

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

E. Terradellas (1), E. Cuevas (1) and J. M. Baldasano (2)

(1) State Meteorological agency (AEMET), Spain

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

The 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 node of research and operational partners implementing the objectives of the SDS-WAS program in the region. 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.

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 and satellite products. In 2008, AEMET launched the project 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.

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 seven (7) modelling systems as well as the multi-model median. The dust models are BSC-DREAM8b_v2, MACC-ECMWF, DREAM8-NMME-MACC, NMMB/BSC-Dust, MetUM, GEOS-5 and NGAC. An important stage of any forecasting system is the evaluation of the outcoming 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 with the AERONET retrievals of AOD.

Finally, the Regional Center coordinates with partners and National Meteorological and Hydrological Services 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.