

WMO Sand and Dust Storm Warning Advisory and Assessment System Regional Center for Northern Africa, Middle East and Europe



E. Terradellas¹, E. Cuevas¹ and J. M. Baldasano²

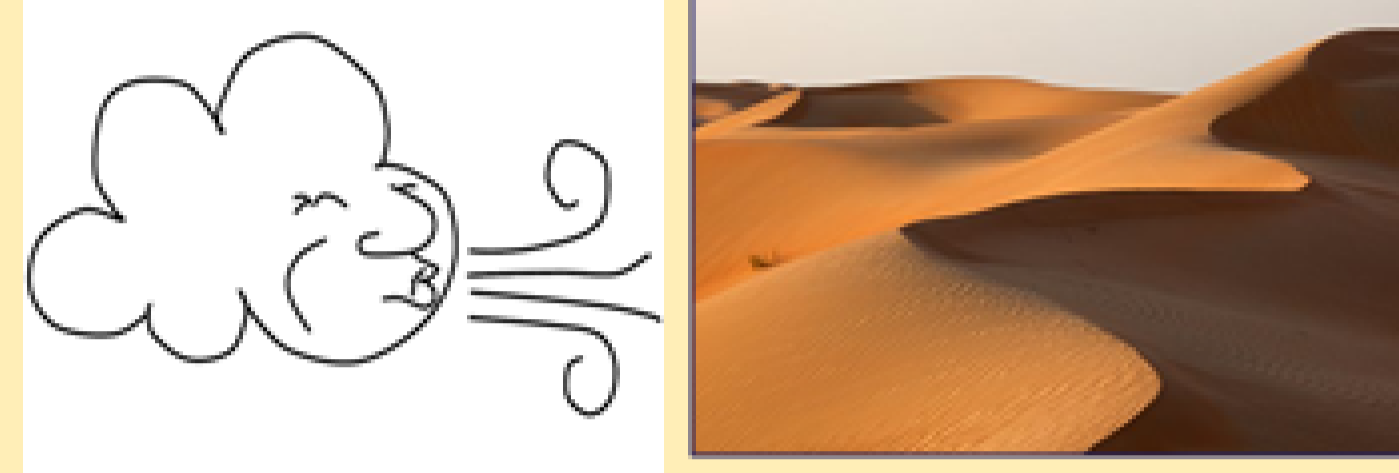
¹Spanish State Meteorological Agency (AEMET)

²Barcelona Supercomputing Center – National Supercomputing Center (BSC-CNS), Spain



Sand and dust storms

When winds are strong, large amounts of sand and dust are lifted from bare, dry soils into the atmosphere producing sand and dust storms. Then, dust particles are transported downwind affecting regions hundreds to thousands of kilometers away before settled down by the effect of gravity, clouds and precipitation.



For countries in and downwind of arid regions, airborne sand and dust presents serious risks to the environment, property and human health. Impacts on health include respiratory and cardio-vascular problems, eye infections and in some regions, diseases such as meningitis and valley fever. Dust can also transport nutrients to parts of the world oceans and positively affect marine biomass production. Other impacts include negative effects on the ground transport, aviation, agriculture and generation of solar energy. More and more, dust particles are considered by atmospheric researchers to have important effects on weather and climate through feedback on atmospheric dynamics, clouds and precipitation formation.



WMO SDS-WAS programme

WMO SDS-WAS Regional Center for Northern Africa, Middle East and Europe

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



Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) is a program of the World Meteorological Organization (WMO) with the mission to enhance the ability of countries to deliver timely and quality sand and dust storm forecasts, observations, information and knowledge to end users.

The Regional Center for Northern Africa, Middle East and Europe, hosted by the Spanish State Meteorological Agency (AEMET) and the Barcelona Supercomputing Center (BSC-CNS), supports a network of research and operational partners implementing the objectives of the SDS-WAS program in the region.

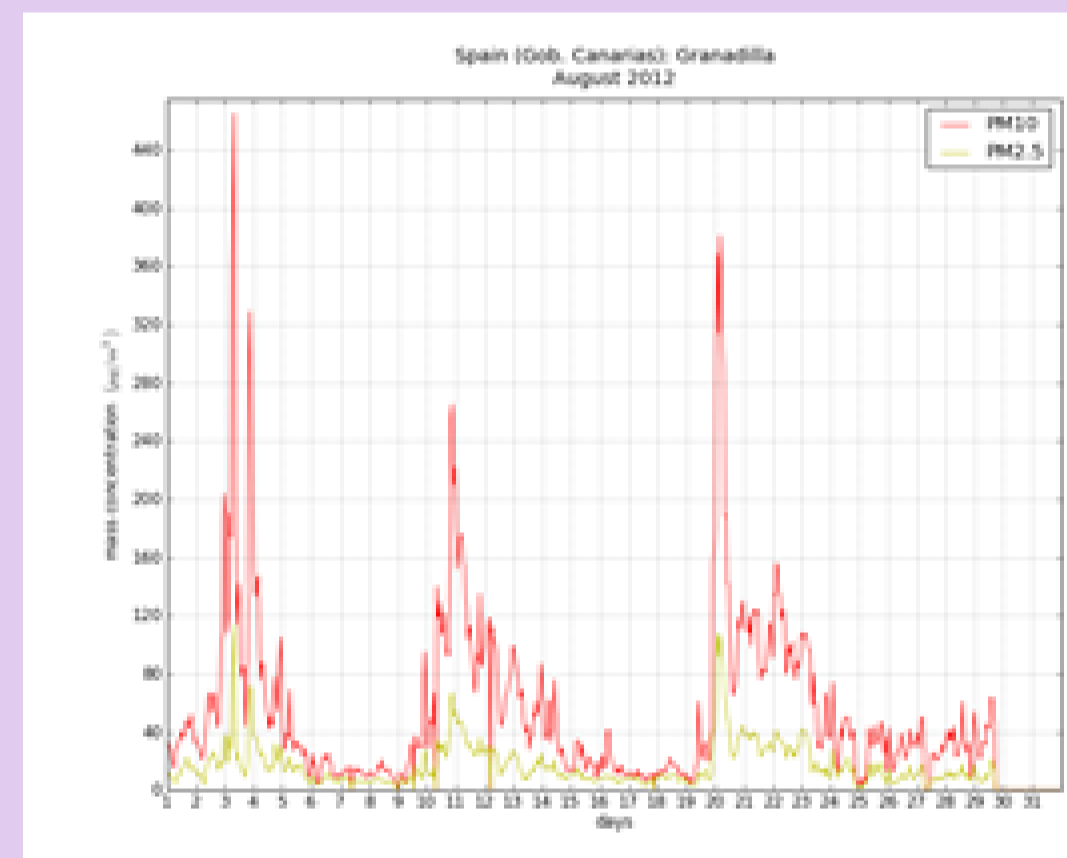
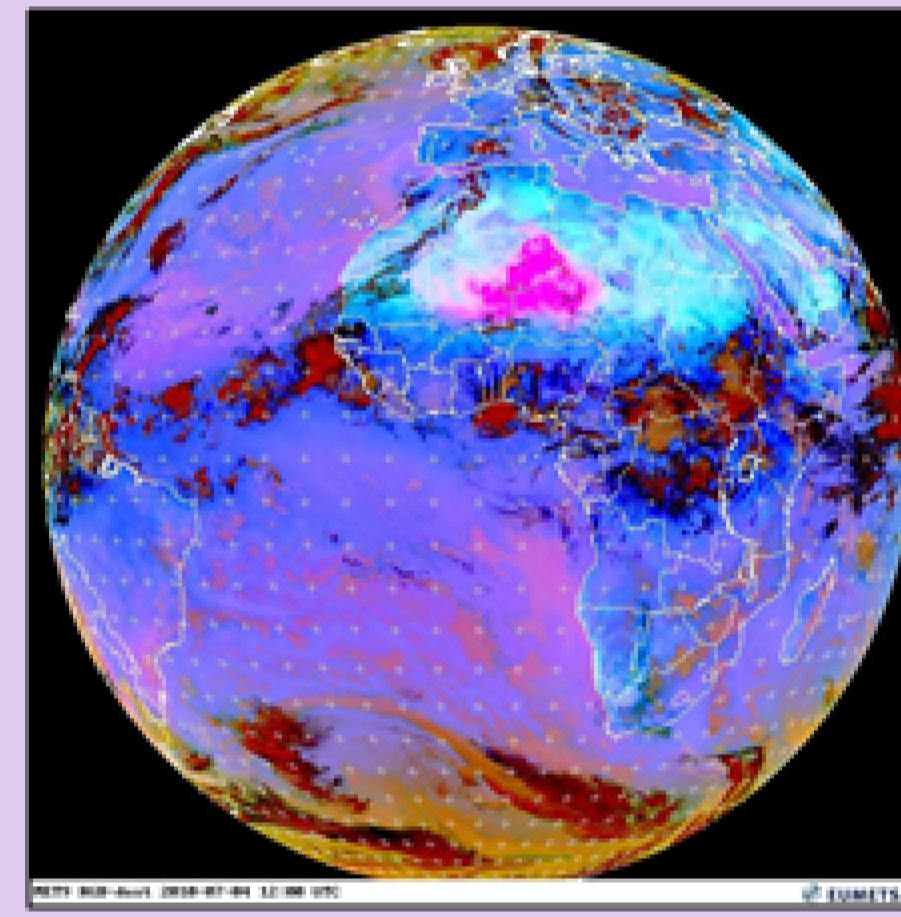


Access to observational data

The Regional Center web portal (<http://sds-was.aemet.es>) has been designed to allow the user access to observational and forecast products, as well as to sources of basic information.

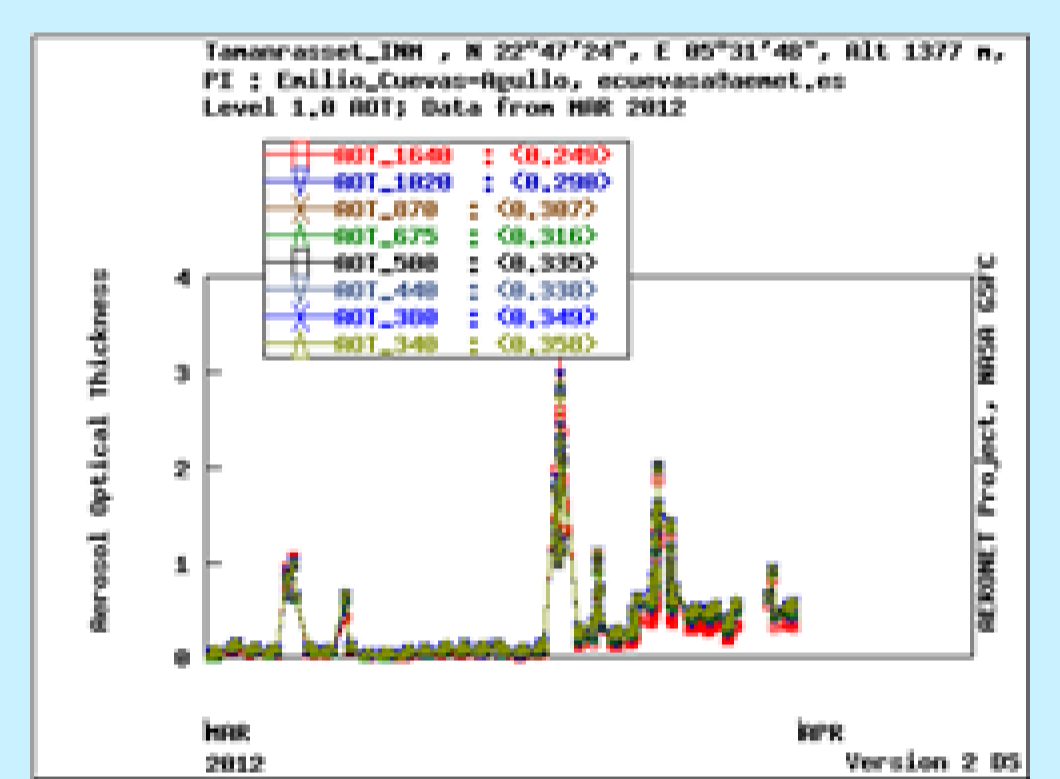
A global observational network is crucial to any forecast and early warning system for real-time monitoring, validation and evaluation of forecast products, as well as for data assimilation. The main data sources are:

- In-situ aerosol measurements performed on air quality monitoring stations
- Indirect observations (visibility and present weather) from meteorological stations
- Sun photometric measurements (e. g. AERONET network)
- Lidar and ceilometers
- Satellite products.



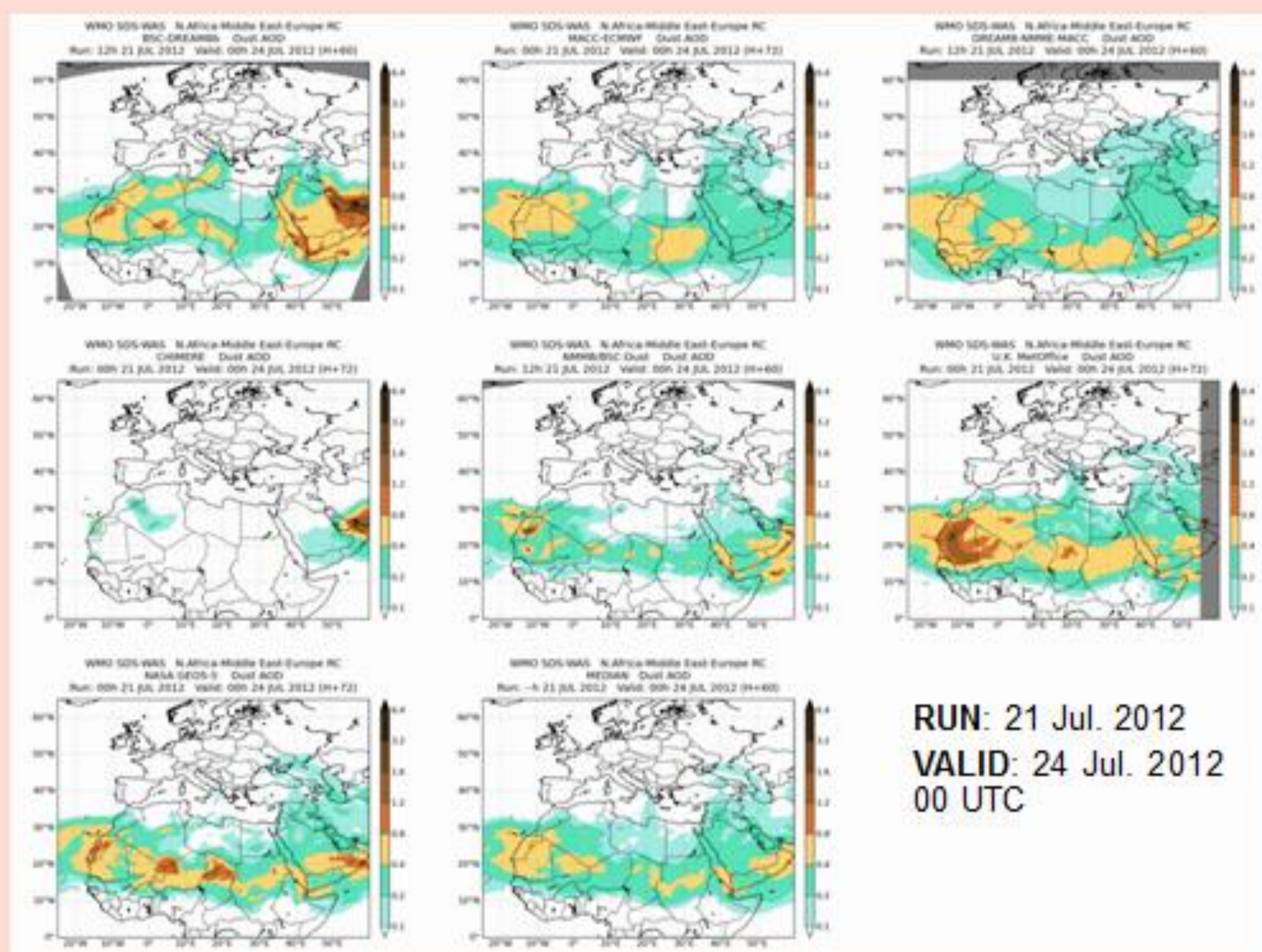
SDS Africa

In 2008, AEMET launched the project 'Sand and Dust Storm Early Warning System in the Magreb Region' (SDS-Africa) aimed to reinforce the observational capacity for mineral dust in Northern Africa. The main goal of the project, financed by the Spanish Agency for International Development Cooperation (AECID), was to establish a ground-based network of sun photometers in selected locations of Northern Africa for detecting and monitoring dust storms. They would also be useful for near-real-time satellite sensor validation and calibration, and for the evaluation of dust models.



Three instruments have already been set in the GAW station of Tamanrasset, Algeria, a strategic site in the heart of the Sahara, in Cairo, Egypt, a strategic place for the monitoring and study of dust transport from the Sahara to the Mediterranean, and in Ouarzazate, Morocco, on the Southeastern slopes of the Atlas range, and the edge of the Sahara desert. A fourth station is expected to be set in Tunisia.

Dust forecasts



The exchange of forecast model products is a core part of the WMO SDS-WAS programme and the basis for the joint visualization and evaluation initiative.

The web portal offers side-by-side dust forecasts (dust surface concentration and dust optical depth at 550 nm) issued by 7 modelling systems as well as the multi-model median. The models are:

- BSC-DREAM8b_v2
- MACC
- DREAM8-NMME-MACC
- NMMB/BSC-Dust
- MetUM
- GEOS-5
- NGAC

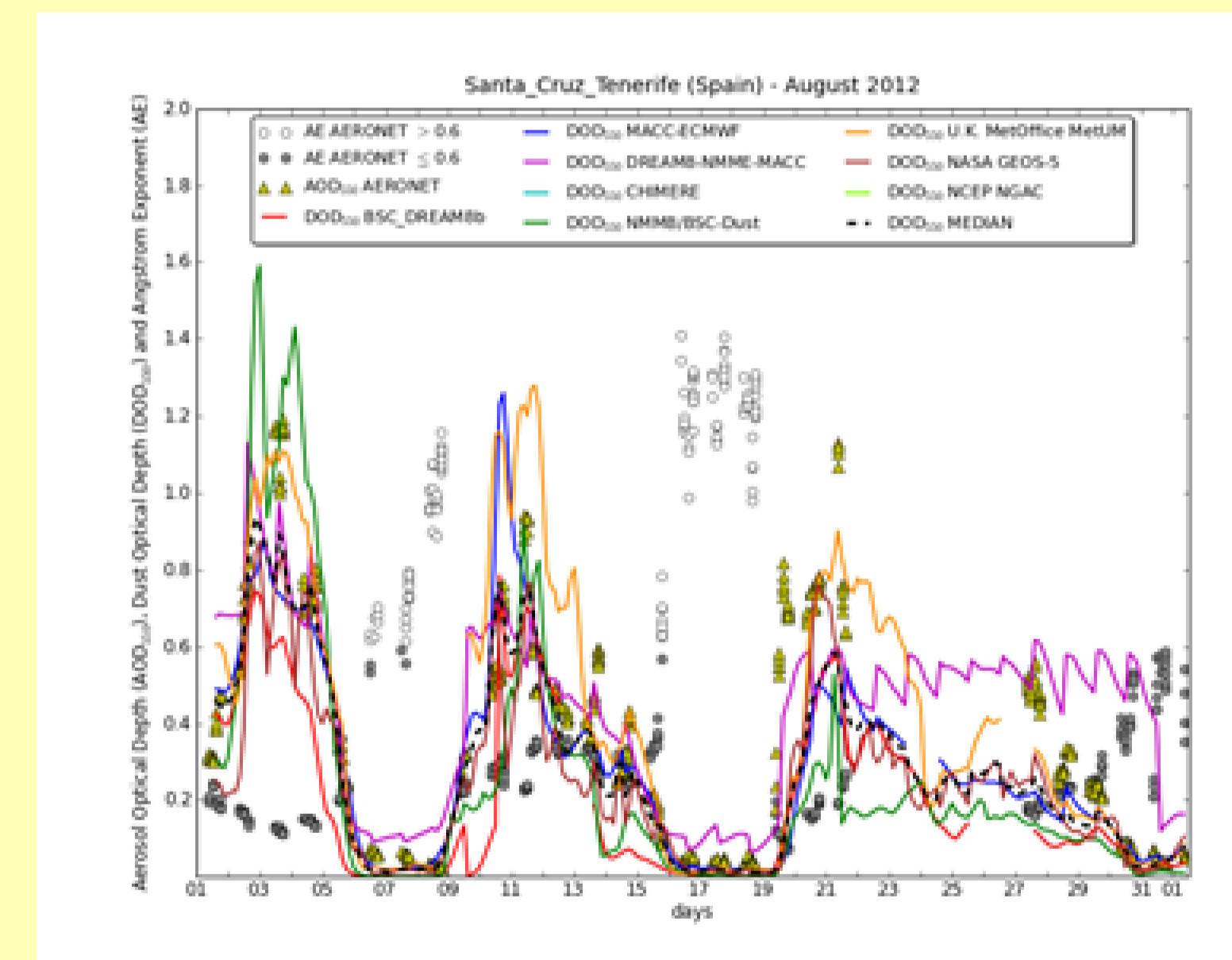
RUN: 21 Jul. 2012
VALID: 24 Jul. 2012
00 UTC

Forecast evaluation with AERONET data

An important stage of any forecasting system is the evaluation of the outgoing products. The main goal is to assess whether the modeling systems successfully simulate the evolution of dust-related magnitudes. Besides, it helps understanding the models capabilities, limitations, and appropriateness for the purpose, for which they were designed.

The evaluation is performed by comparing the models forecasts with observational data. The dust optical depth (DOD) at 550 nm forecast by the models and multi-model median is first drawn together with the AERONET observations of aerosol optical depth (AOD) in monthly plots for 40 selected dust-prone stations.

In addition to this nrt evaluation, a system to quantitatively assess the performance of the different models has been set. It yields evaluation scores computed from the comparison of the simulated DOD and the AERONET retrievals of AOD.



Capacity building

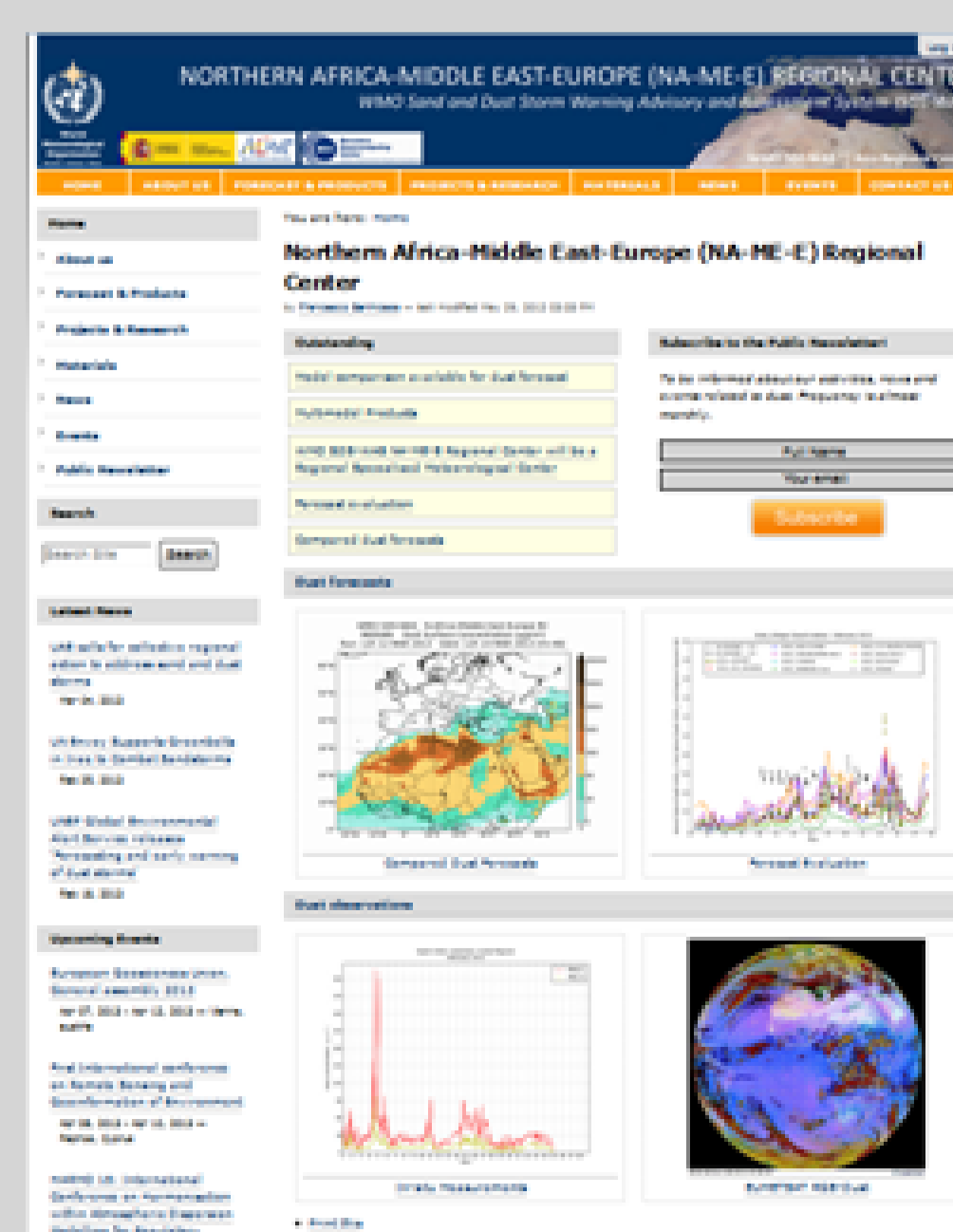
The Regional Center coordinates with partners and NMHSs in the region different actions aimed to strengthen the capacity of countries to use the observational and forecast products distributed in the framework of the WMO SDS-WAS programme.

- Training Week on Satellite meteorology, Barcelona, Spain, 7-12 Nov.2010
- Lectures on Atmospheric Mineral Dust and its Impact on Human Health, Environment and Economy, Barcelona, Spain, 13 Nov 2010
- Training Week on WMO SDS-WAS products, Barcelona, Spain, 15-19 Nov 2010
- Meteorological Services, Sand and Dust Storm (SDS), Forecasting and Early Warning System, Istanbul, Turkey, 22-26 Nov 2011
- 2nd. Training Course on WMO SDS-WAS products, Antalya, Turkey, 21-25 Nov 2011
- Cours sur l'Utilisation des Produits Satellitaires aux Applications Agrometeorologiques, Niamey, Niger, 19-23 Nov 2012
- Workshop on Meteorology, Sand and Dust Storm (SDS), Combating Desertification and Erosion, Ankara, Turkey, 26-28 Nov 2012
- II Lectures on Atmospheric Mineral Dust, Barcelona, Spain, 5-9 Nov 2012

Our partners:



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

Full Name

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The home page of the web portal has been designed to facilitate access to the most outstanding content, and to latest news and to information on upcoming events. Furthermore, a Newsletter service has been created to periodically release information on ongoing actions and latest news.



SERVICE TO DOWNLOAD NUMERICAL FORECASTS FROM DUST PREDICTION MODELS

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

CONTACT: sdswas@aemet.es