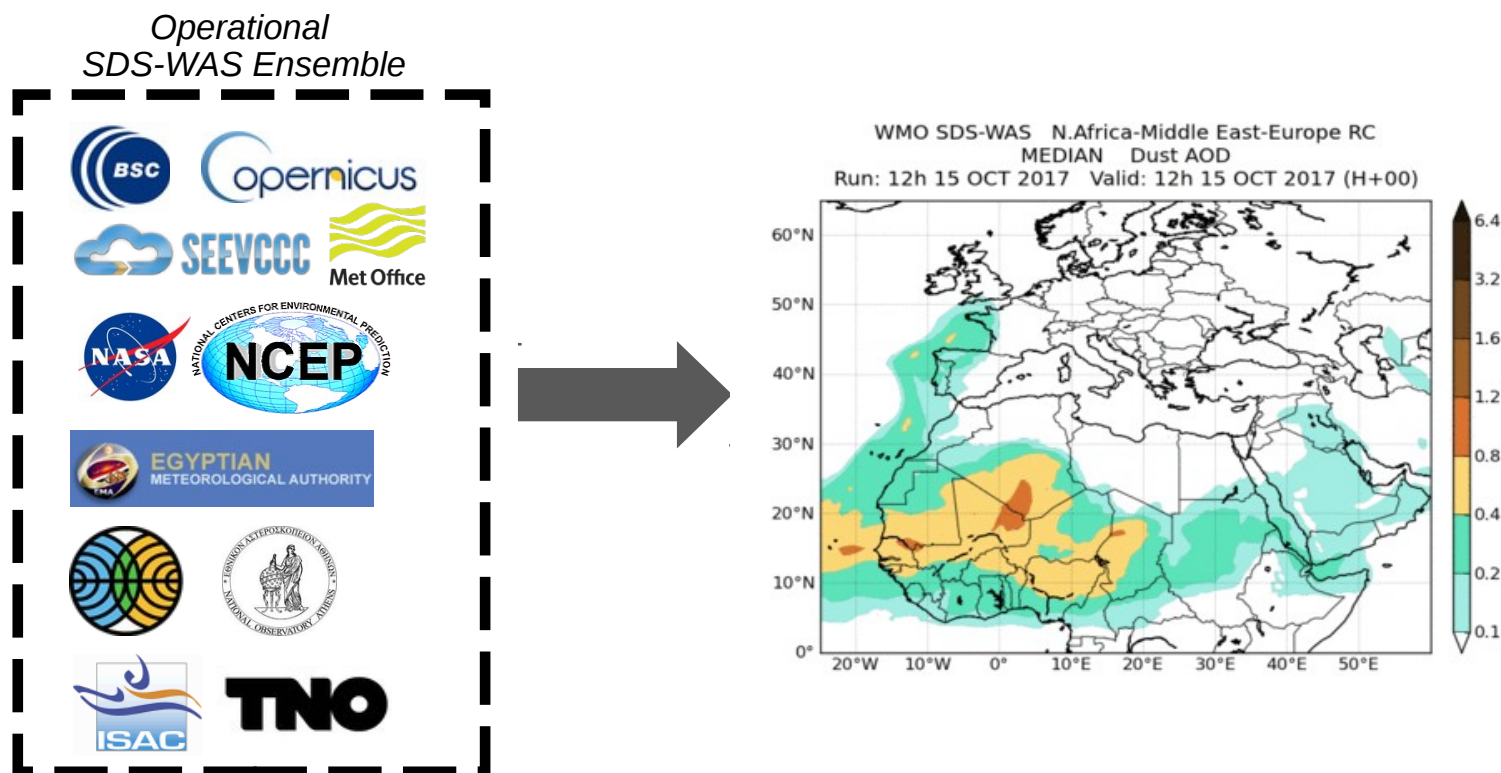
Dust forecasts

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

- SDS-WAS multi-model product



12 Global – Regional models from ~ 100 to 10 km



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

SDS-WAS and the NAMEE Regional Center

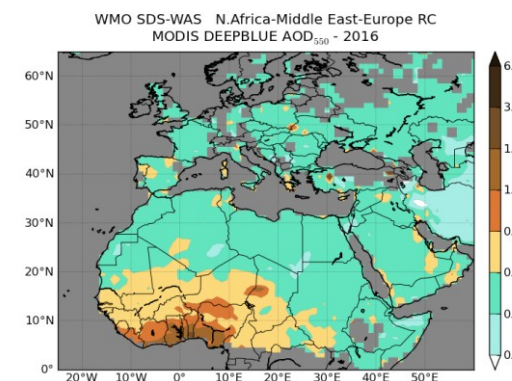
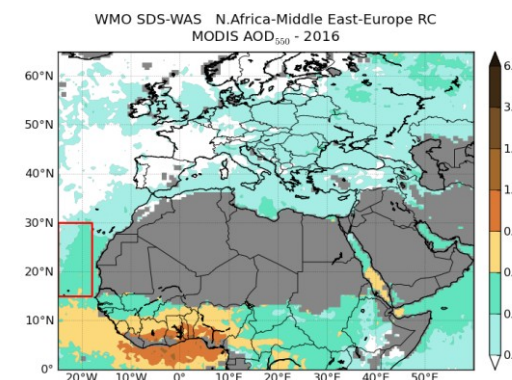
- **Evaluation with AERONET data**
 - Graphical NRT Evaluation by site
 - Evaluation scores monthly/seasonal/annual
 - by regions and sites



- **Evaluation with MODIS data onto the Atlantic**
 - Evaluation scores monthly/seasonal/annual



- **Evaluation of dust models with MODIS Deep Blue retrievals**
 - Evaluation scores monthly/seasonal/annual



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/>



Our goals

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

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

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



Applications for Aviation

SDS can impact aviation management and safety

- Disturbances in airport operations
 - Closing of airports
 - Cleanup: Remove sand/dust from runways and other critical areas
 - Outside workers
- Rerouting
- Cancellations of scheduled flights

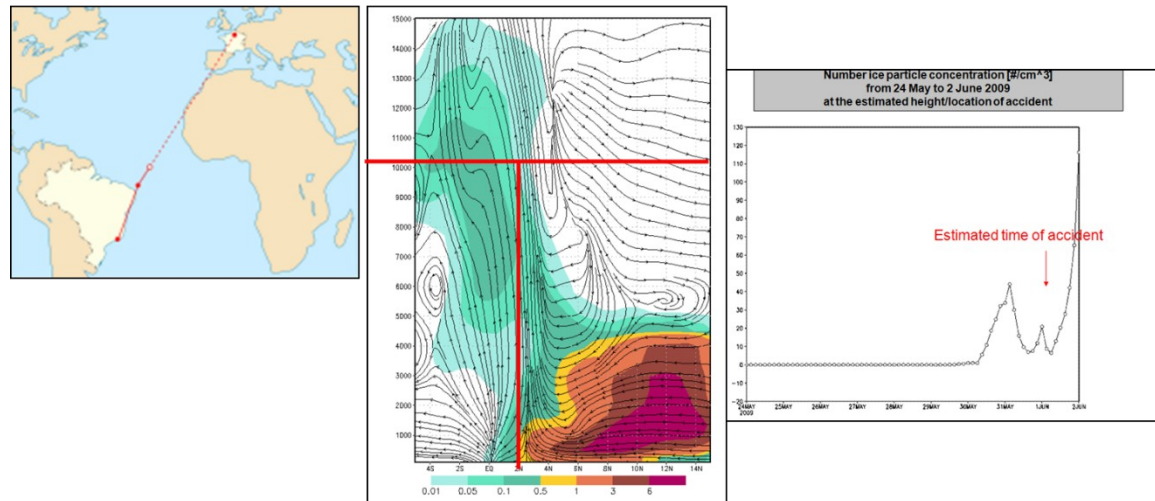




Applications for Aviation

- Poor Visibility
- Often associated with strong winds
- Mechanical problems:
 - Pitot-static tube blockage (ice nucleation)
 - Corrosion
 - Dust melting in turbines
 - Turbine abrasion
 - ...

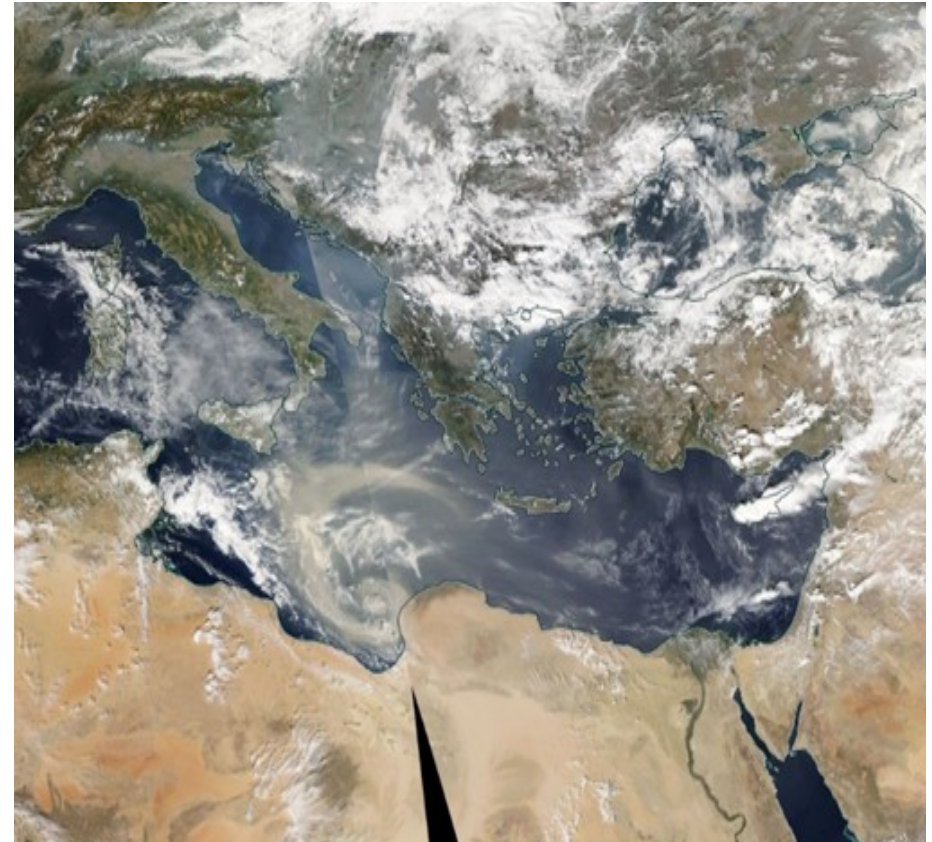
AirFrance 2009 accident (icing due to dust?)





Workshop objectives

- **inDust** searches to build a community of researches and users that can start to design the strategy to develop **dust services**.
- Review **current research, available products and commercial solutions** that mitigate the impacts of dust on aviation
- **Identify gaps** in current measurement and modelling capability in order to improve air traffic management and safety
- Propose **actions for harmonising** transfer of dust products into aviation sector.



MODIS/Terra, 19th October 2019



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