

WMO Regional Node of Sand & Dust Storm Warning, Advisory and Assessment System for GCC

المركز الإقليمي للتحذير من العواصف الغبارية والرمليّة
Sand and Dust Storm Warning Regional Center



المركز الوطني للأرصاد
National Center for Meteorology



Objectives:

To be informed on the progress and the plans
for Regional SDS-WAS Node for the GCC





Regional Node

1

2

Regional
SDS-WAS Center for
GCC countries

WMO RSMC-ASDF
Center

GCC Regional Steering Committee

Supporters



وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture





Mission

The mission is to enhance the ability to deliver timely and quality sand and dust storm forecasts, observations, information and knowledge to users through an organized regional center and an international partnership of research and operational communities





Goals

The SDS-WAS, will have a leading role in national and international framework, providing services and linking institutions involved in SDS research, operations and delivery of services, will address the following objectives :

Share data and information

Advance SDS-WAS products

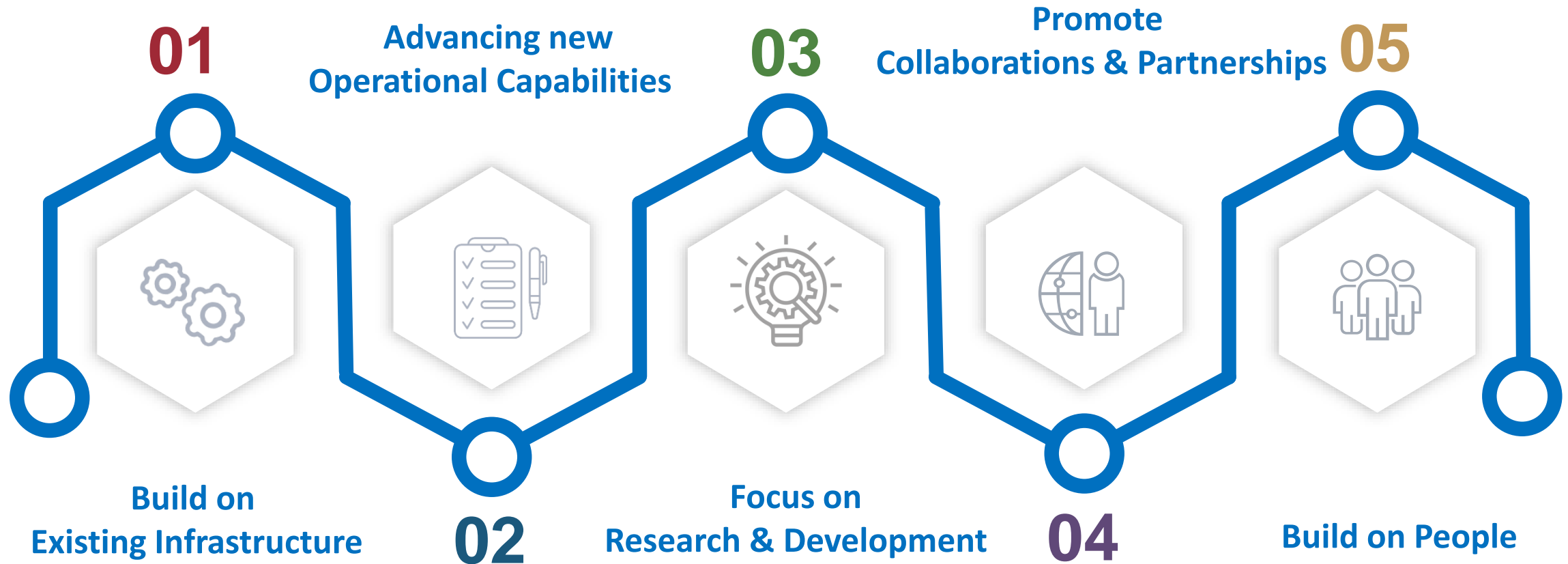
Enhance operational SDS-WAS forecasts

Improve forecasting and observation technology

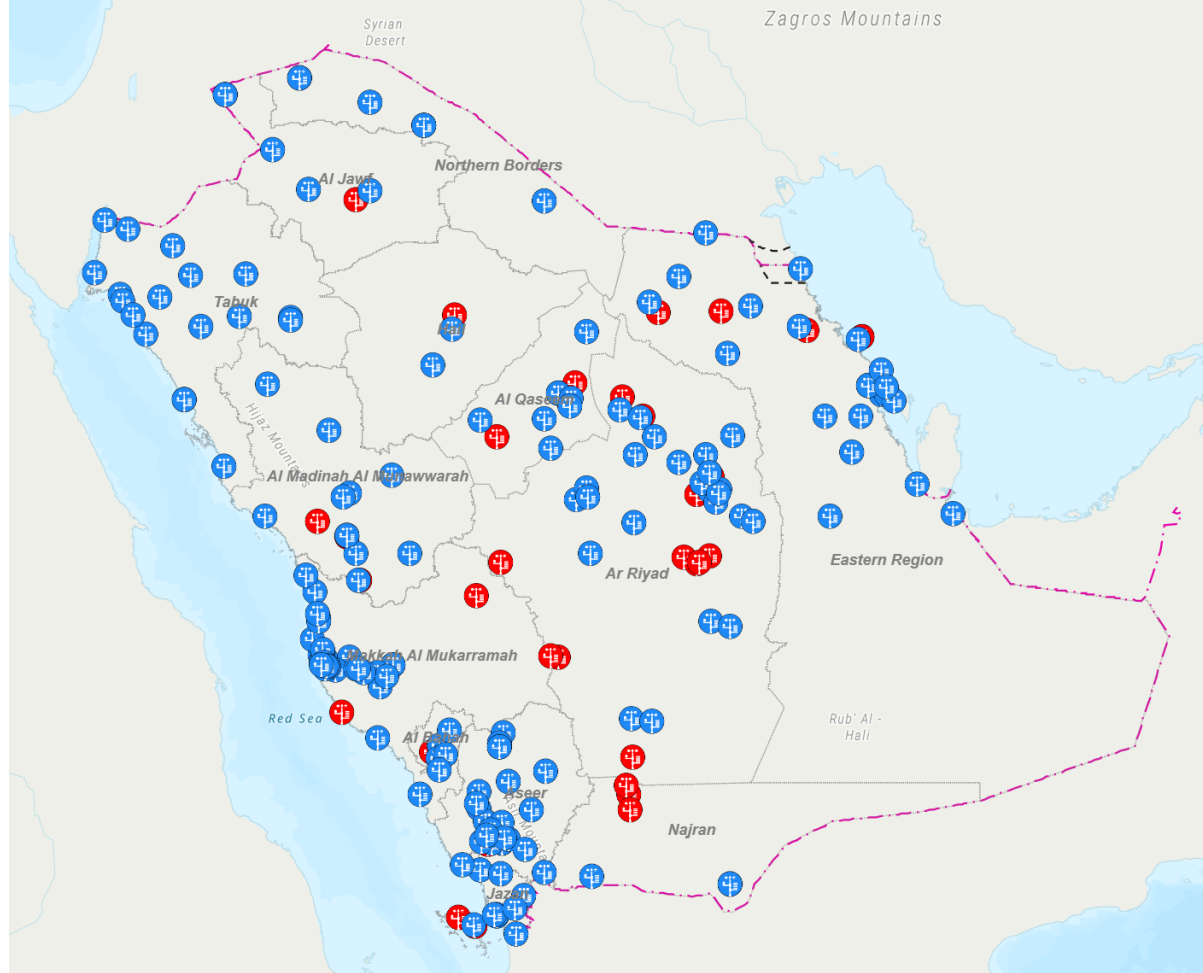
Build capacity of relevant countries

Pursue Collaborations and Partnerships





01 Observing capabilities



173+36 Automated SFC Stations

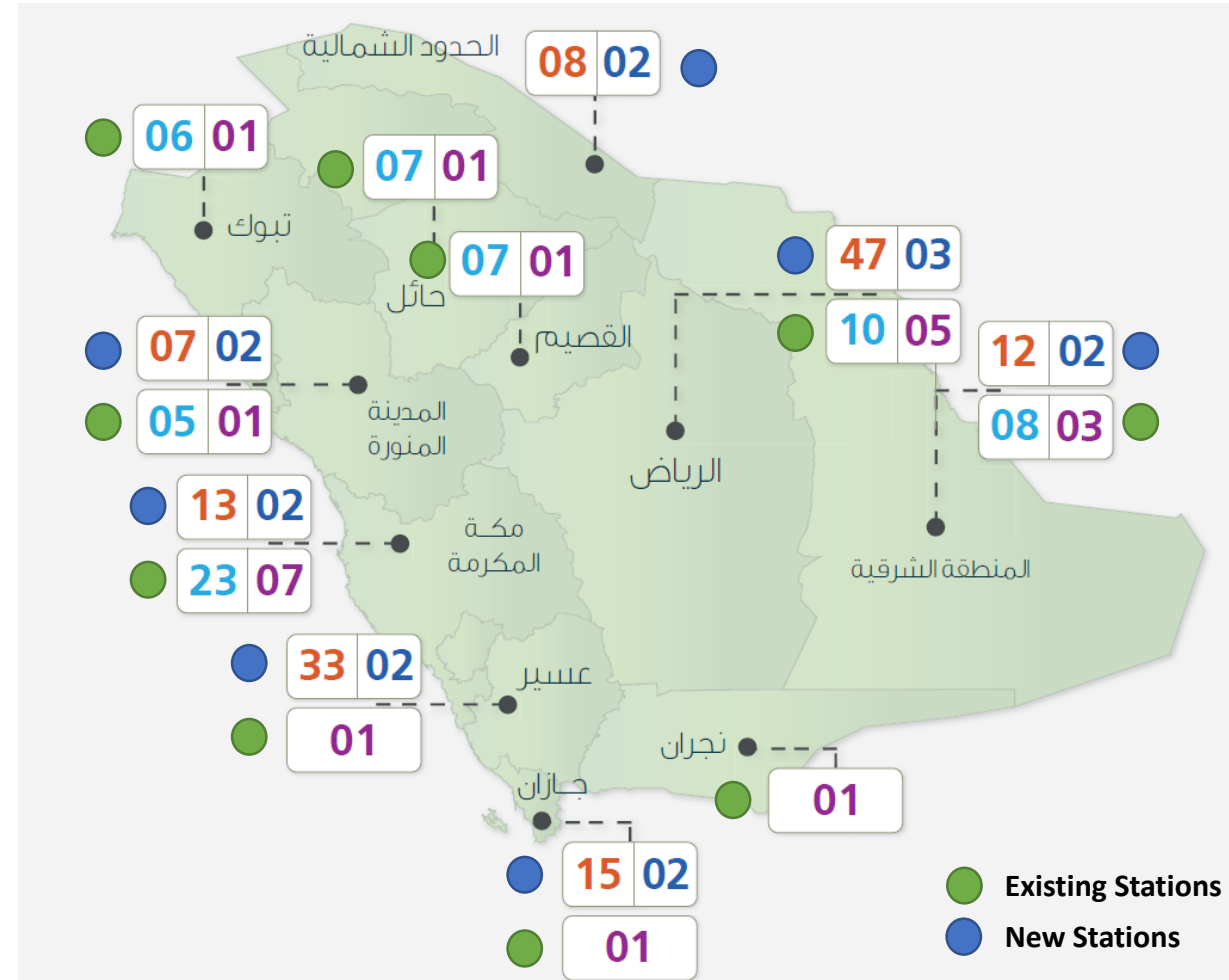


32 Manned SFC Stations



National Center of Environmental Compliance

Ambient Air Quality Monitoring



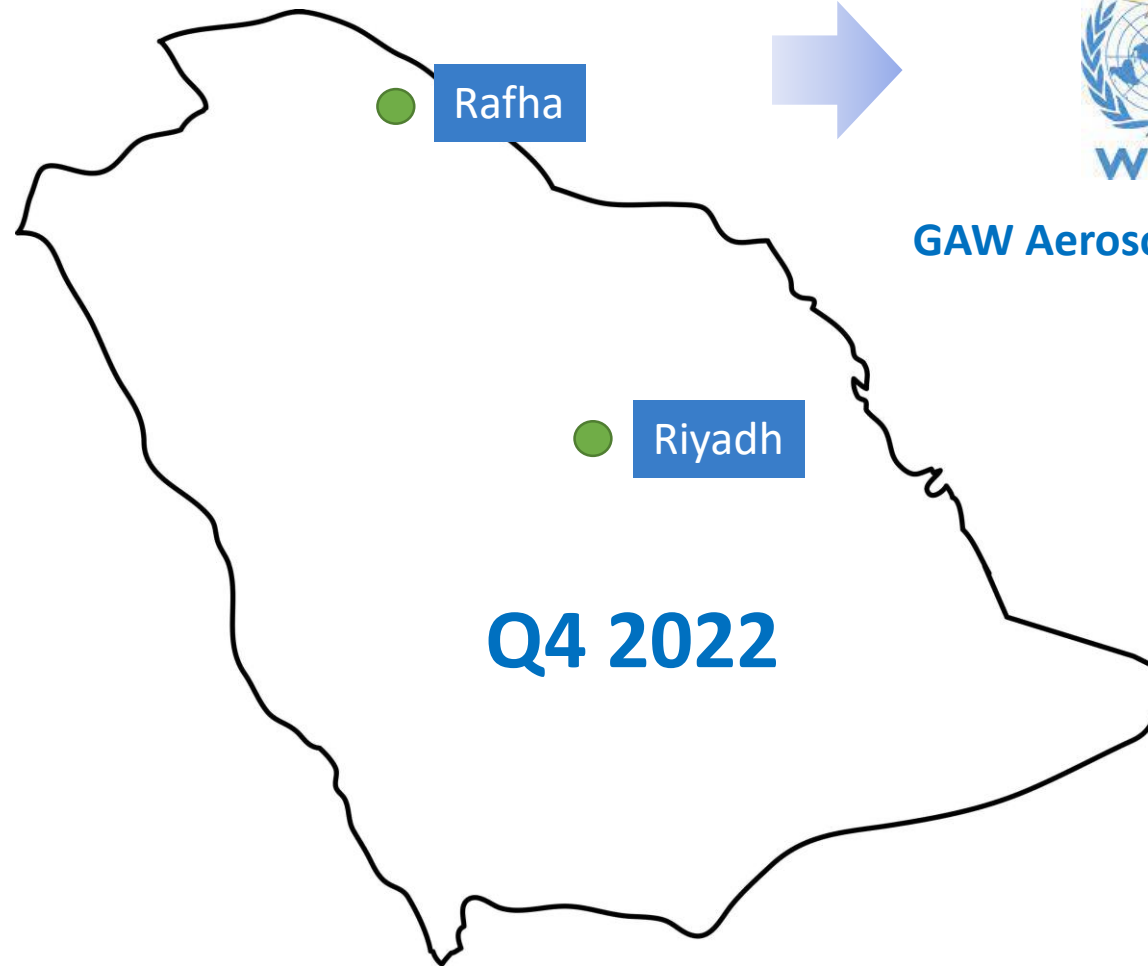
01 New Aerosol monitoring capabilities



2 x AERONET systems (Installed)



2xLiDAR systems



GAW

GAW Aerosol Lidar Observing Network
(GALION)

01 High Performance Computing

35200 cores

Intel Xeon Ice lake 8358 32C 2.6Ghz processor

200 Gpbs

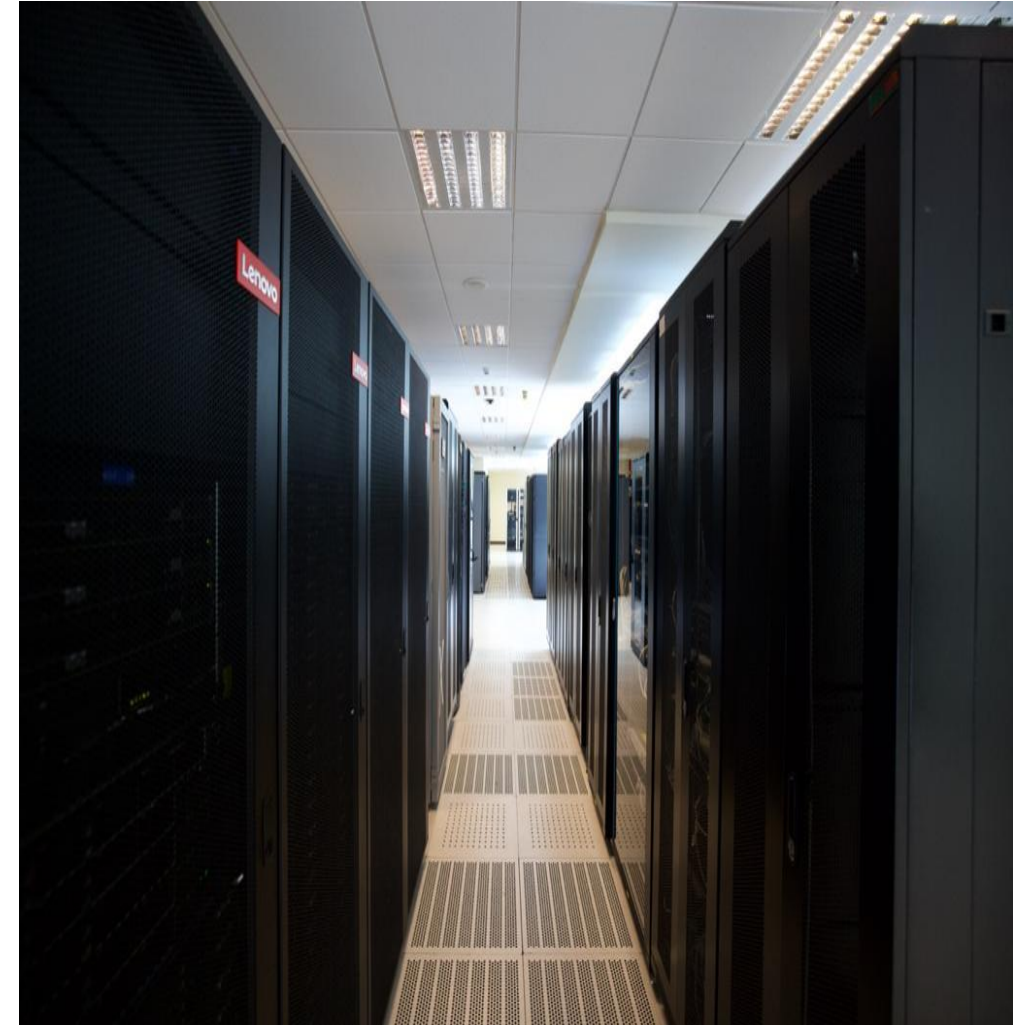
NVIDIA HDR100

1.6 PFlops

Cluster Performance

4.8 PBytes

Spectrum Scale



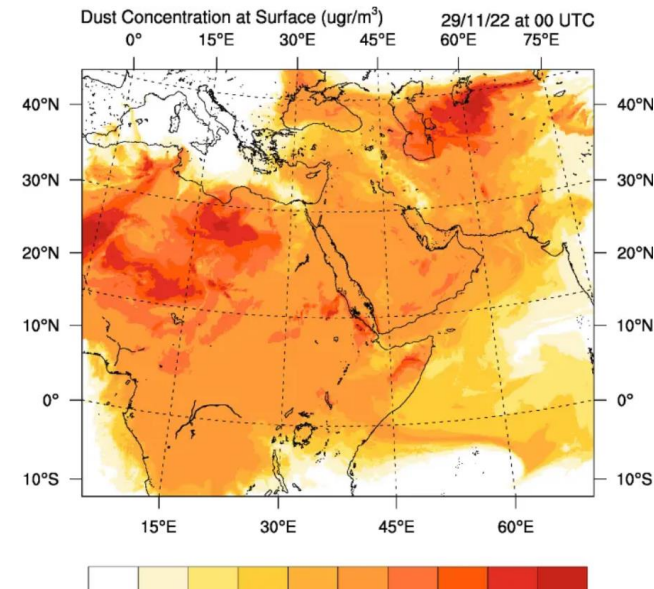


DUST FORECAST CHARTS

Latest dust forecast for GCC Countries and Middle East Region

Dust forecast charts are derived from Numerical Weather Prediction (NWP) simulations of Regional and Global Atmospheric Models using advanced numerical algorithm and complex parametrization of atmospheric processes. They represent the predicted dust properties such as surface concentration, optical depth or other atmospheric parameters over the period of forecast. Forecast maps from regional models cover a limited area or region of interest but in a higher spatial and temporal resolution in comparison with the forecast maps produced by global models covering the entire globe.

EXPLORE MORE



Interim

URL Link: dust.ncm.gov.sa

- Dust NWP Products
- Interactive
- Verification & Validation
- Observations (SFC/Satellite)
- Research Activities & Reports

Production (Q2 2023)



New Activities

WRF-Chem:

- Employ a new scheme with better characteristics (eg. wet deposition).
- Output more dust-related outputs (eg. Dry & wet deposition, visibility etc).
- Fine tune the new scheme. - **in progress**
- Set up a new domain with higher resolution over the region according to the needs of the center and the resources available. - **in progress**

RAMS/ICLAMS:

- Employ a new model version with updated IO.
- Output more dust-related products (eg. Dry & wet deposition, visibility etc).
- Set up and fine tune the model for a new domain over the region according to the needs of the center and the resources available. - **in progress**

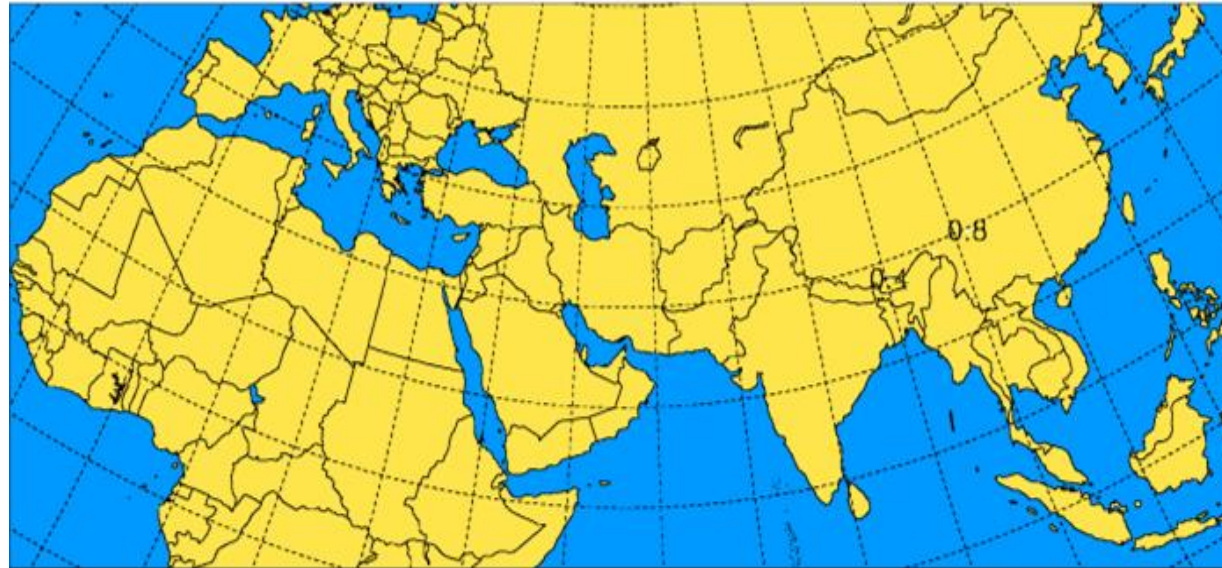




New Activities

SKIRON/Dust:

The main aim is to describe the Dust Climate on trans-continental scales – covering three continents. **Covers the “dust belt”**



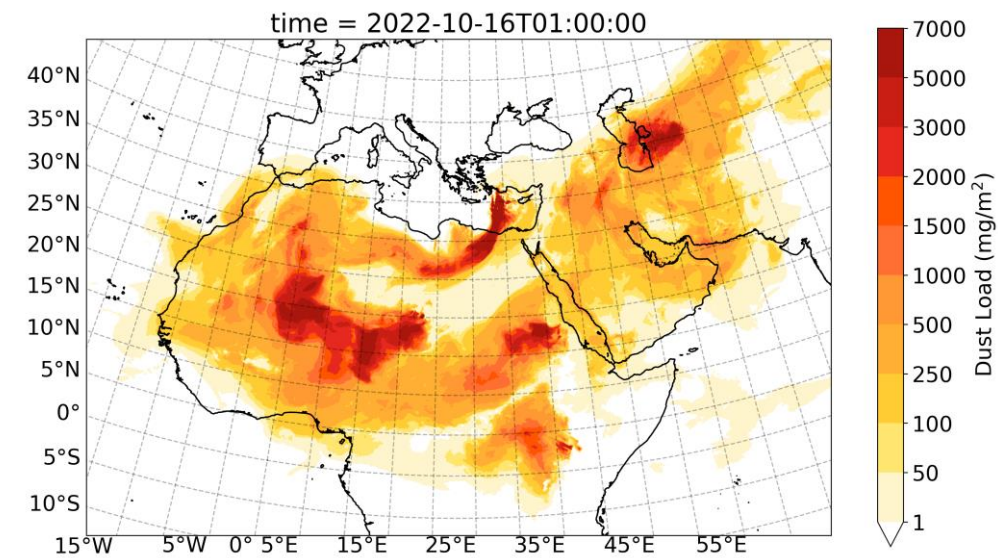
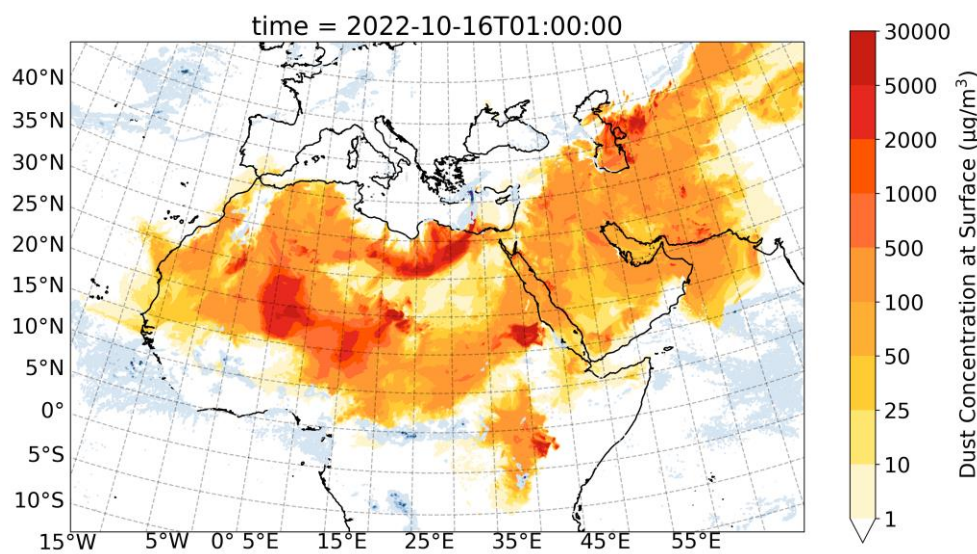
- Porting to HPC: **completed**
- Select the most appropriate resolution: **in progress**
- Sensitivity tests: **in progress**
- Fine tuning: **in progress**





New Activities

30-years Atmospheric & Dust Climatology with WRF-Chem





600

Automated Weather Stations



Smart Sensor

- temperature,
- relative humidity,
- air pressure,
- wind direction,
- wind speed,
- radiation



Visibility Sensor





Research

Research Activities Objectives:

- Gain better understanding on the nature of SDS in the GCC region
- Assess the risks and impacts of SDS
- Develop user-oriented services and products
- Promote collaboration & partnerships

2022-2024 Research Plan

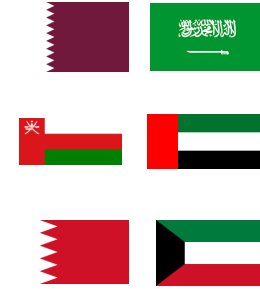
7 research projects



Collaboration

Regional Steering Group

- Formation of RSG consisting of representatives of the meteorological centers in GCC, the World Meteorological Organization, and international word centers
- Organization of four meetings of the committee



MoU with KAUST

- Signing a Memorandum of Understanding between the NCM and King Abdullah University of Science and Technology and King Abdulaziz University on SDS-WAS common topics



Options for New Partnerships

- Pursue opportunities for collaboration and partnerships as part of Regional SDS-WAS GCC Center research activities





International Workshop on Sand and Dust Storms in Arabian Peninsula

Jeddah, June 01-02, 2022





Cooperation & Knowledge Transfer

Key Actions

- Cooperation with end-users to fit for purpose dust products
- Implementing Training courses
- Conferences and workshops
- Scientific exchange with centers of excellence specialized in this field
- Specialty training and seminars



Research

Research Projects:

1. Enhancing WRF-Chem performance on Sand and Dust Storms
2. Aerosol and Dust characterization of the GCC region
3. Mineralogical and Chemical Speciation of Dust Source in the GCC Region
4. Sand and Dust Storm Climatology for the GCC Region



5. Sand and Dust Storm risk assessment
6. Sand and Dust Storm source and impact mitigation



7. Advance Sand and Dust Storm Web-Based Visualization



Thanks
