



**Barcelona
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Centro Nacional de Supercomputación

Dust Forecast Services

WMO SDS-WAS and Barcelona Dust Forecast Center

Francesco Benincasa

Amman, 2nd of November 2015



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OUTLINE

OUTLINE

« WMO SDS-WAS NA-ME-E Regional Center

- ▶ Web portal
- ▶ Howto use it
- ▶ Products and Services

« Barcelona Dust Forecast Center

- ▶ Web portal
- ▶ Products and Services



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WMO SDS-WAS NA-ME-E Regional Center

» Research and development

► Retrieving

- Data models
- Data observations

► Producing

- Dust forecasts of 2 variables (Surface concentration and Aerosol optical depth) of 9 (10) numerical models + 4 multi-model products
- Models evaluation against observations
- Studies of dust episodes
- Workshop, training courses and seminars

WMO SDS-WAS NA-ME-E Regional Center

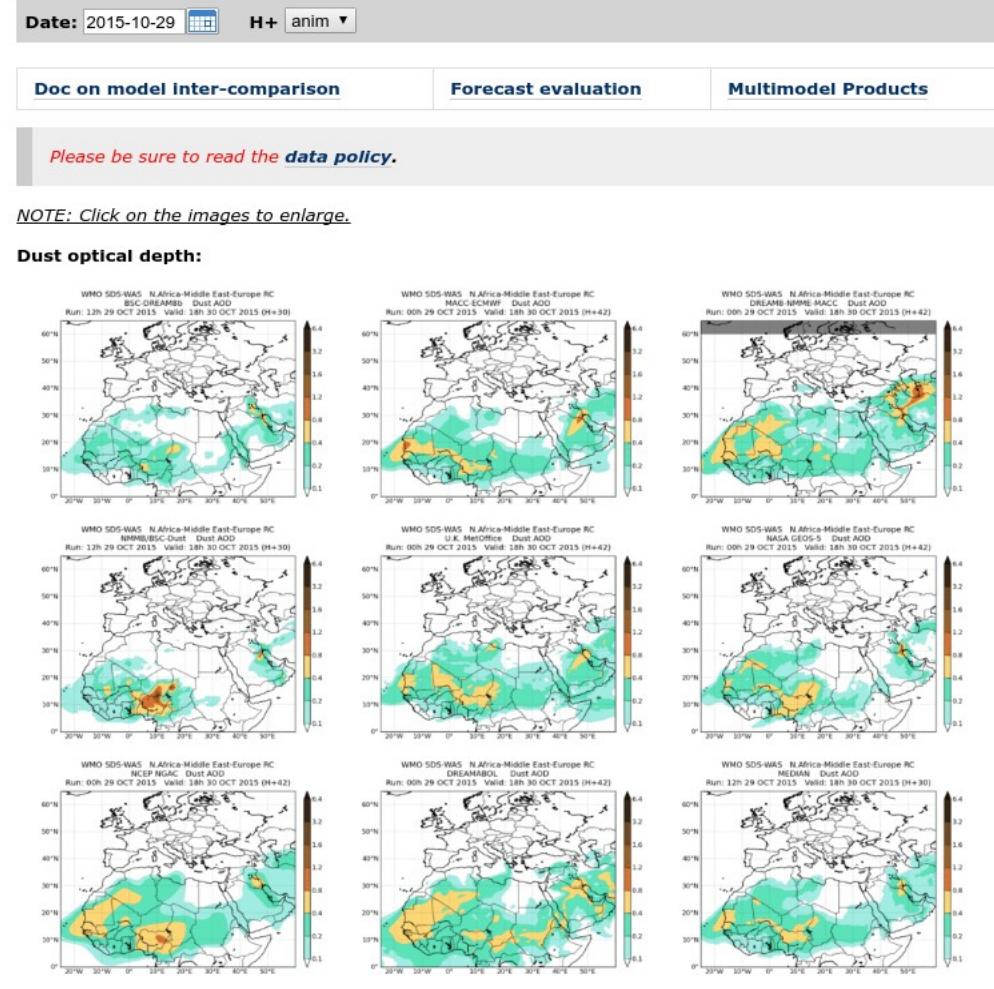
» <http://sds-was.aemet.es>

- ▶ **Browsable** images
 - Forecast

You are here: Home > Forecast & Products > Dust forecasts > Compared dust forecasts

Compared dust forecasts

by Francesco Benincasa — last modified Mar 06, 2015 02:57 PM



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► *Browsable* images

- Forecast
- Observations

You are here: Home > Forecast & Products > Dust observations > In-situ measurements > Granadilla - Spain

Granadilla - Spain

by Enric Terradellas — last modified Aug 01, 2014 10:43 AM

Select another station ▾

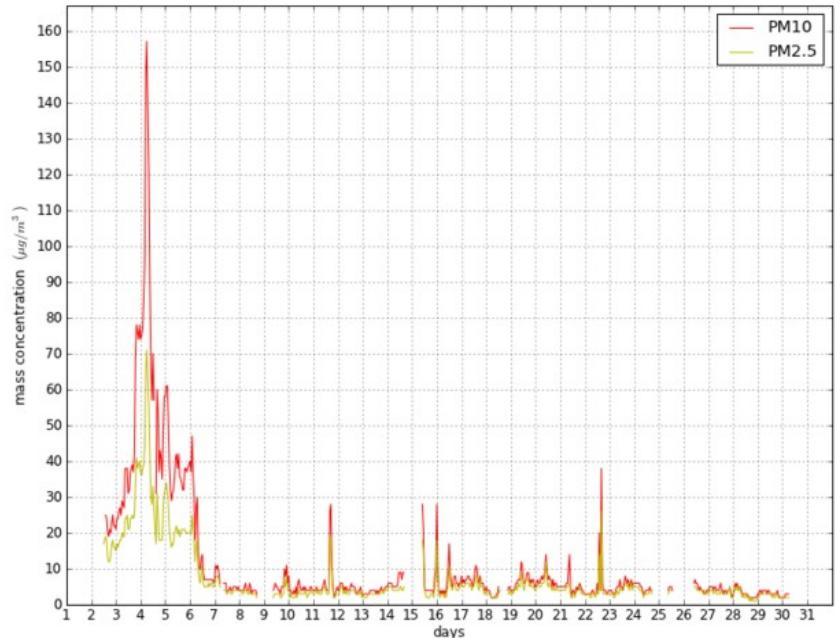
Display previous graphs

[*<< Back to Station Selection*](#)

[*Check Backtrajectories >>*](#)

NOTE: Click on the image to enlarge

Spain (Gob. Canarias): Granadilla
October 2015



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► *Browsable* images

- Forecast
- Observations
- Evaluation
 - AERONET

You are here: Home > Forecast & Products > Forecast evaluation > Santa_Cruz_Tenerife - Spain

Santa_Cruz_Tenerife - Spain

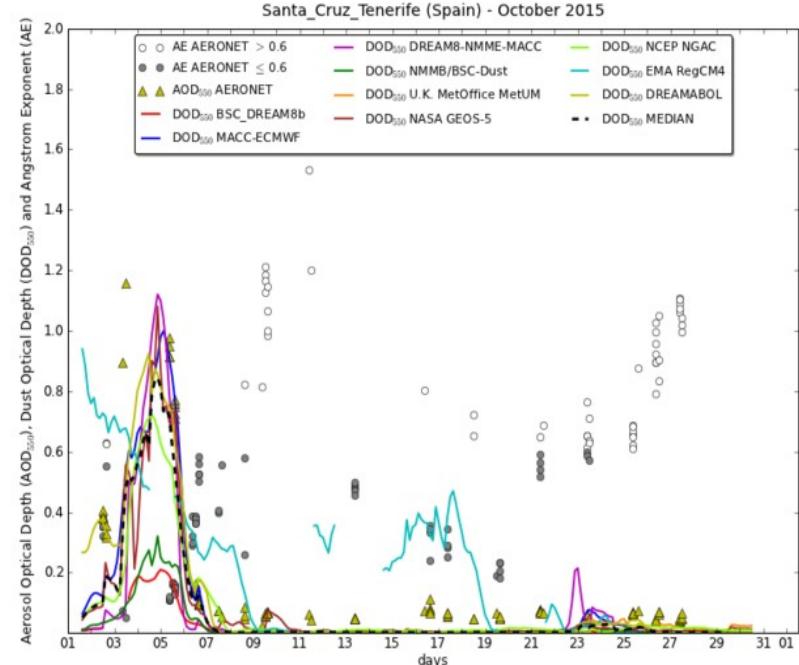
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Date: 2015-10

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► *Browsable* images

- Forecast
- Observations
- Evaluation
 - AERONET
 - MODIS

You are here: Home > Forecast & Products > Forecast evaluation > Evaluation of Saharan Dust Transport onto the Atlantic

Monthly Evaluation

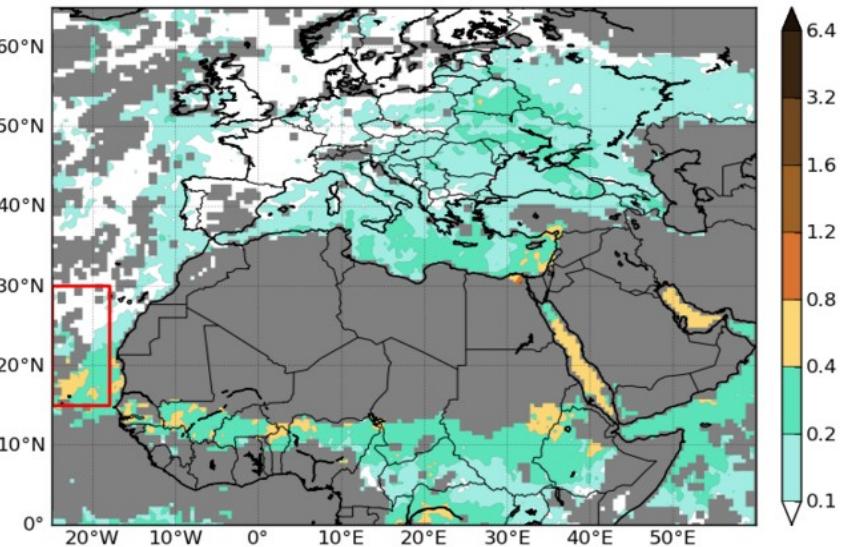
by Francesco Benincasa — last modified Dec 03, 2014 01:25 PM

Date:

[Go to Seasonal evaluation](#)

Average values of the MODIS retrievals used in the evaluation. The plot has been generated from products between the 2nd of the stamped month and the 1st of the following one.

WMO SDS-WAS N.Africa-Middle East-Europe RC
MODIS AOD₅₅₀ - SEP 2015



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	BIAS	ROOT MEAN SQUARE ERROR	CORRELATION COEFFICIENT	FRACTIONAL GROSS ERROR	NUMBER OF CASES
BSC_DREAM8b	-0.15	0.19	0.80	1.14	1239



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► Numerical evaluation scores archive

You are here: Home > Forecast & Products > Forecast evaluation > Model evaluation metrics

Monthly scores

by [Francesco Benincasa](#) — last modified Nov 27, 2014 11:51 AM

Date:

Sep 2015. Dust Optical Depth.
Threshold Angstrom Exponent = 0.600

BIAS

	BSC_DREAM8b	MACC-ECMWF	DREAM8-NMME-MACC	NMMB/BSC-Dust	U.K. Met Office	NASA GEOS-5	NCEP NGAC	EMA RegCM4	DREAM ABOL	MEDIAN
Sahel/Sahara show stations	-0.28	-0.16	-0.12	-0.32	N/A	-0.20	-0.09	-0.05	0.02	-0.17
Middle East show stations	-0.28	-0.24	-0.22	-0.46	N/A	-0.27	-0.36	-0.23	0.02	-0.27
Mediterranean show stations	-0.31	-0.24	-0.23	-0.36	N/A	-0.25	-0.22	-0.20	-0.16	-0.26
TOTAL	-0.30	-0.20	-0.18	-0.35	N/A	-0.23	-0.17	-0.13	-0.06	-0.22

ROOT MEAN SQUARE ERROR

	BSC_DREAM8b	MACC-ECMWF	DREAM8-NMME-MACC	NMMB/BSC-Dust	U.K. Met Office	NASA GEOS-5	NCEP NGAC	EMA RegCM4	DREAM ABOL	MEDIAN
Sahel/Sahara hide stations	0.48	0.42	0.41	0.50	N/A	0.43	0.40	0.49	0.42	0.42
Capo_Verde	0.27	0.12	0.17	0.31	N/A	0.19	0.16	0.30	0.17	0.16
Dakar	0.60	0.48	0.44	0.65	N/A	0.51	0.43	0.51	0.43	0.48
IER_Cinzana	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Banizoumbou	0.67	0.60	0.56	0.68	N/A	0.60	0.56	0.59	0.54	0.58
Zinder_Airport	0.23	0.19	0.14	0.26	N/A	0.21	0.15	0.34	0.28	0.17
Santa_Cruz_Tenerife	0.10	0.12	0.13	0.14	N/A	0.10	0.10	0.25	0.17	0.11
Zouerate-Fennec	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tamanrasset_INM	0.35	0.20	0.24	0.37	N/A	0.25	0.23	0.34	0.37	0.22



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► Numerical evaluation scores archive

► Numerical data archive

Files Download

by [Francesco Benincasa](#) — last modified Jan 16, 2015 01:31 PM — [History](#)

This page allows downloading numerical dust forecasts issued by different dust prediction models. Dust models may have very different characteristics (global or regional, horizontal and vertical resolutions, dust emission and deposition parameterizations, presence or absence of data assimilation, feedback to the meteorological model, ...). Information on the characteristics and configurations of the models can be found on their respective websites.

Please be sure to read the [data policy](#).

Models currently available are:

BSC-DREAM8b v2.0	DOWNLOAD FILES	Model website	 BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación
MACC-ECMWF	DOWNLOAD FILES	Model website	 macc Monitoring atmospheric composition & climate
DREAM-NMME-MACC	DOWNLOAD FILES	Model website	 SEVCCC
NMMB/BSC-Dust	DOWNLOAD FILES	Model website	 BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación
NASA-GEOS-5	DOWNLOAD FILES	Model website	
NCEP-NGAC	DOWNLOAD FILES	Model website	 NATIONAL CENTERS FOR ENVIRONMENTAL PREDICTION NCEP
DREAMABOL	DOWNLOAD FILES	Model website	 ISAC
EMA-RegCM4	DOWNLOAD FILES	Model website	 EGYPTIAN METEOROLOGICAL AUTHORITY
Multimodel MEDIAN	DOWNLOAD FILES	Model website	 WMO ESSD AEMET

« Main products

- ▶ Dust forecast ensemble
- ▶ Visibility
- ▶ Eumetsat RGB products archive

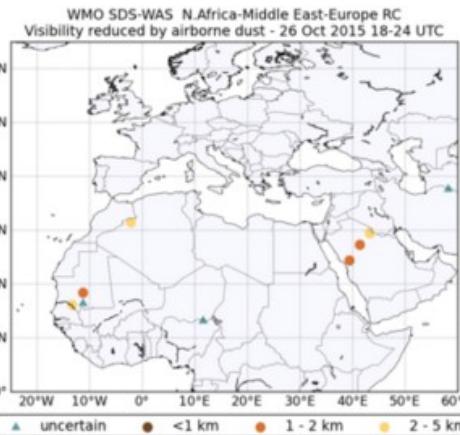
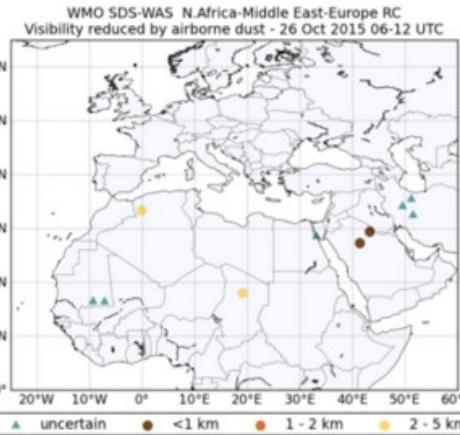
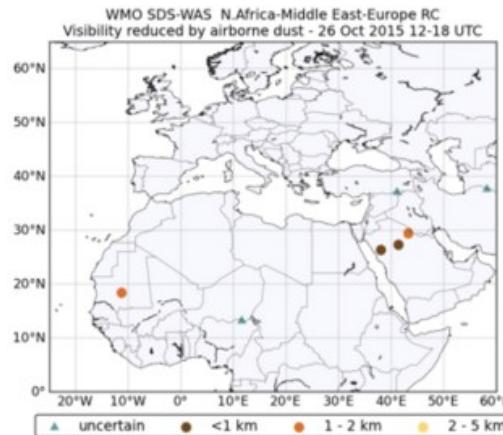
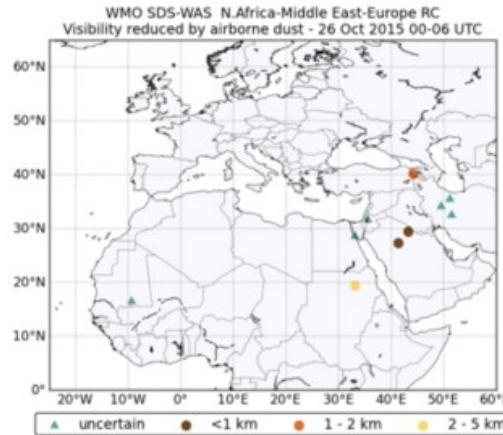
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Visibility

by [Francesco Benincasa](#) — last modified Oct 28, 2015 09:32 AM

Date 2015-10-26 



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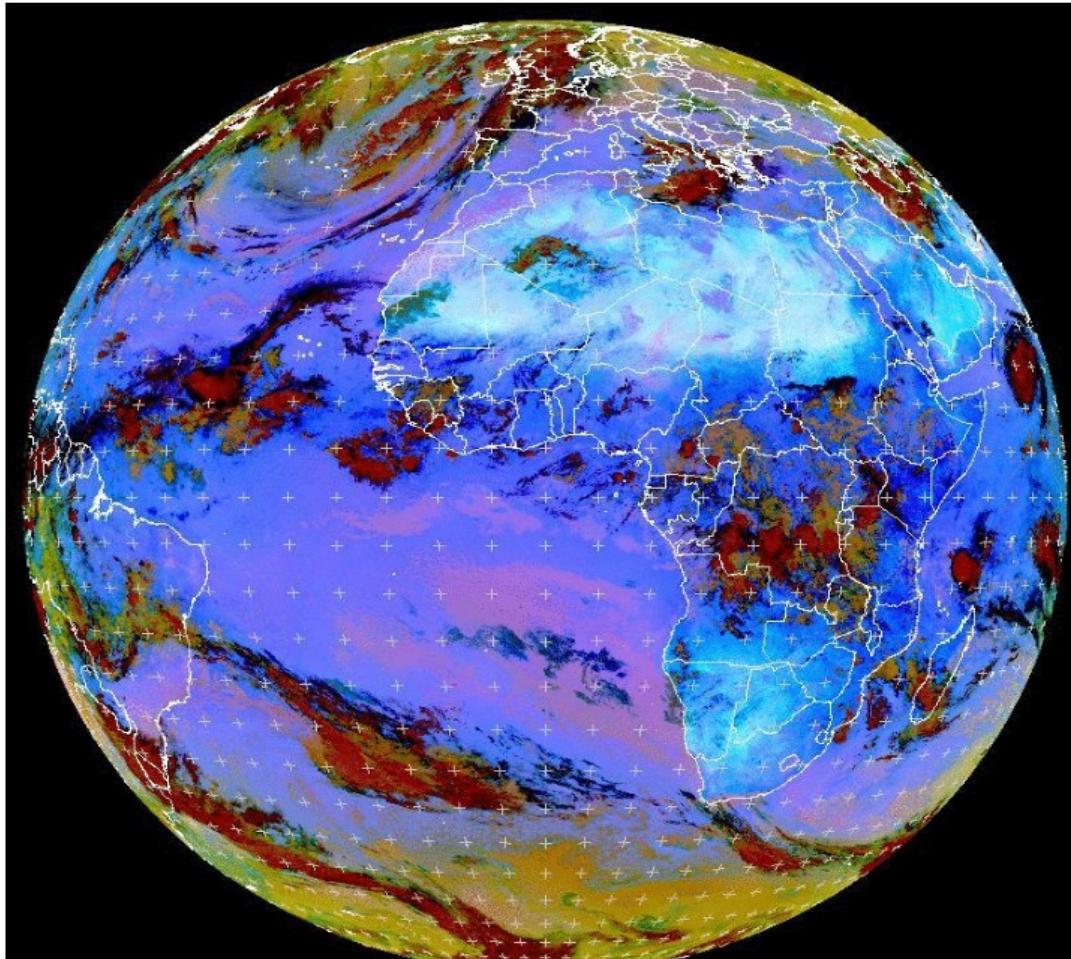
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MSG – EUMETSAT

by [Francesco Benincasa](#) — last modified May 29, 2012 03:26 PM

Date:  anim ▾



« Main services

► Dust News & Events

► Newsletters

► Materials

WMO SDS-WAS NA-ME-E Regional Center

Materials

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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 Weather + Climate + Water

Gobierno de España Agencia Estatal de Meteorología AEMET BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación

WMO SDS WAS || Asia Regional Center

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Materials

You are here: Home > Materials

Materials

by Enric Terradellas — last modified Oct 29, 2015 11:54 AM

This section includes different materials related to mineral dust:

- [training materials](#)
- [workshops](#)
- [information on several dust events](#)
- [scientific documentation](#)
- [technical reports](#)
- [information on dust impacts \(\[meningitis\]\(#\)\)](#).
- [information relative to different events carried out in the framework of the WMO SDS-WAS \(\[meetings, training courses\]\(#\)\)..](#)

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« Meningitis

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Materials

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Latest News

[Equipment calibration and staff training at Izana Atmospheric Research Center](#)

Oct 29, 2015

[The edge of crisis: Dust and sand storms](#)

Oct 29, 2015

You are here: Home > Materials > Meningitis

Meningitis

by Enric Terradellas — last modified May 21, 2014 02:34 PM

- [Climate & Health Bulletin: Meningitis Vigilance Zones](#)
- [WHO Meningitis Weekly Bulletin](#)
- [Meningitis Vaccine Project](#)
- [Meningitis Environmental Risk Information Technologies \(MERIT\)](#)



Meningococcal meningitis is a bacterial form of meningitis, a serious infection of the meninges that affects the brain membrane. It commonly causes epidemics with high fatality rates. The largest epidemics occur in the arid areas of sub-Saharan Africa: the so-called African meningitis belt, which stretches from Senegal to Ethiopia. They occur in seasonal cycles between end of November and end of June, depending on the location, and decline rapidly with the arrival of the rainy season. The yearly average incidence is about 40,000-50,000 cases with a 10% of deaths and a 10-20% of affected by permanent neurological sequelae.

It is believed that low absolute humidity and presence of dust may enhance meningococcal invasion, either by damaging the mucosal barrier and allowing bacterial penetration, or by inhibiting mucosal immune defences. A controversial hypothesis suggests that dust particles might serve as bacterial carriers, thus facilitating the transmission.

- Cuevas, E., C. Pérez, J.M. Baldasano, C. Camino, S. Alonso-Pérez and S. Basart (2011): [Long-term retrospective analysis of dust and AI with meningitis epidemics data](#), MACC O-INT WP3. (Meningitis linked to mineral dust transport in the Sahel). 2nd. delivery report.



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Barcelona Dust Forecast Center

« Operational center

- ▶ Operated by BSC and AEMET
- ▶ Officially recognized by the WMO
- ▶ 72 hours forecast (3-hourly) model developed at BSC
- ▶ 6 variables (Optical depth, Dry and Wet deposition, Load, Surface concentration, Surface extinction)

« <http://dust.aemet.es>

« Products

- ▶ Forecast images
- ▶ Google Earth integration (KML/KMZ files)
- ▶ Averaged values images
- ▶ Zoomed area forecast images (Spain, Burkina Faso, ...)

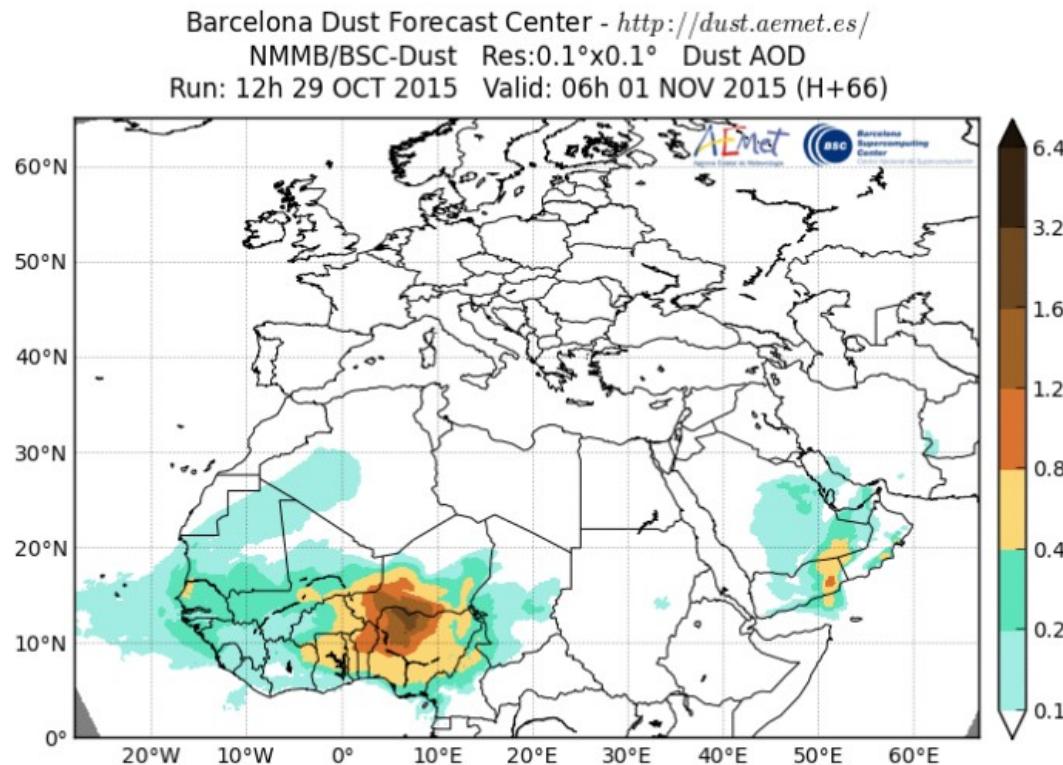
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You are here: Home / Forecast

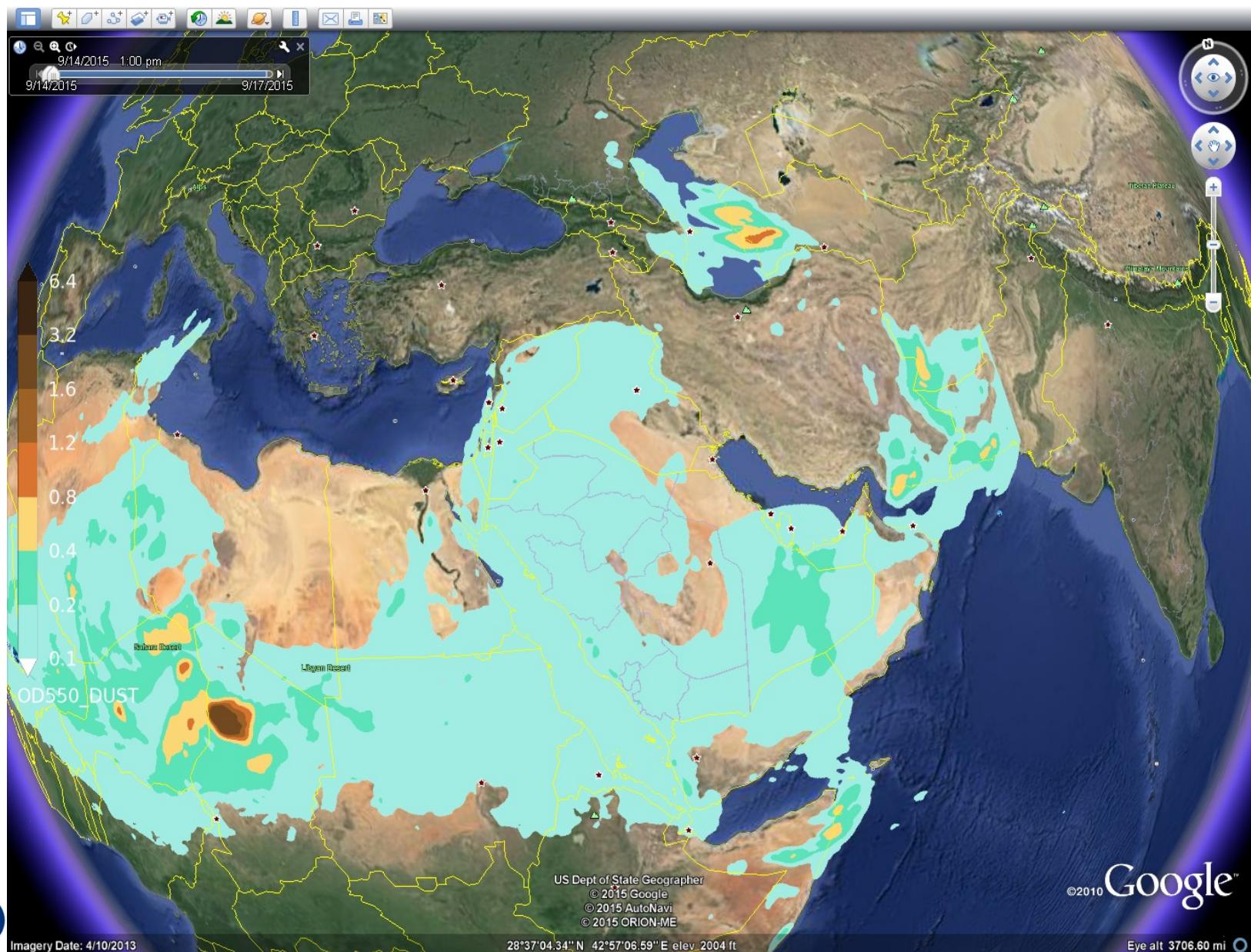
Dust Optical Depth

Date anim ▾ Variable

The NMMB/BSC-Dust model



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You are here: [Home](#) / [Other products](#) / [Averaged values](#)

Monthly averaged values

Monthly averaged values of dust surface concentration and dust load computed from the daily runs of the NMMB/BSC-Dust model.

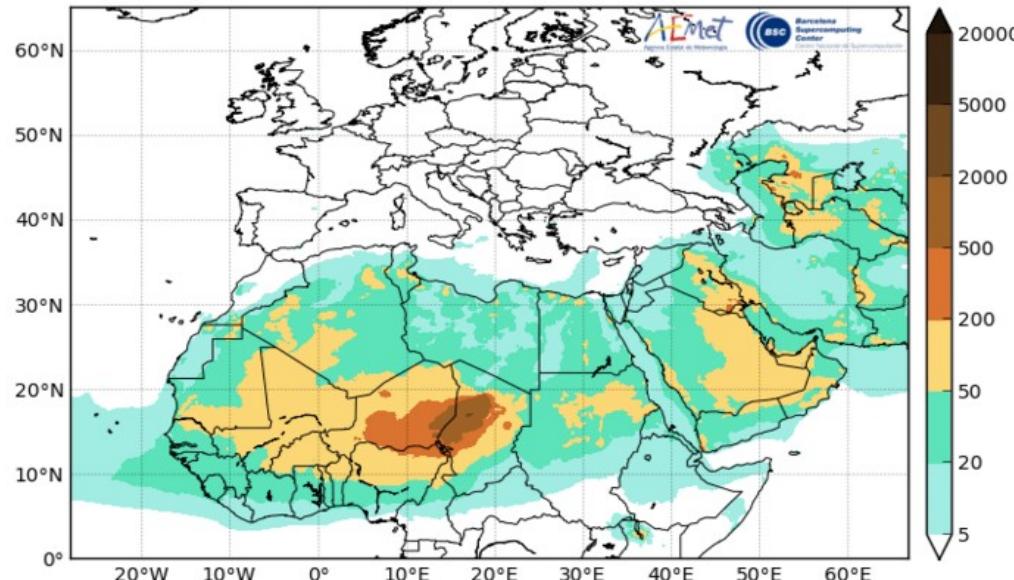
Date 2015-10 

[Methods: Time-averaged values](#)

NOTE: Click on the images to enlarge

Monthly Averaged Dust Surface Concentration ($\mu\text{m}/\text{m}^3$)

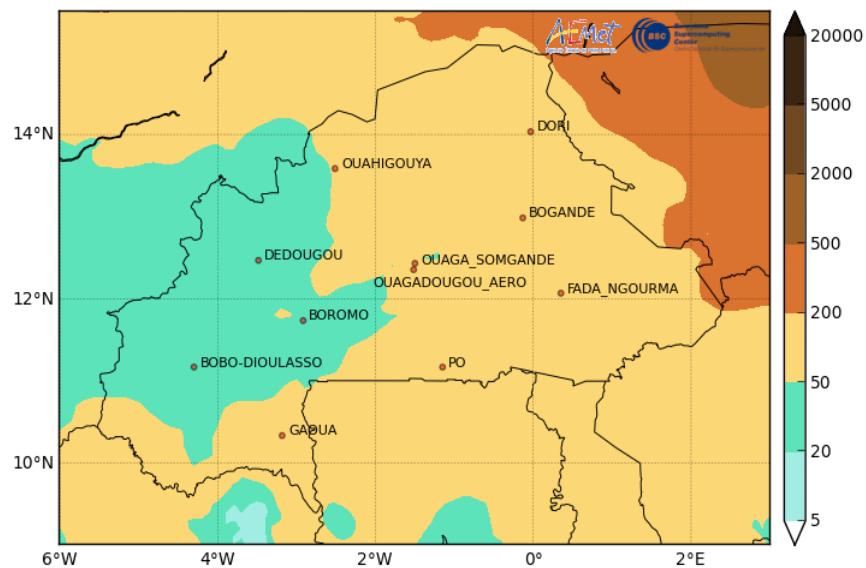
Barcelona Dust Forecast Center - <http://dust.aemet.es/>
NMMB/BSC-Dust Res:0.1°x0.1° Dust Surface Conc. ($\mu\text{g}/\text{m}^3$)
Average: OCT 2015



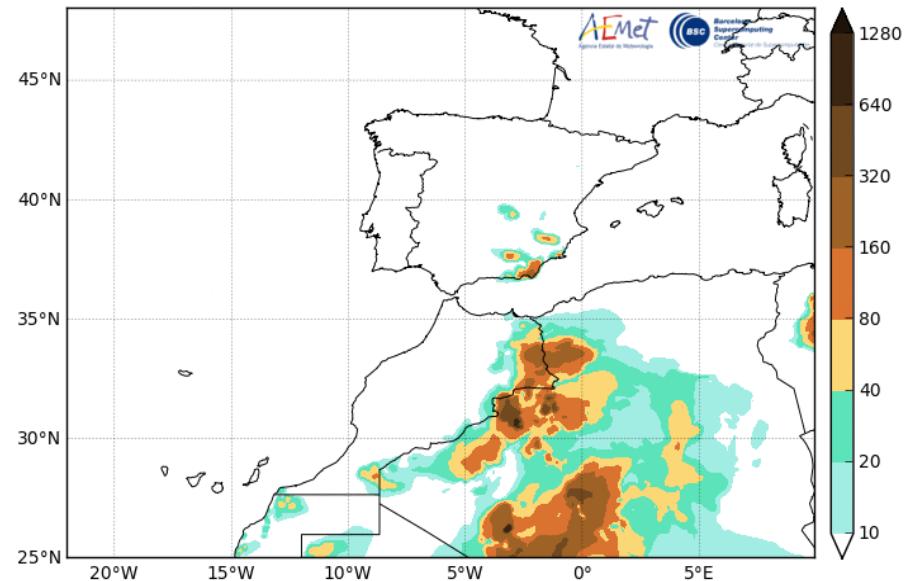
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Barcelona Dust Forecast Center

Barcelona Dust Forecast Center - <http://dust.aemet.es/>
NMMB/BSC-Dust Res:0.1°x0.1° Dust Surface Conc. ($\mu\text{g}/\text{m}^3$)
Run: 12h 29 OCT 2015 Valid: 12h 01 NOV 2015 (H+72)



Barcelona Dust Forecast Center - <http://dust.aemet.es/>
NMMB/BSC-Dust Res:0.1°x0.1° Dust Surface Conc. ($\mu\text{g}/\text{m}^3$)
Run: 12h 29 OCT 2015 Valid: 12h 01 NOV 2015 (H+72)

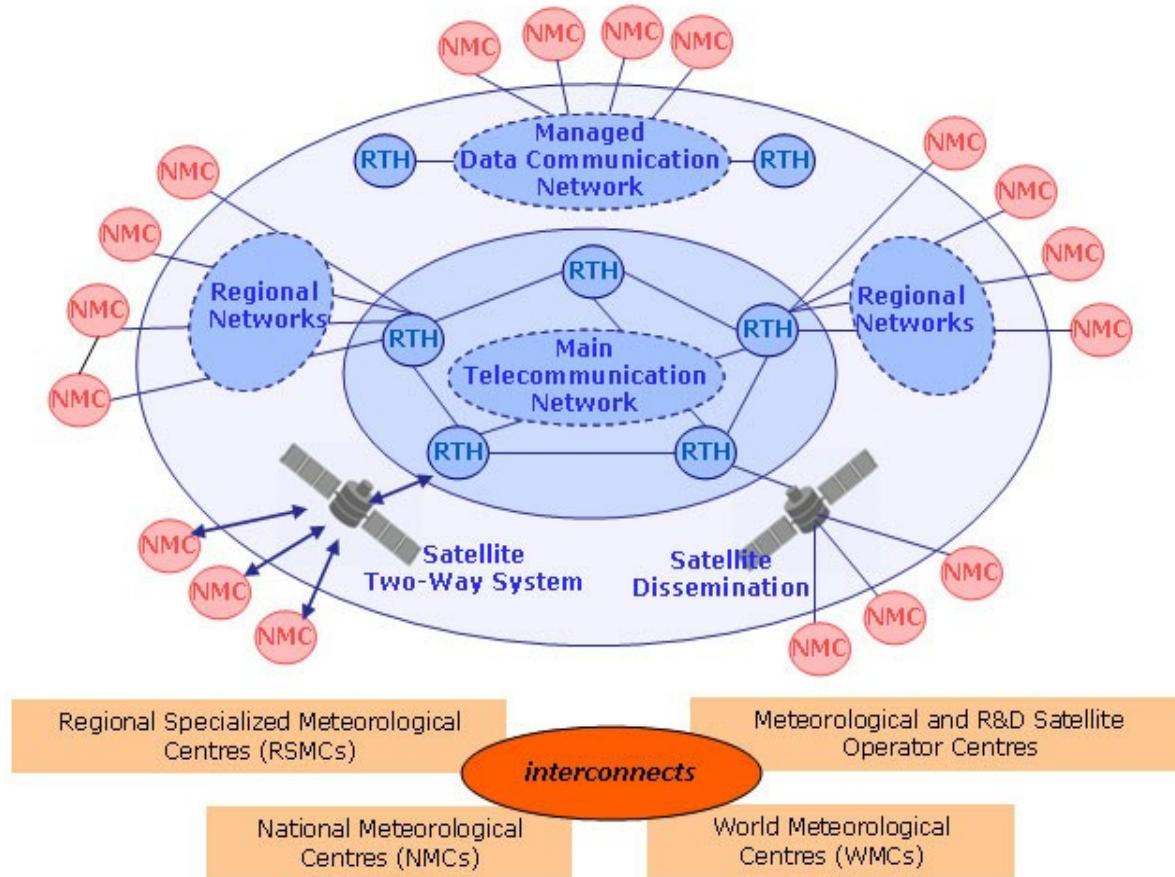


« Services

- ▶ Forecast images dissemination
 - ▶ WMO GTS (Global Telecommunication System)
 - ▶ EUMETCast (EUMETSAT's primary dissemination mechanism)
- ▶ News & Events, Newsletter

Barcelona Dust Forecast Center

WMO GTS

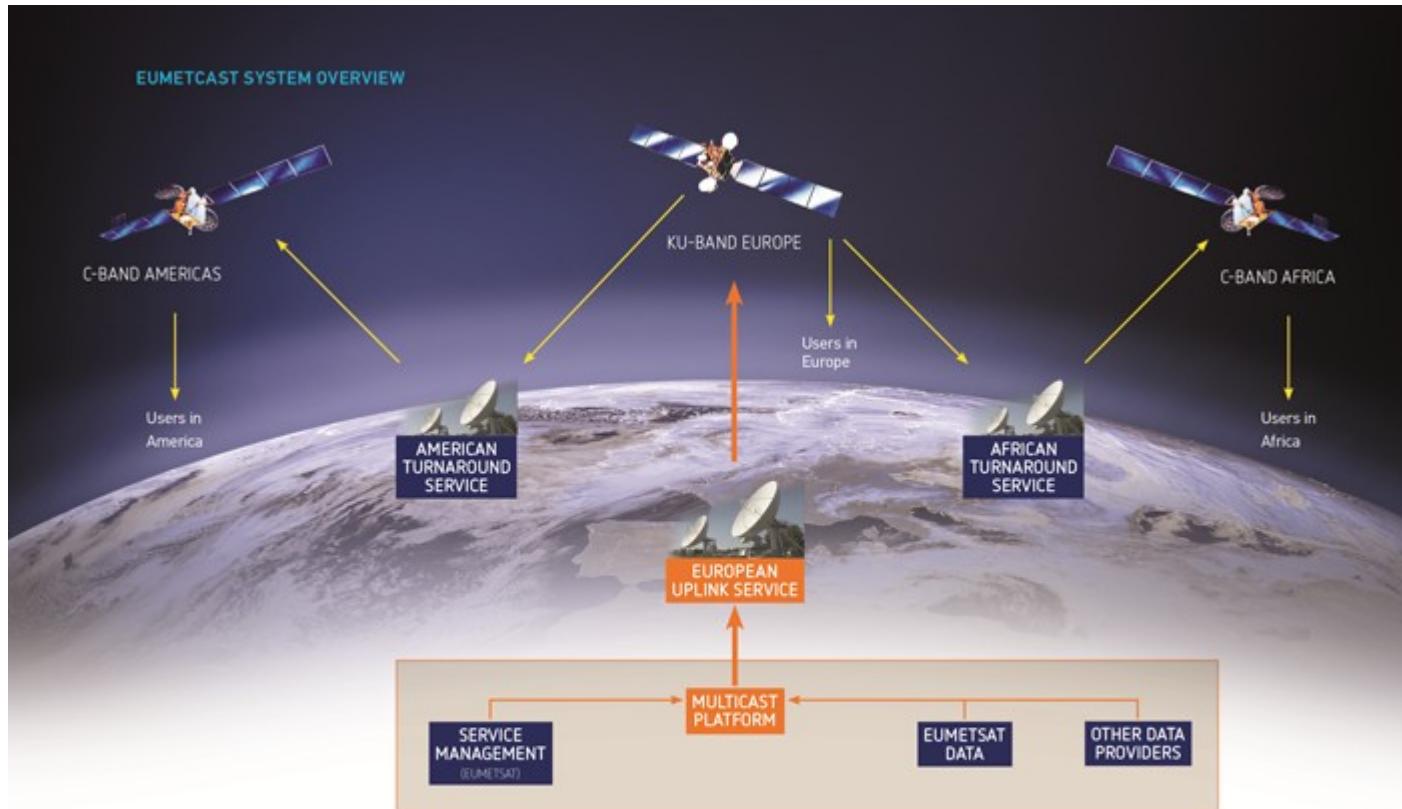


WMO GTS

- ▶ Global network for transmission of meteorological data
- ▶ Data proceeding from weather stations, satellites and NWP centres
- ▶ Implemented and operated by
 - National meteorological services
 - Other international organizations (ECMWF, EUMETSAT, ...)

Barcelona Dust Forecast Center

EUMETCast



« EUMETCast

- ▶ Multi-service dissemination system based on standard Digital Video Broadcast (DVB) technology
- ▶ It uses commercial telecommunication geostationary satellites
- ▶ Multi-cast files (data and products) to a wide user community
- ▶ From 15th of October 2015 **BDFC** products are distributed over Europe and Africa



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Thank you!

For further information please contact

francesco.benincasa@bsc.es

dust@aemet.es

sdswas@aemet.es