



El Centro Regional de la Organización Meteorológica Mundial de Avisos y Evaluación de Tormentas de Polvo y Arena para el Norte de África, Oriente Próximo y Europa

**The Sand and Dust Storm Warning Advisory and Assessment System Regional Center
for Northern Africa, Middle East and Europe
(SDS WAS Regional Center)**

Emilio Cuevas (AEMET) y José M^a Baldasano (BSC-CNS)



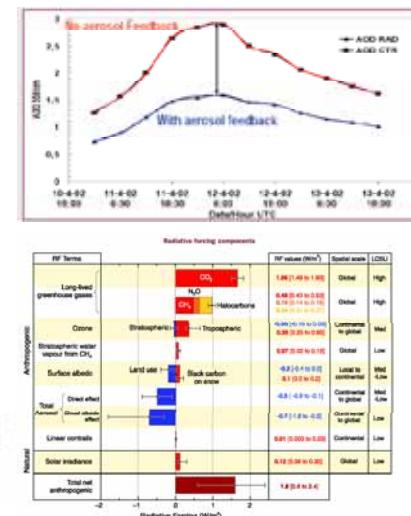
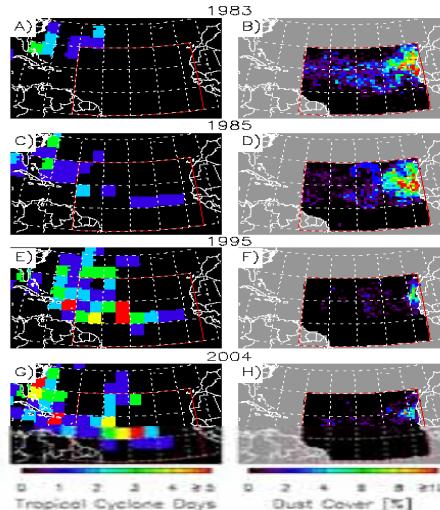
Barcelona, 26 de abril de 2010



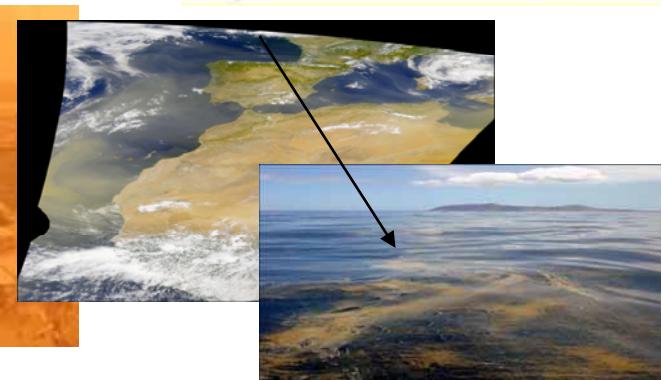
¿ Por qué un Centro Regional ?



Salud humana (Asma, infecciones respiratorias, meningitis en Africa, Fiebre del Valle en America)



Agricultura (impactos positivos y negativos)



Productividad marina (impactos negativos y positivos)

Predicción meteorológica a corto y medio plazo, estacional y climática

Industria (Semiconductores, etc.)

Energía (plantas termosolares)



Aviación (accidentes y operatividad de aeropuertos)
Transporte terrestres



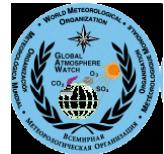
Alianza AEMET / BSC-CNS



(CSIC, OMM, socios de centros de investigación y Servicios Meteorológicos Nacionales)



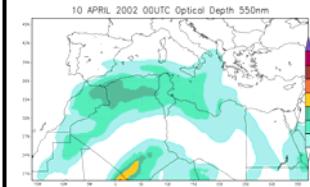
+



I+D polvo atmosférico

1 Meteorólogo + 1 Ingeniero 100%

3 investigadores tiempo parcial



I+D y modelización en
polvo atmosférico



1 Investigador + 1 Ingeniero 100%

3 investigadores tiempo parcial



World
Meteorological
Organization
Weather • Climate • Water

Centro Regional de la Organización Meteorológica Mundial

Antecedentes



Shanghai, noviembre-2006. El “steering committee of the Sand and Dust Storm Project” propone el desarrollo e implementación del: “**Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)**”. AEMET y el BSC-CNS son invitados.



Barcelona, noviembre-2007. Primer “**SDS WS Expert meeting**” organizado por el BSC-CMS y AEMET



7.11.2007

Atenas, junio-2008. Se redacta el “**Plan de Implementación del SDS WAS de la OMM**”. Participan BSC-CMS y AEMET



Túnez, noviembre-2008. Primera reunión del “**SDS Regional steering group**” nombra grupos de trabajo y establece actividades del Centro Regional. AEMET y el BSC-CNS presentan la primera estructura del Centro Regional





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DE MEDIO AMBIENTE
Y MEDIO RURAL Y MARINO



Agencia Estatal de Meteorología



Barcelona
Supercomputing
Center

Centro Nacional de Supercomputación

Incheon
18-25 November
2009

Commission for Atmospheric Sciences

Fifteenth session



World
Meteorological
Organization

WMO-No. 1050

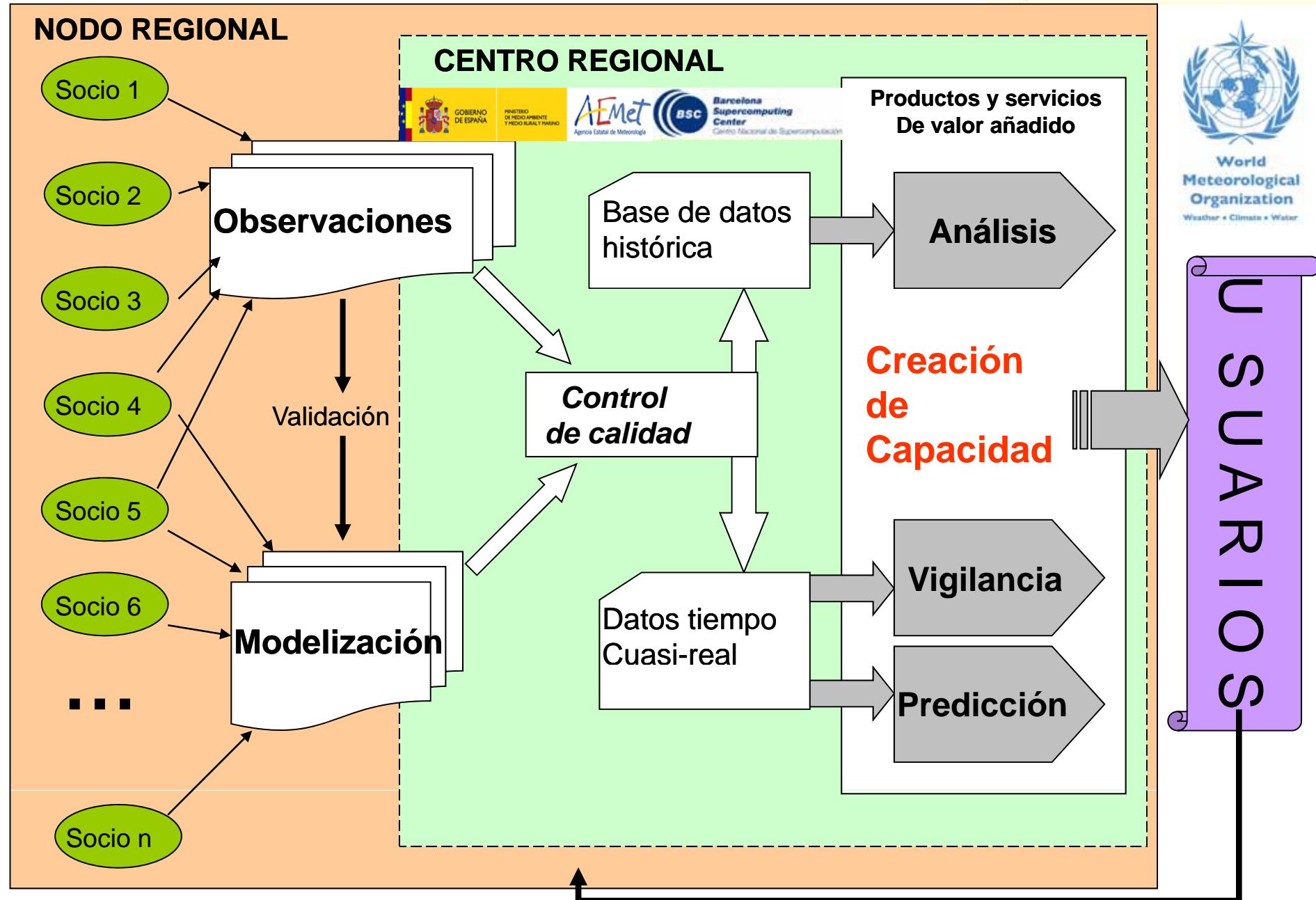
Weather • Climate • Water

El SDS WAS juega un papel fundamental para la Comisión de Ciencias Atmosféricas (último informe Nov.- 2009)

Objetivos

1. **Proporcionar herramientas** específicas de **predicción y observación** de polvo atmosférico a los **Servicios Meteorológicos Nacionales** a través de la OMM.
2. **Identificar y mejorar los productos** de polvo atmosférico consultando a diferentes **comunidades de usuarios** (aviación, salud, oceanografía, agricultura, energía...).
3. Mejorar la observación y la predicción de tormentas de polvo mediante **investigación y transferencia de tecnología** coordinadas internacionalmente
4. Aumentar la **Creación de Capacidad en países en vías de desarrollo** para utilizar observaciones, predicciones y análisis de productos de polvo atmosférico que satisfagan sus necesidades económicas y sociales.
5. Establecer puentes de comunicación entre el SDS-WAS y **otras comunidades que realizan estudios relacionados** con aerosoles (calidad del aire, quema de biomasa, etc...)

I+D + aspectos operativos + cooperación internacional





World Meteorological Organization
Working together in weather, climate and water

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World Weather Research Programme (WWRP)

Programmes > AREP > WWRP > SDS >



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



SDS-WAS Implementation

- Draft Implementation Plan

Organizations currently delivering or developing SDS systematic forecasts

Northern Africa-Middle East-Europe (NA-ME-E) Node

- Members of the SDS-WAS Regional Steering Group (RSG)
- First Meeting of the Regional Steering Group
(24-25 November 2008, Tunis, Carthage, Tunisia)

Asia Node

- Members of the SDS-WAS Regional Steering Group (RSG)
- First Meeting of the Regional Steering Group
(4-6 November 2008, CMA, Beijing, China)
- Workshop on the Implementation of the WMO SDS-WAS Asia Node

AREP

WWRP

WWRP Joint Scientific Committee

2009 Calendar

2010 Calendar

Publications

Newsletters

Mesoscale Forecasting

Nowcasting

Sand & Dust Storms

THORPEX

Tropical Meteorology

Verification

Weather & Health

Weather



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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)

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- Steering Group
- Partners & Links
- SDS-WAS Wiki

Steering Group

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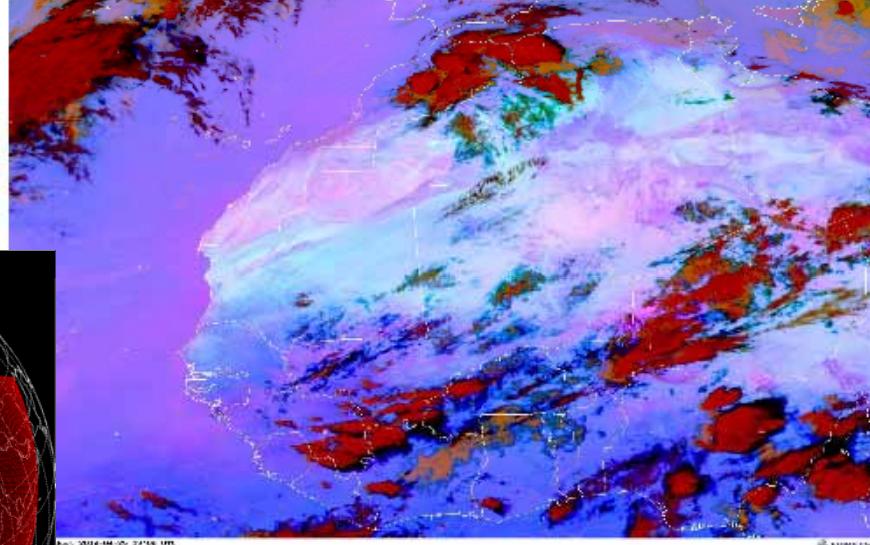
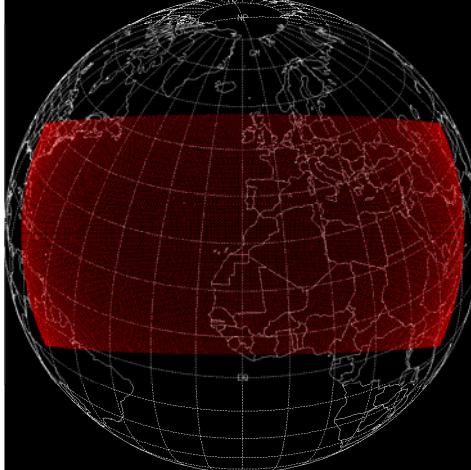
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WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

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

LATEST RGB dust image (courtesy of EUMETSAT)

<http://www.bsc.es/sds-was>

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

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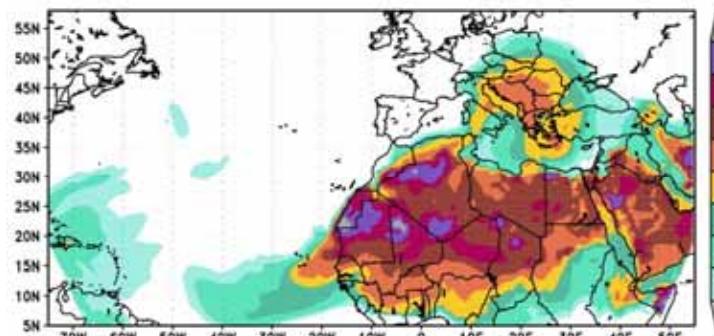
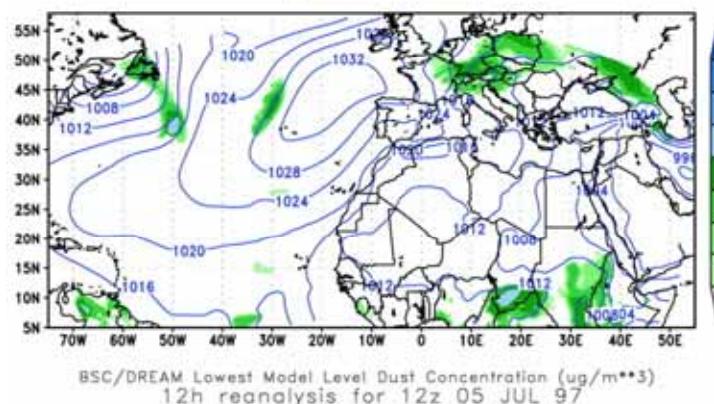
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Products

- ▼ Dust forecasts
 - BSC-DREAM
 - ECMWF
 - LMDZT-INCA
 - CHIMERE
 - METEO-FRANCE
 - SKIRON
 - TAU-DREAM
- ▼ Near real time observations
 - AERONET
 - MODIS
 - OMI
 - SEAWIFS
 - CALIPSO
 - MSG
 - METAR
- Forecast Verification
- Reanalysis
- Data access

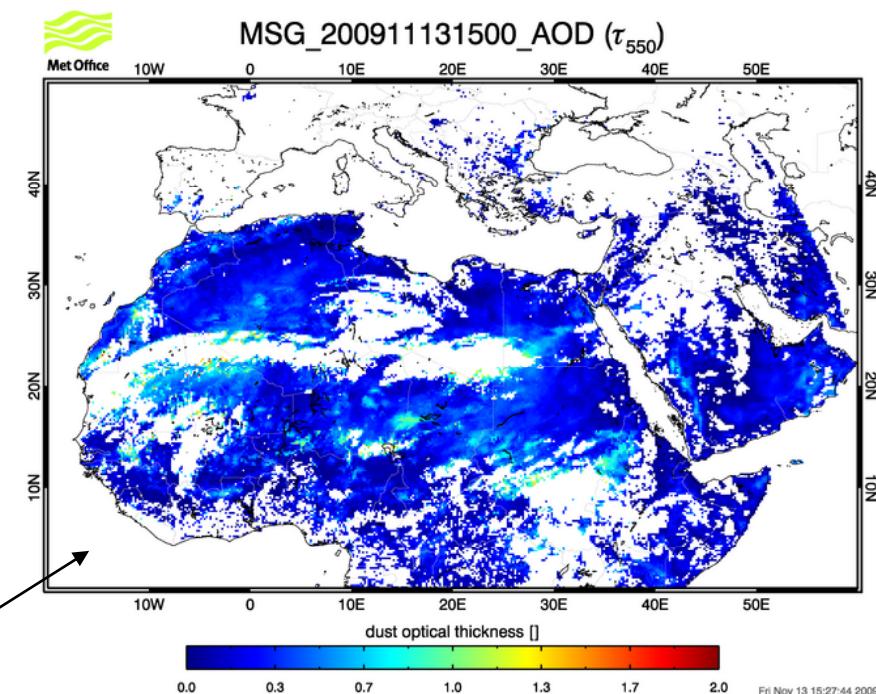
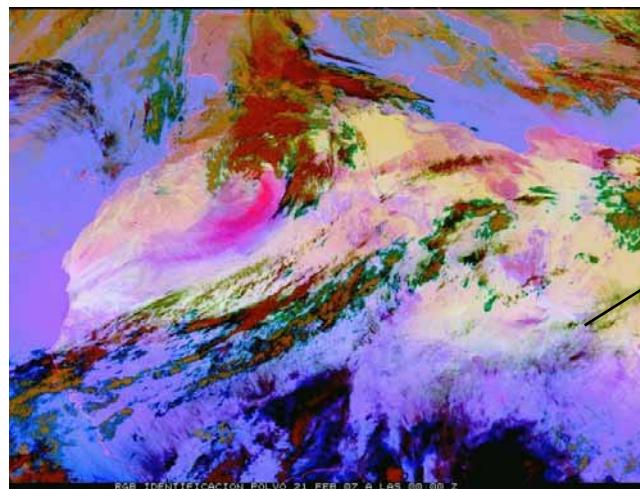
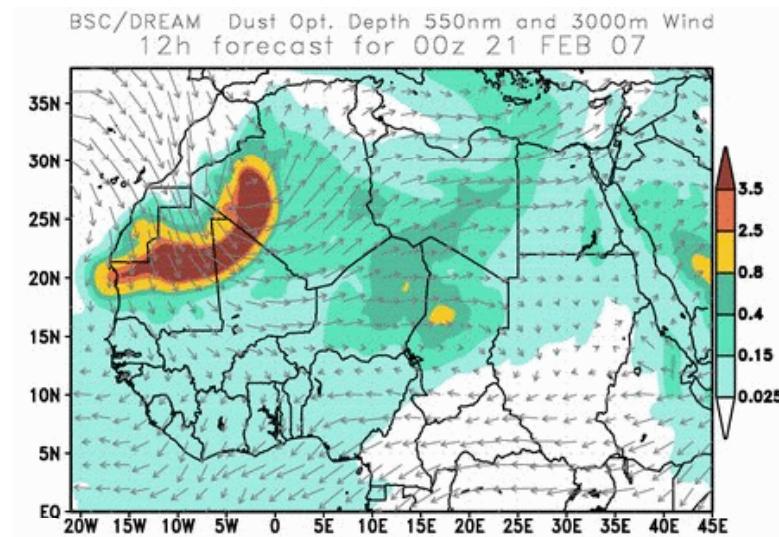
BSC-DREAM



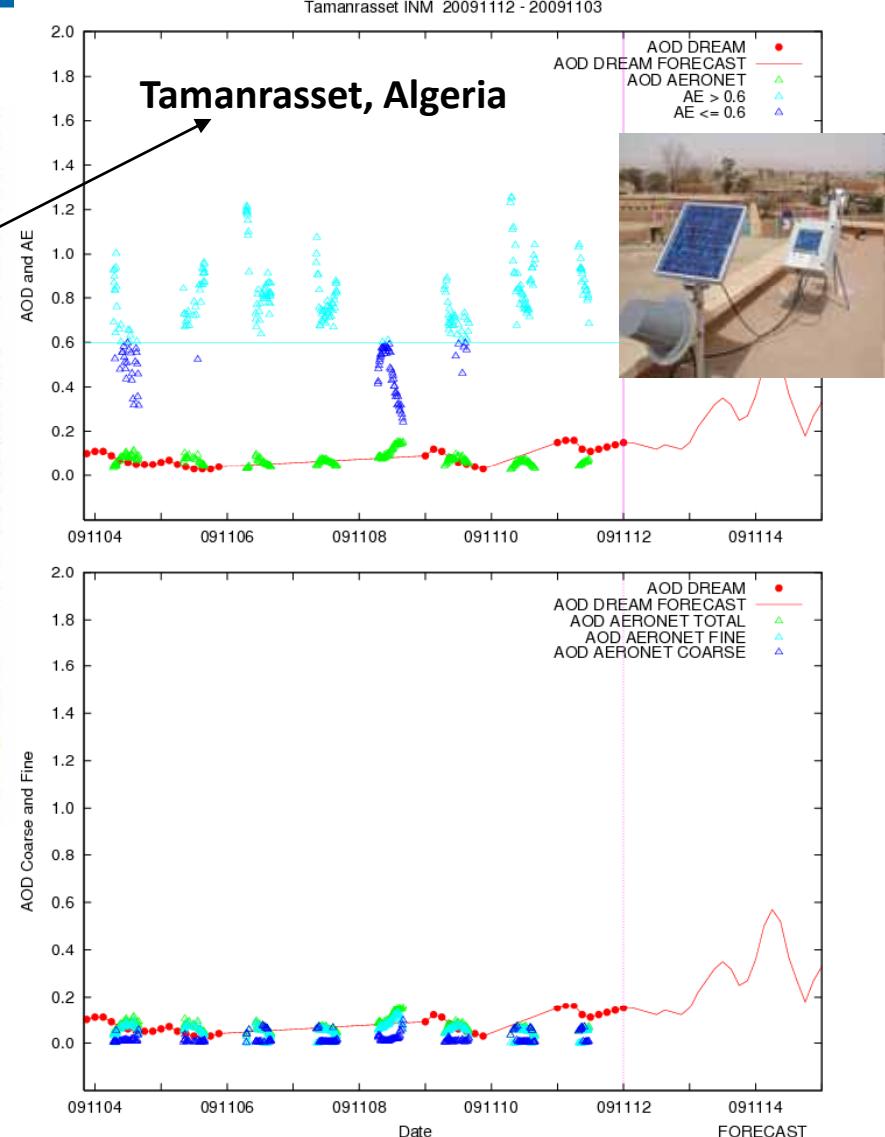
- Preliminary list of models (list is not exhaustive and needs to be completed and updated):

SDSWAS_ID	Model	Type	Daily Forecasts	Operational	Responsible
CHIMERE_Dust	CHIMERE at LMD	Regional	X		Menut
BSC_DREAM	DREAM at BSC	Regional	X		Perez/Baldasano
SKIRON	SKIRON at UA	Regional	X		Kallos
TAU_DREAM	DREAM at TAU	Regional	X		Kishcha
LM_MUSCAT_DES	LM_MUSCAT at IFT	Regional			Tegen
RegCM3	RegCM3 at ICTP	Regional			Zakey
Meso-NH		Regional			Tulet
RAMS-DMP		Regional			Bouet
NAAPS	NAAPS at U.S.Navy	Global	X	X	Westphal
MOCAGE-dust	MOCAGE-dust at MeteoFrance	Global	X	Pre-oper	Peuch
??	??	??			Wilson
GEMS-Aerosol	GEMS-Aerosol at ECMWF	Global	X	Pre-oper	Morcrette/Boucher
LMDz_INCA	LMDz INCA at	Global	X		Schulz
BSC_NMMb-dust	NMMb_dust at BSC	Global			Perez/Baldasano
GFS-GOCART	GFS-GOCART at NCEP	GLOBAL		Pre-oper	Moqueen
.....					

Validación frente a satélites



Verificación frente a AERONET

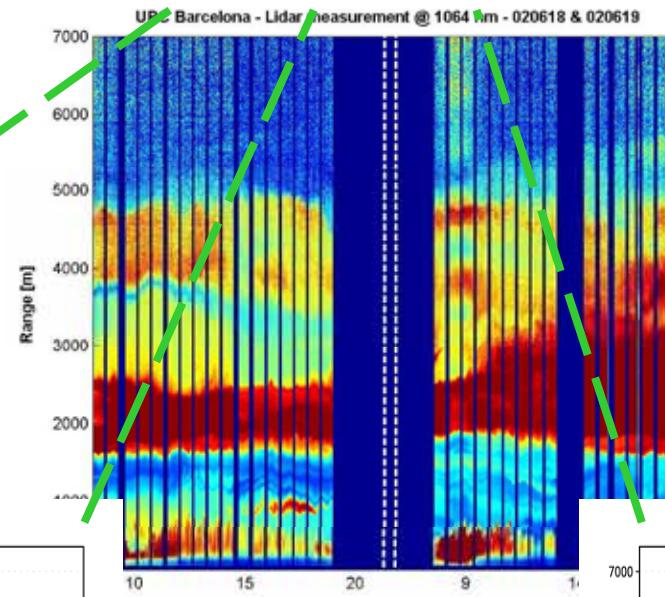


Near real time model validation against
AERONET data

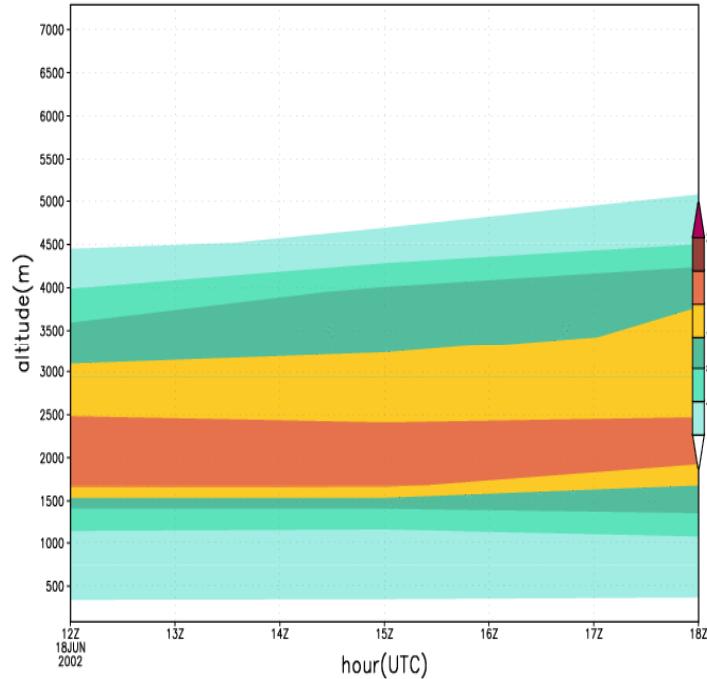
Validación vertical frente a las redes lidar AIRLINET y MPLNet



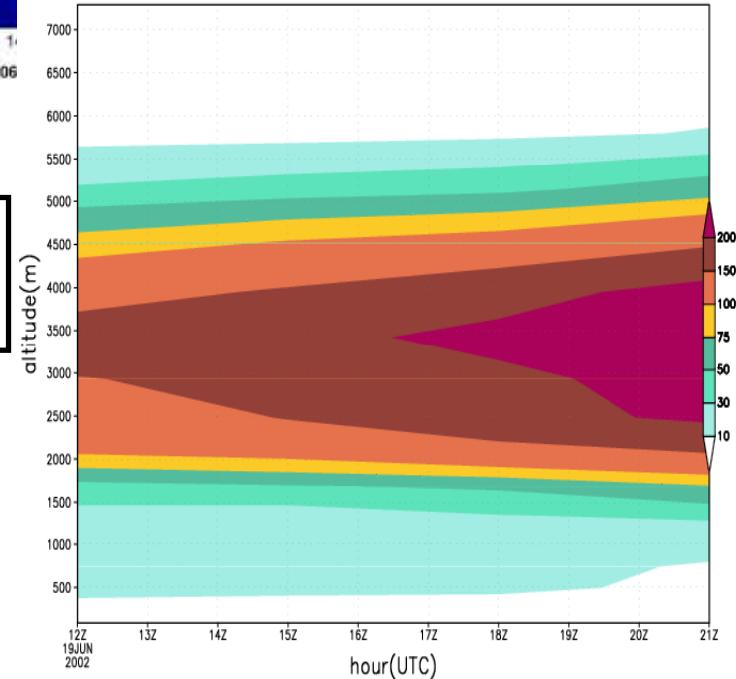
DUST CONC. ($\mu\text{g}/\text{m}^3$) 18 JUN 2002



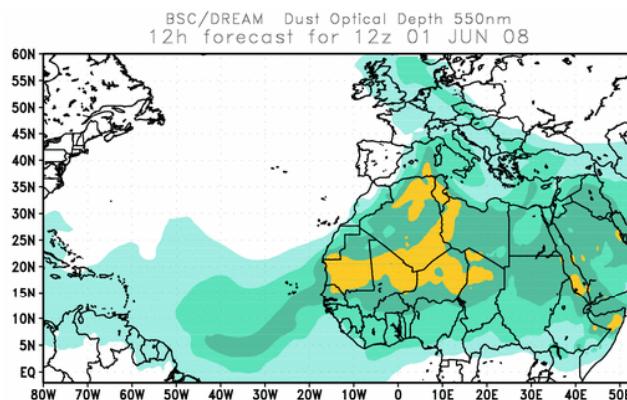
EARLINET: Lidar-UPC,
Barcelona



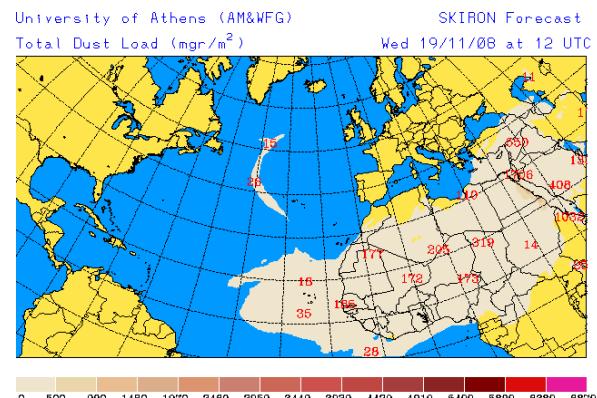
Validación vertical:
AIRLINET-DREAM



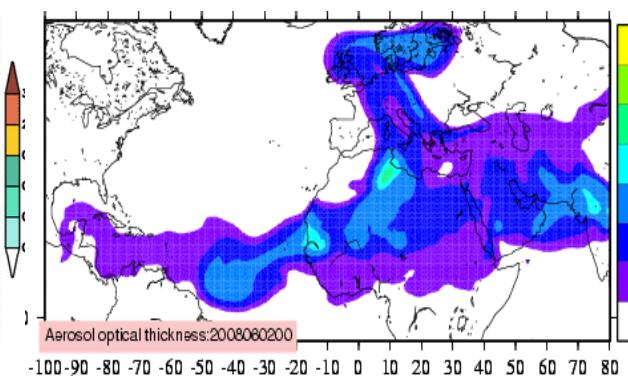
Implementación de modelos de diferentes instituciones



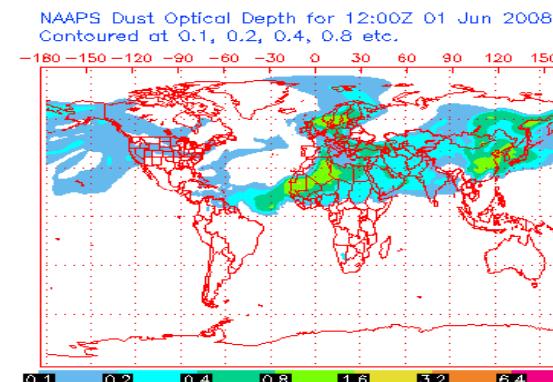
BSC-DREAM



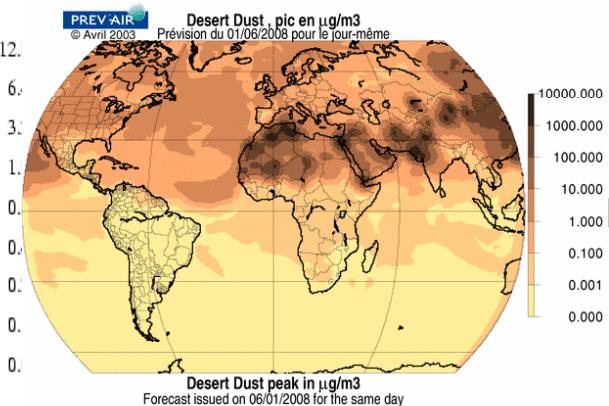
SKIRON



CHIMERE-dust



NAAPS

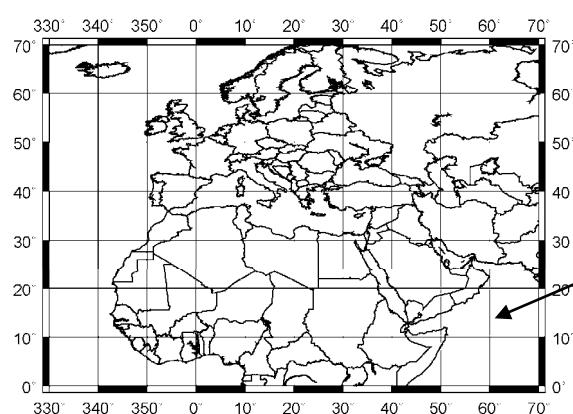
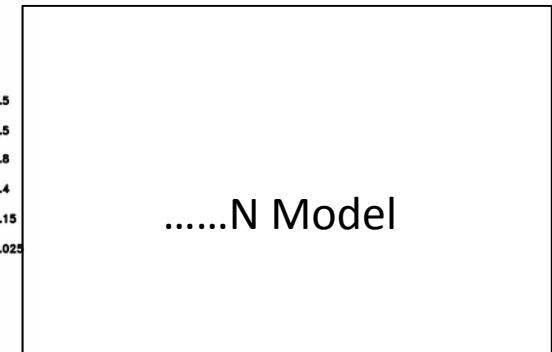
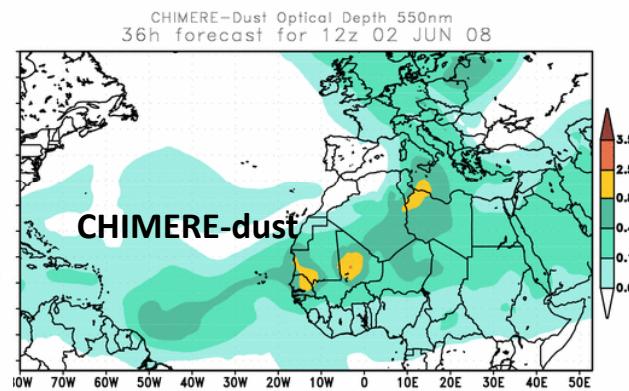
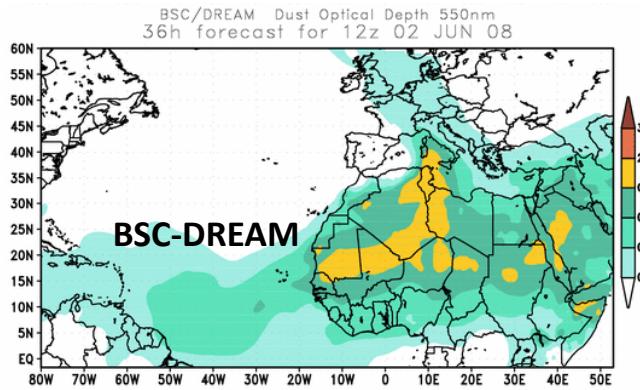


MOCAGE-dust

....N Model

Homogenización de resultados y de obtención de productos “ensemble”

...una web común de predicción de polvo atmosférico



Homogenization

- Data format (GRIB2)
- Products
- Forecasting range +72h, every 3h
- Geographical domain
- Lat/Lon
- Color palette
-

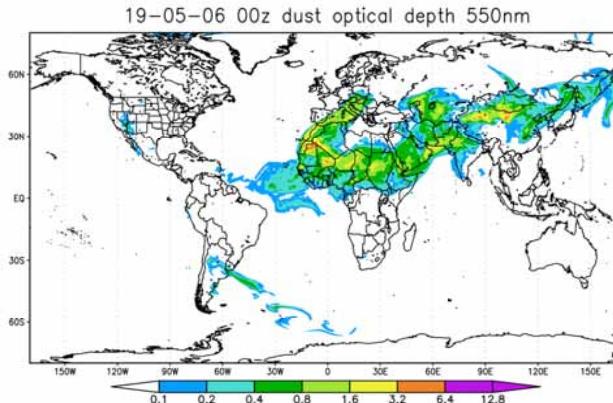
- Dust aerosol load (mg.m^{-2})
- Dust aerosol at the surface (mg.m^{-3})
- Dust aerosol at 500m (mg.m^{-3})
- Dust aerosol at 1000m (mg.m^{-3})
- Dust Aerosol optical depth at 550nm
- Dust Aerosol optical depth at 870nm
- Dust extinction coefficient at ground (km^{-1})
- Dust emission flux -the last 3h ($\text{mg.m}^{-2}.s^{-1}$)
- Dust dry deposition flux -the last 3h ($\text{mg.m}^{-2}.s^{-1}$)
- Dust wet deposition flux -last 3h ($\text{mg.m}^{-2}.s^{-1}$)

Nuevo modelo regional BSC/DREAM-8b

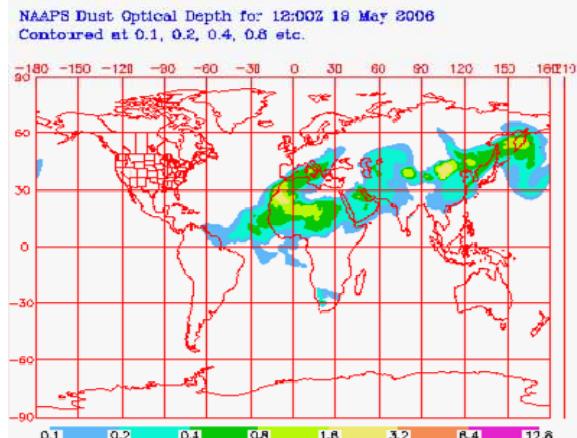
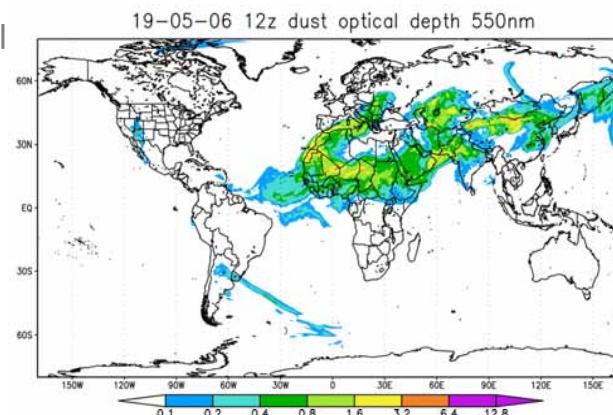
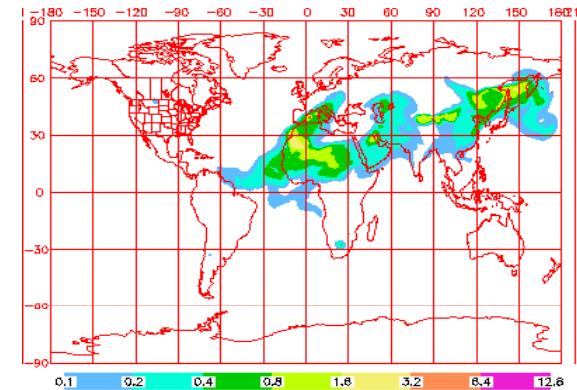
Online model

Horizontal resolution of about $1/3^\circ$
 Meteorological fields are initialized every 24h and boundary conditions updated every 6h with the NCEP/NCAR I global analysis ($1^\circ \times 1^\circ$).

- USGS 1km vegetation and FAO 4km soil texture data
- **8 particle size bin distribution**
 (between 0.1 and $10 \mu\text{m}$) → sub-bin log normal distribution (Zender et al., 2003; D'Almeida, 1987)
- Dry deposition (Georgi, 1986) and simple below cloud scavenging
- Horizontal and vertical advection, turbulent and lateral diffusion (Janjic, 1994) represented as for other scalars in the Eta/NCEP model
- Dust radiative feedbacks on meteorology (Pérez et al., 2006)



NAAPS Dust Optical Depth for 00:00Z 19 May 2006
 Contoured at 0.1, 0.2, 0.4, 0.8 etc.



Nuevo modelo global NMMb/BSC-DUST

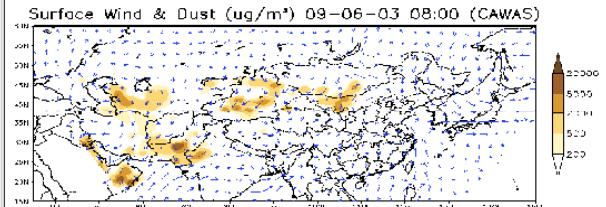
Coordinación técnica-científica con el nodo de Asia

SDS → HOME - Microsoft Internet Explorer
文件 转换 查看 收藏 工具 帮助
后退 前进 地址 http://www.sds.cma.gov.cn/
WMO Sand and Dust Storm Warning Advisory and Assessment System(WMO SDS-WAS)
ASIA/CENTRAL PACIFIC REGIONAL CENTRE
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SURFACE CITY DEPOSITION SATELLITE FLUX VERTICAL

Forecast Highlights More
SDS forecast results 2009-05-31-16

Surface Wind & Dust (ug/m³) 09-06-03 08:00 (CAWAS)



May 31, Blowing or Suspended dust in Kazakhstan, [Turbulence Detachment](#) [Turbulence Detachment](#) [Turbulence Detachment](#)

SDS Forecast OF [Beijing] (BST) More

MON/DAY	DAY	NIGHT
05/31	[red]	No SDS
06/01	No SDS	[red]
06/02	No SDS	[red]

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26th October 2009 08:14:46 AM

News Meeting Science Highlights

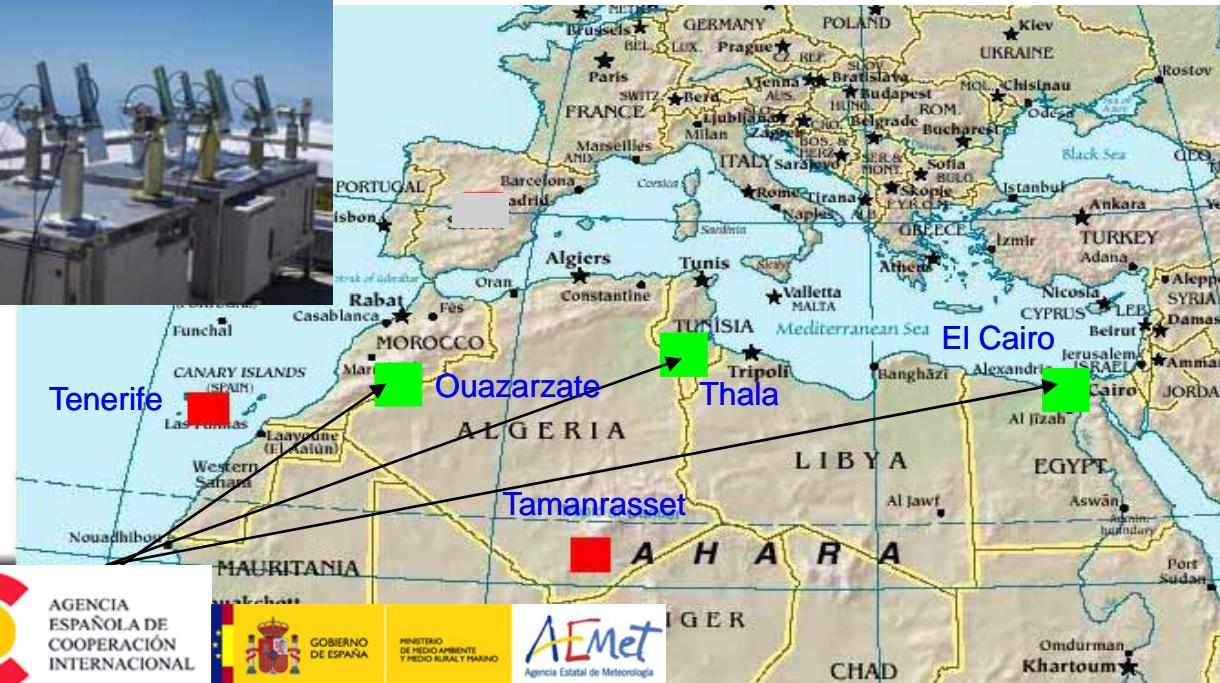
» Severe Solar Blast Affects China's Communication [2006/12/18]
» Three days of rain help ease drought in east China province. [2006/12/06]
» Beijing's water supply suffers worsening pollution [2006/12/06]

» Workshop on the Implementation of the WMO SDS-WAS Asia Node (28-30 October 2009, Seoul, Korea) [\[More\]](#)
» Korea-Sino Bilateral Cooperation Discussion
» 3rd International SDS and dustfall Symposium

» Reference not listed in above sections
» Iron oxides and light absorption by pure desert dust
» Deposition of Asian SDS
» Sources of Asian SDS
» SDS and its Emission Strength

开始 localhost / Adobe Reader WORK (D) SDS → HOME ... 未命名 - Internet 16:30

Creación de capacidad en África



Red AERONET en África

Egipto

Túnez

Argelia

Marruecos



Reunión con usuarios: MERIT y ACMAD (Niamey, Noviembre 2009)

Workshops de SDS: ESA (Barcelona, Septiembre 2009) y Meteosat (Madrid, Noviembre 2009)

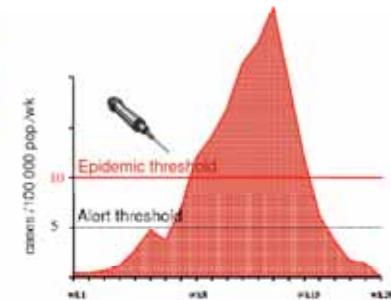
Curso formación sobre SDS para África: en preparación para finales de 2010

Proyectos

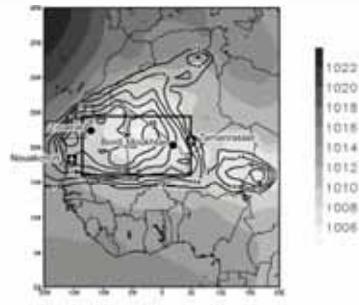


WMO SDS-WAS es un socio del Proyecto internacional de la OMS
Meningitis Environmental Risk Information Technologies
(MERIT)

CHALLENGE:
timely
vaccination to
optimize the
control of the
epidemics



SDS WAS RC participa en el Proyecto Europeo **Monitoring Atmospheric Composition and Climate (MACC)**



Soporte a campañas internacionales
SAMUM (Saharan Mineral Dust Experiment)



FENNEC (Universidades de Leeds, Oxford, Reading, Met Office)



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Y MEDIO RURAL Y MARINO

AEMet
Agencia Estatal de Meteorología



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Muchas gracias

Kuwait 16-06-2008

Cortesía de los Drs. Al-Maskari y Albadi, Oman Met. Service