

# Some useful tools for analysis of SDS

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**Research Department**

**25-27 October 2017, Istanbul**



IPCC accepts mineral dust as a very important component of atmospheric aerosols, one of the main climate variables.

According to the IPCC's latest climate predictions, it is expected that **sand and dust storms will be more intense** as the frequency and severity of the drought has increased.



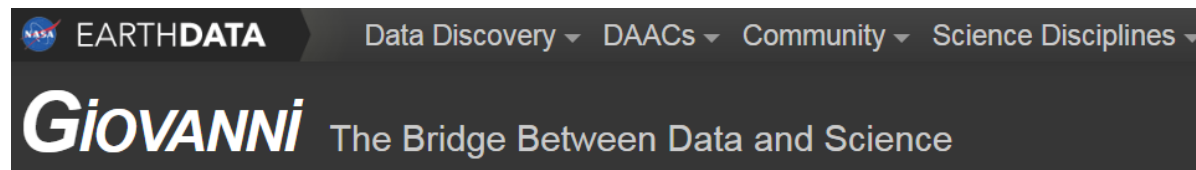
## **EOSDIS Worldview – NASA**

<https://worldview.earthdata.nasa.gov/>



## **NASA Giovanni**

<https://giovanni.gsfc.nasa.gov/giovanni/>



## **HYSPLIT-WEB (Internet-based)**

<http://ready.arl.noaa.gov/HYSPLIT.php/>



## **ESRL : PSD : Monthly/Seasonal Composites - NOAA Earth System**

<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>



## The dust storm in Nusaybin affected life negatively, 19.05.2017

The dust cloud coming from Syria and affecting the Nusaybin district of Mardin affected the life negatively because the falling rain turned into mud.





<https://worldview.earthdata.nasa.gov>

**NASA WORLDVIEW**

Layers Events Data

**OVERLAYS**

- Place Labels  
OpenStreetMap (license), Natural Earth
- Coastlines / Borders / Roads  
OpenStreetMap (license), Natural Earth
- Coastlines  
OpenStreetMap (license)

**BASE LAYERS**

- Corrected Reflectance (True Color)  
Suomi NPP / VIIRS
- Corrected Reflectance (True Color)  
Aqua / MODIS
- Corrected Reflectance (True Color)  
Terra / MODIS

+ Add Layers

2017 MAY 18

JUN 2017 JUL 2017 AUG 2017

200 km  
100 mi

DAYS MONTHS YEARS

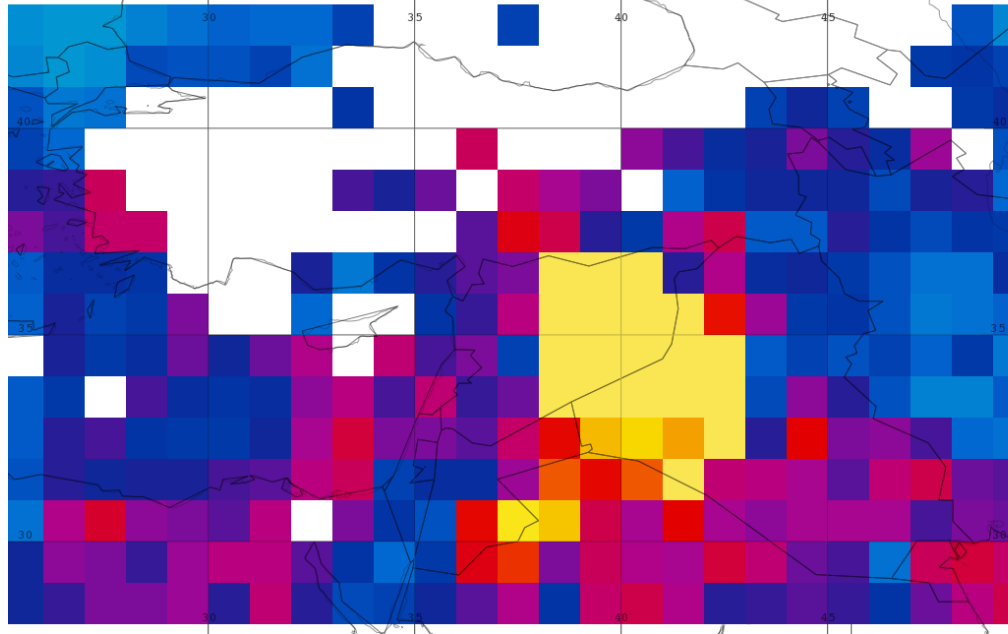


<https://worldview.earthdata.nasa.gov>

The screenshot displays the NASA Worldview interface. The main view is a satellite image of the Earth, showing the Middle East and surrounding regions. The interface includes a left sidebar with a 'Layers' panel containing 'OVERLAYS' (Place Labels, Coastlines / Borders / Roads, Coastlines) and 'BASE LAYERS' (Corrected Reflectance from Suomi NPP / VIIRS, Aqua / MODIS, Terra / MODIS). A '+ Add Layers' button is at the bottom of the sidebar. The top right has navigation icons (share, globe, camera, info). The bottom left shows the date '2017 MAY 19' and navigation arrows. The bottom right shows a timeline with 'JUN 2017', 'JUL 2017', and 'AUG 2017' markers, and a 'DAYS MONTHS YEARS' selector. A scale bar (200 km, 100 mi) and coordinates (44.1702°, 18.3546° EPSG:4326) are visible in the bottom right corner.

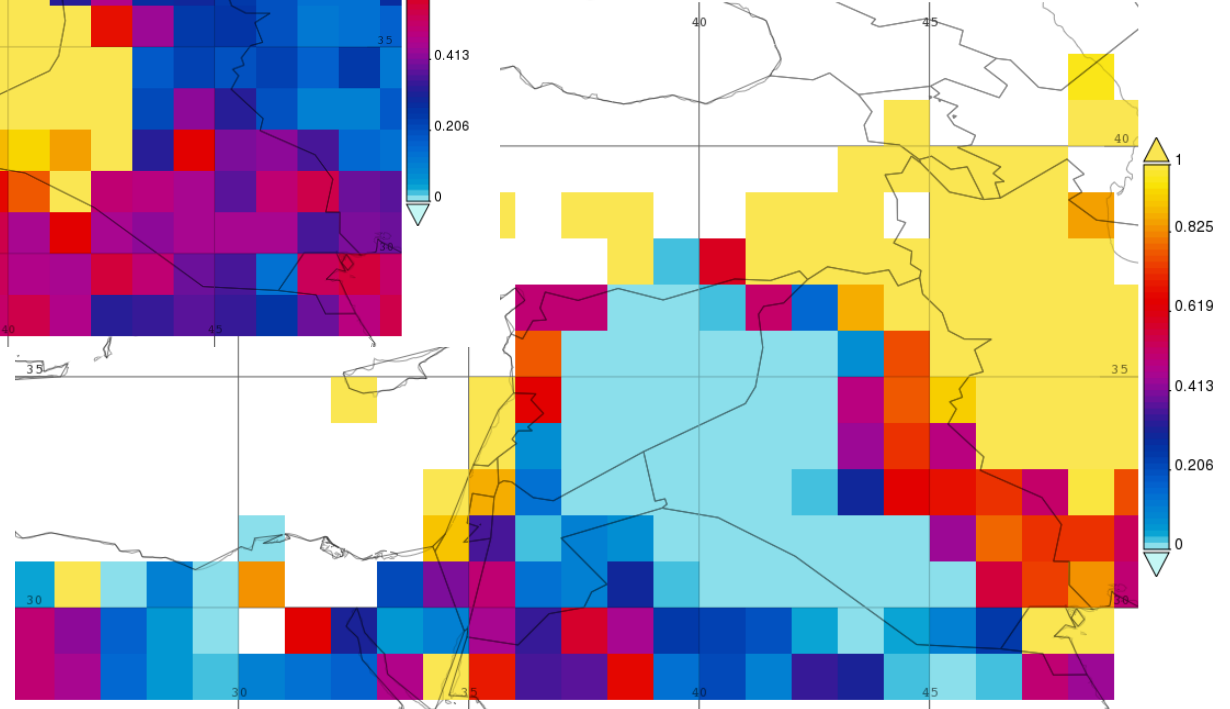
<https://giovanni.gsfc.nasa.gov/giovanni>

Time Averaged Map of Combined Dark Target and Deep Blue AOD at 0.55 micron for land and ocean: Mean daily 1 deg. [MODIS-Aqua MYD08\_D3 v6]  
over 2017-05-18 - 2017-05-19, Region 25.1579E, 27.7482N, 49.5036E, 43.1291N



**AOD - Aqua**

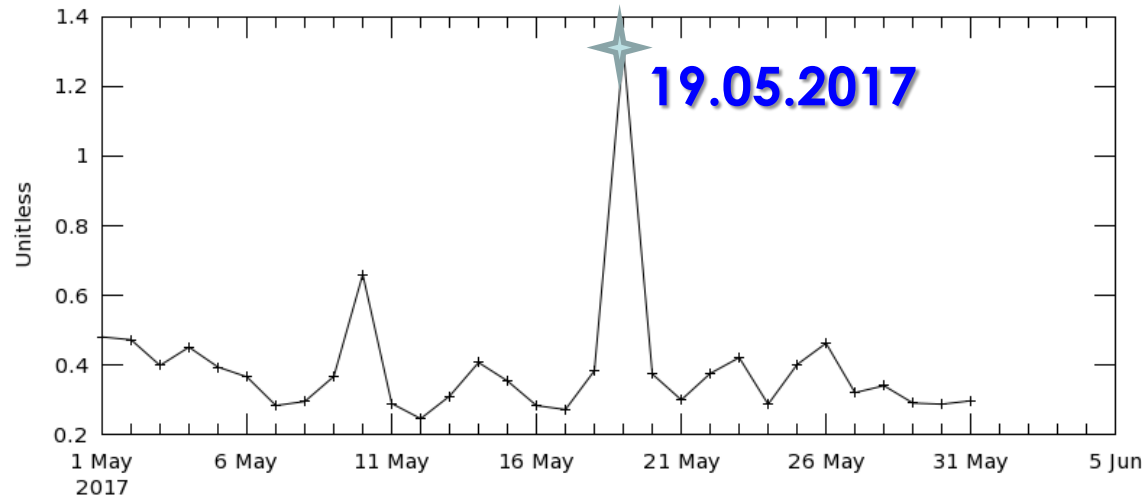
for land (0.412-0.47 micron): Mean of Daily Mean daily 1 deg. [MODIS-Aqua MYD08\_D3 v6]  
7-05-19, Region 25.1579E, 27.7482N, 49.5036E, 43.1291N



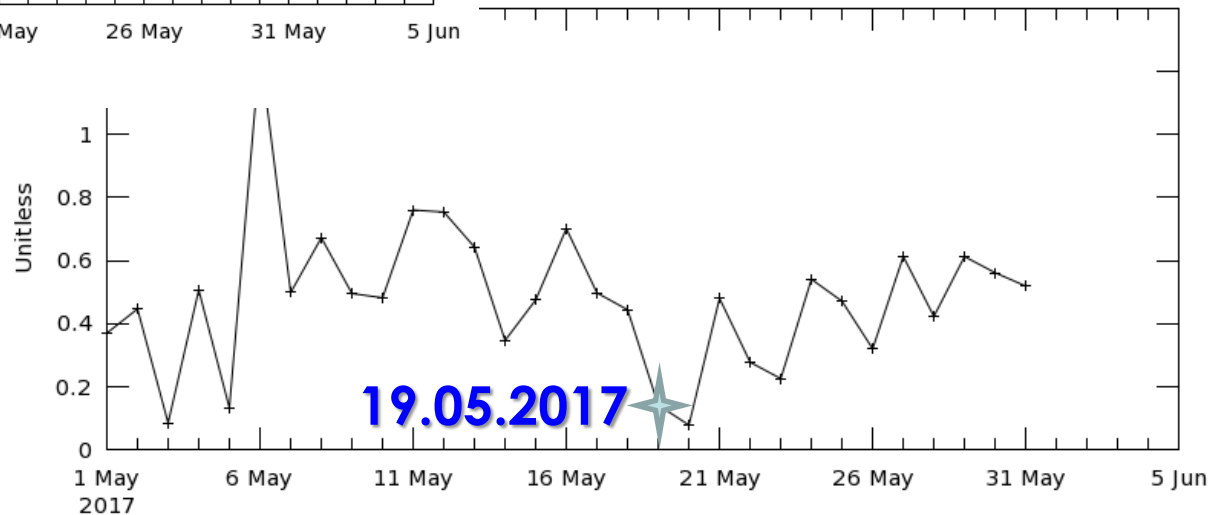
**AE - Aqua**

<https://giovanni.gsfc.nasa.gov/giovanni>

Time Series, Area-Averaged of Combined Dark Target and Deep Blue AOD at 0.55 micron for land and ocean: Mean daily 1 deg. [MODIS-Aqua MYD08\_D3 v6] over 2017-05-01 - 2017-05-31, Region 35.4832E, 34.4677N, 41.8333E, 37.5659N



Time Series, Area-Averaged of Deep Blue Angstrom Exponent for land (0.412-0.47) Mean daily 1 deg. [MODIS-Aqua MYD08\_D3 v6] over 2017-05-01 - 2017-05-31, Region 35.4832E, 34.4677N, 41.8333E, 37.5659N





# HYSPLIT-WEB (Internet-based)

<http://ready.arl.noaa.gov/HYSPLIT.php>

You can use HYSPLIT model for the detection of SDS source area.

ready.arl.noaa.gov/HYSPLIT.php

## ARL

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    - [Get/Run HYSPLIT >>](#)
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    - HYSPLIT Forum
    - HYSPLIT Workshop
    - Volcanic Ash
    - Fukushima TCM
  - Short-Range Ensemble Dispersion Forecasts
  - Balloon Flight Forecasting Tools
  - DATEM Tracer Verification
  - HYSPLIT Modeling Group
  - Current & Forecast Meteorology
    - North America
    - Animations
  - Archived Meteorology

The HYSPLIT model can be run interactively on the READY web site or installed on a PC (Mac and run using a graphical user interface (GUI) or script.

Got a question about HYSPLIT? Ask your question through the [HYSPLIT Forum](#).

### HYSPLIT-WEB (Internet-based)

- [Run HYSPLIT Trajectory Model](#) (No registration required)
- [Run HYSPLIT Dispersion Model](#) (includes volcanic ash)
  - [HYSPLIT Registration Instructions](#)
- [HYSPLIT for Volcanic Ash](#)
- [Spain HYSPLIT](#)
- [HYSPLIT for NWS Forecast Offices](#) (NOAA employees only - you will leave the ARL web site)
  - [BACKUP - HYSPLIT for NWS Forecast Offices](#) (NOAA employees only - backup ARL site)

## ARL

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## HYSPLIT Trajectories

- [Compute forecast trajectories](#)
- [Compute archive trajectories](#)
- [Retrieve previous model results](#)
- [Restart user session \(clear user inputs\)](#)

### Daily Limits

Users are limited to 500 trajectories per day in order to share the res

### Publishing HYSPLIT results

Publications using HYSPLIT results, maps or other READY products  
NOAA Air Resources Laboratory. Appropriate versions of the following a

<http://ready.arl.noaa.gov/HYSPLIT.php>

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- ▶ [Compute forecast trajectories](#)
- ▶ [Compute archive trajectories](#)
- ▶ [Retrieve previous model results](#)
- ▶ [Restart user session \(clear user inputs\)](#)

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READY users produced 3197 un-registered HYSPLIT simulations since 00 UTC today!

## Type of Trajectory(ies)

**Number of Trajectory Starting Locations**

- 1 Note: By choosing just one source location, more options for selecting the location will be presented on the next
- 2 page, such as choosing by latitude/longitude, by WMO ID, or by plant location. Multiple source locations limit
- 3 the input to just latitude/longitude positions. This option is ignored for trajectory ensemble and frequency.

**Type of Trajectory**

- Normal
- Matrix
- Ensemble
- Frequency

Next>>





# HYSPLIT-WEB (Internet-based)

<http://ready.arl.noaa.gov/HYSPLIT.php>

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## Meteorology File

**Meteorology:** Archived GDAS1  
**Source Location:** Lat: 37.070000 Lon: 41.220000

### Choose an archived meteorological file

Archive File:

Next>>

# HYSPLIT-WEB (Internet-based)

<http://ready.arl.noaa.gov/HYSPLIT.php>

## Model Run Details

Request trajectory

The archived data file (GDAS1) has data beginning at 05/15/17 0000 UTC.

### Model Parameters

Trajectory direction:

- Forward  
 Backward (Change the default start time!)

[More info](#) ▶

Vertical Motion:

- Model vertical velocity  
 Isobaric  
 Isentropic

[More info](#) ▶

Start time (UTC):

Current time: 11:50

year month day hour  
17 05 19 12

[More info](#) ▶

Total run time (hours):

96

[More info](#) ▶

Start a new trajectory every:

0 hrs

Maximum number of trajectories:

24

[More info](#) ▶

Start 1 latitude (degrees):

37.070000

[More info](#) ▶

Start 1 longitude (degrees):

41.220000

[More info](#) ▶

Start 2 latitude (degrees):

Start 2 longitude (degrees):

Start 3 latitude (degrees):

Start 3 longitude (degrees):

Level 1 height:

10

meters AGL

meters AMSL

[More info](#) ▶

Level 2 height:

1500

Level 3 height:

3000



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## HYSPLIT Trajectory Model Results

**HYSPLIT MODEL RESULTS FOR JOB NUMBER 161609**

<b>Model Status:</b>	Complete Hysplit
	Percent complete: 100.0
	Percent complete: 99.0

There are no graphics files available yet. This page will reload every 10 seconds until the model and graphics have finished.

- [HYSPLIT SETUP file.](#)

[Return to main menu \(keep user inputs\)](#)

[Return to main menu \(clear user inputs\)](#)

<http://ready.arl.noaa.gov/HYSPLIT.php>



## HYSPLIT Trajectory Model Results

**HYSPLIT MODEL RESULTS FOR JOB NUMBER 159792**

**Model Status:** Thu Oct 26 07:53:50 EDT 2017  
The model and graphics are now complete.  
Finished generating graphics for job 159792.

<b>RESULTS</b>	Click on text link to view images in a new window.	
	<b>GIF Plots</b>	<b>PDF Plots</b>
<b>Trajectories</b>	<a href="#">.gif</a>	<a href="#">.pdf</a>

- [Modify the trajectory plot without rerunning the model.](#)
- [Trajectory endpoints file.](#)
  - [Trajectory endpoints format help.](#)
- [HYSPLIT SETUP file.](#)
- [HYSPLIT CONTROL file.](#)
- [HYSPLIT MESSAGE \(diagnostics\) file.](#)
  - [MESSAGE file format help \(pdf\)](#)

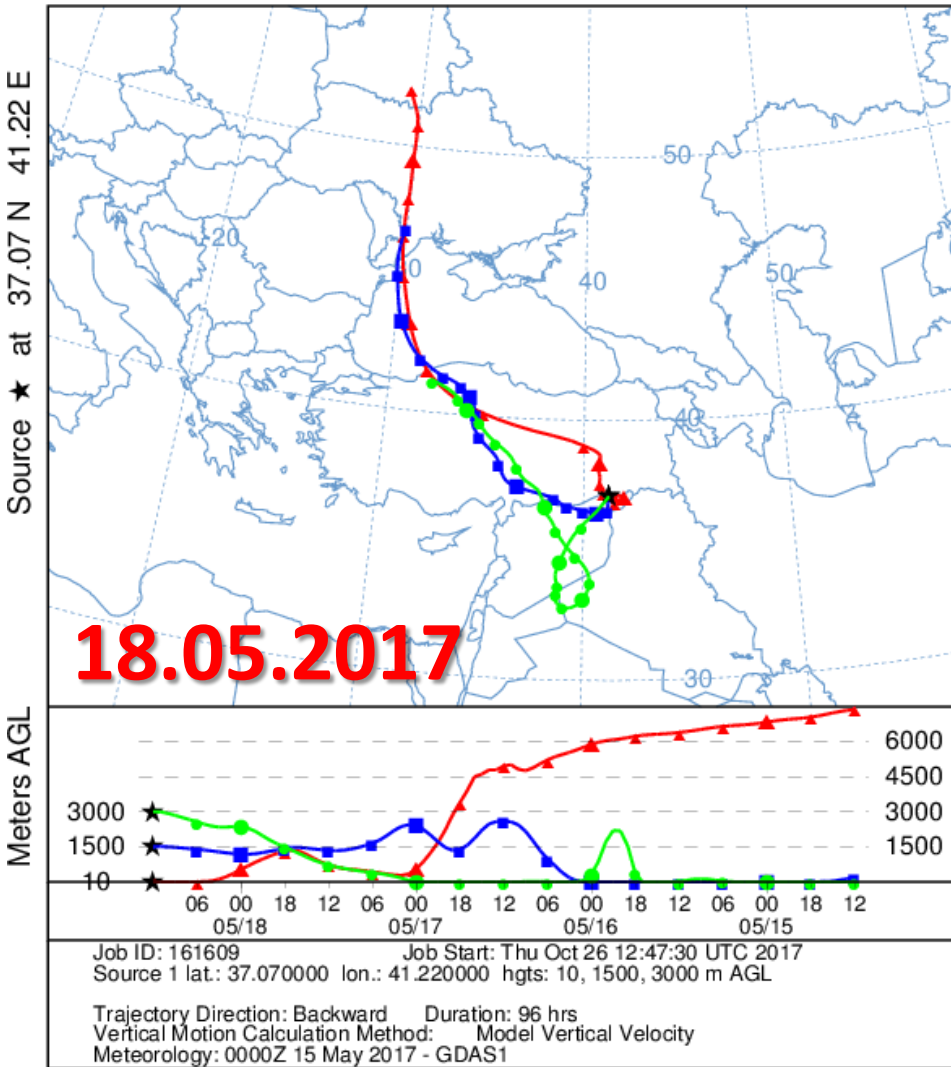
[Return to main menu \(keep user inputs\)](#)

[Return to main menu \(clear user inputs\)](#)

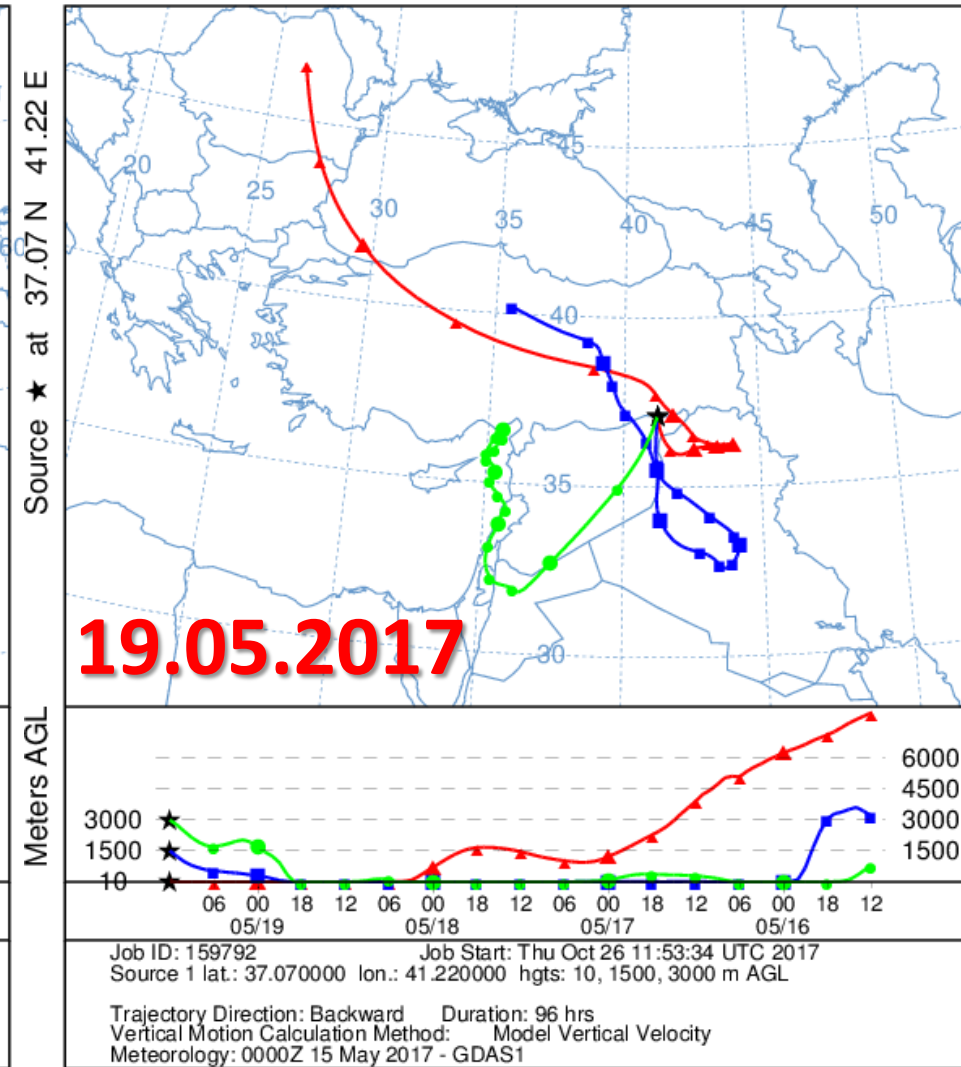
<http://ready.arl.noaa.gov/HYSPLIT.php>

# HYSPLIT-WEB (Internet-based)

NOAA HYSPLIT MODEL  
Backward trajectories ending at 1200 UTC 18 May 17  
GDAS Meteorological Data



NOAA HYSPLIT MODEL  
Backward trajectories ending at 1200 UTC 19 May 17  
GDAS Meteorological Data





<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>

U.S. Department of Commerce | National Oceanic & Atmospheric Administration | NOAA Research



Earth System Research Laboratory  
Physical Sciences Division

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In order to help ensure that this web analysis page remains available, we would greatly appreciate feedback on its use, particularly in the classroom, for presentations or for research. Mail to ESRL/PSD data at ([esrl.psd.data@noaa.gov](mailto:esrl.psd.data@noaa.gov)).

## Help

[Instructions](#)  
[Datasets and variables](#)  
[Index time-series Info](#)  
[Use your own time-series](#)

## Background Information

[Referencing Plots](#)

## Related Plot/Analysis

[Plot daily composites](#)  
[Plot 6-hourly composites](#)

We have transitioned the data files from netCDF3 to netCDF4-classic format on Monday Oct 20th, 2014.

## Monthly/Seasonal Climate Composites

Plot seasonal composites (averages) of the mean or anomalies (mean - total mean) of variables from the NCEP reanalysis and other datasets. NCEP data is available from **Jan 1948** to **Sep 2017**. Other datasets have different time ranges. Note the climatology used for the anomaly and long term mean plots is now **1981-2010** to match the new climate normal timeperiod.

Which variable?  Level?

Beginning month of season:  Ending month:

Enter years for composites (from 1 to 20): e.g. 1972. For seasons that span a year (e.g. DJF), please enter year of the **LAST** month.

To subtract one set of years from another, use a minus sign (-) before the years that are to be subtracted.

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

OR Enter range of years:  to  (optional minus  to )

OR List of years: Enter filename:

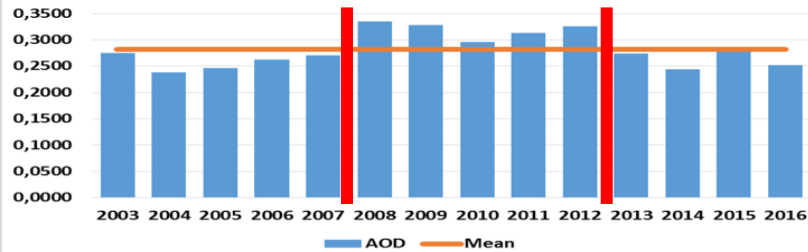
OR Years from values in Time Series:

If CUSTOM Time Series:

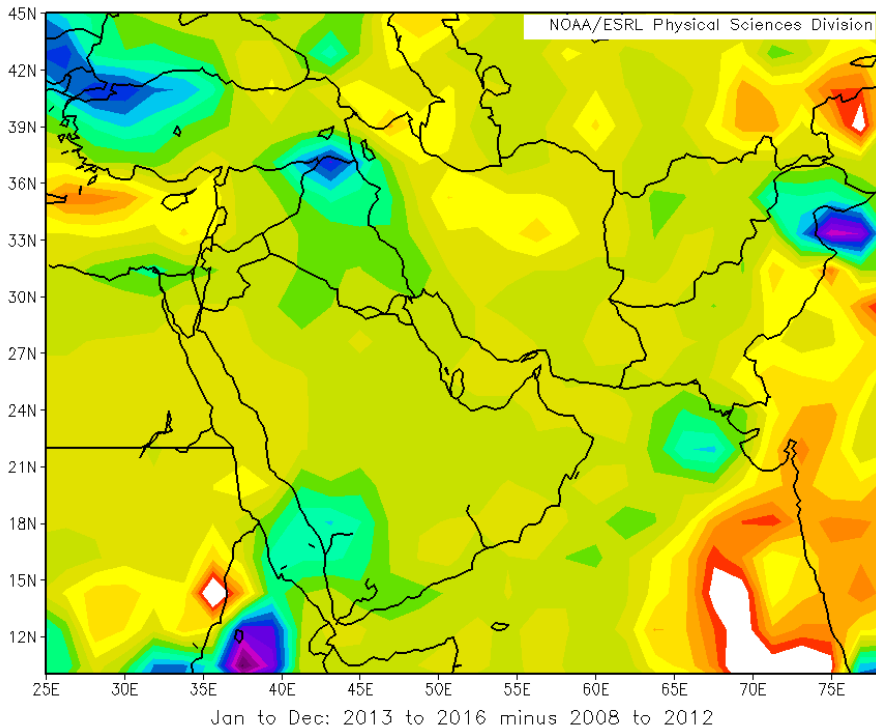


<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>

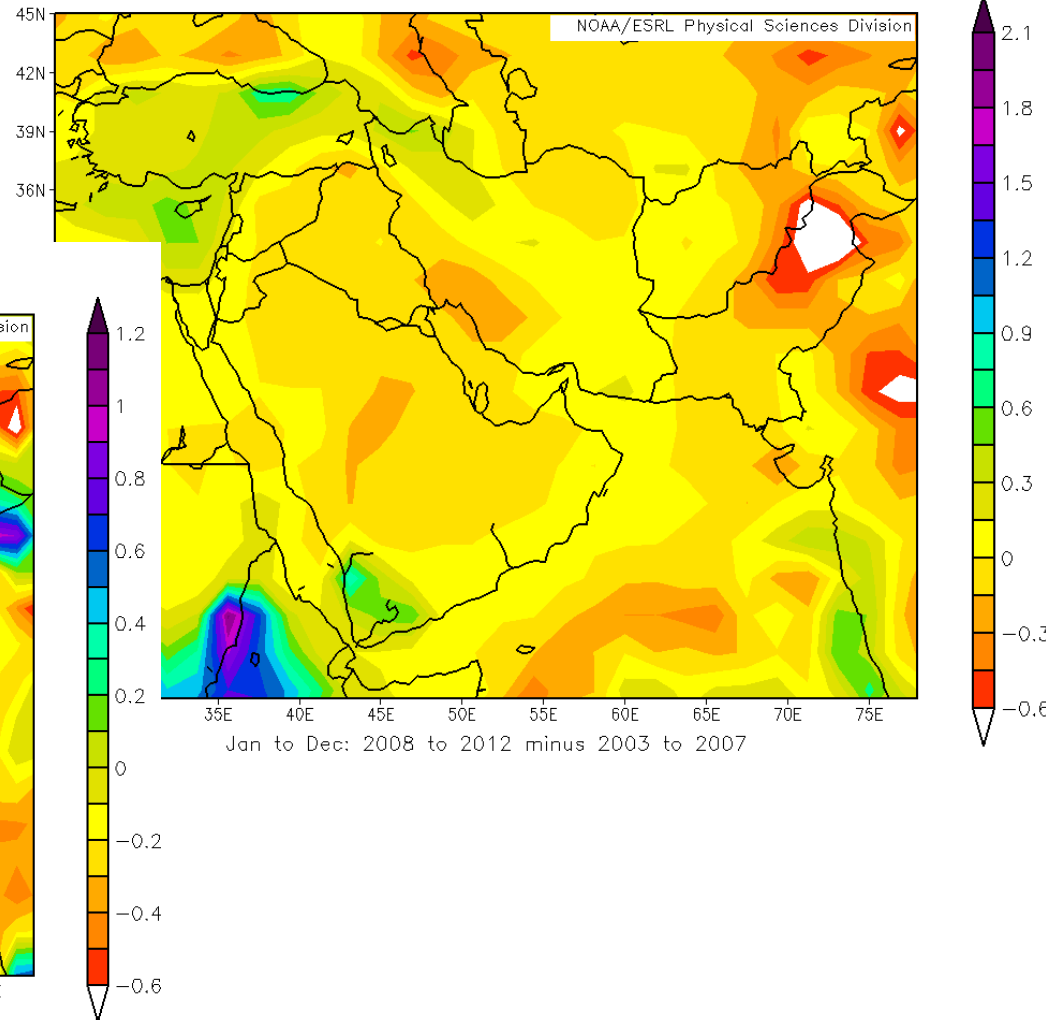
MODIS-Aqua AOD (36-64°E - 26-38°N)



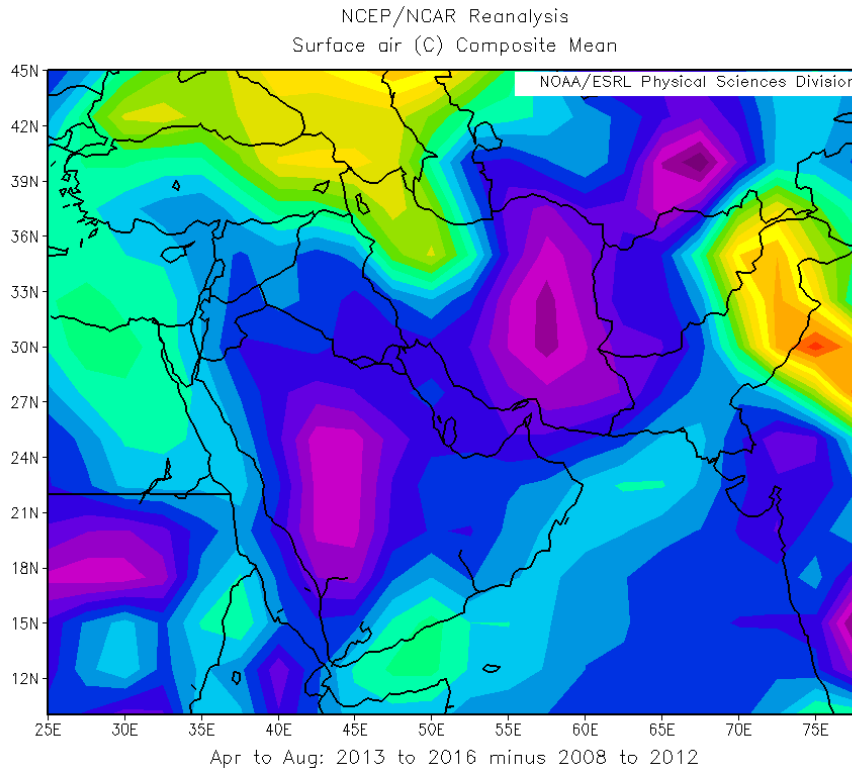
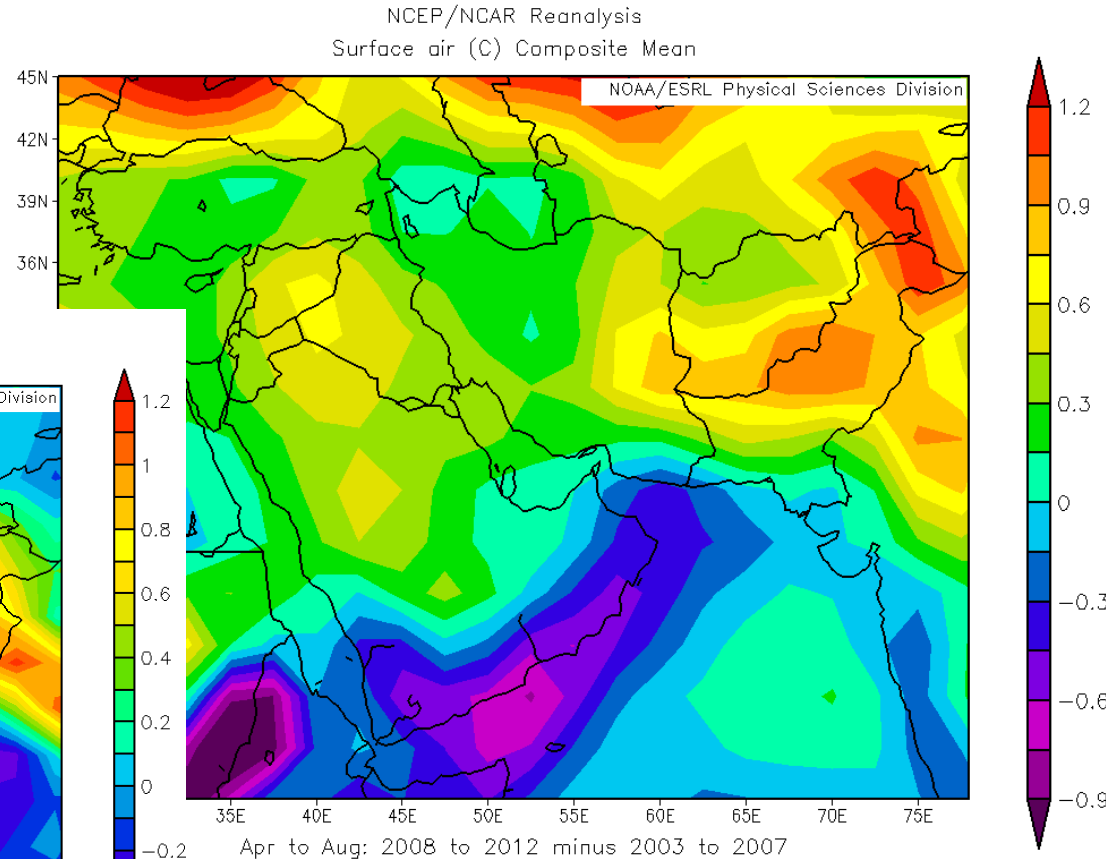
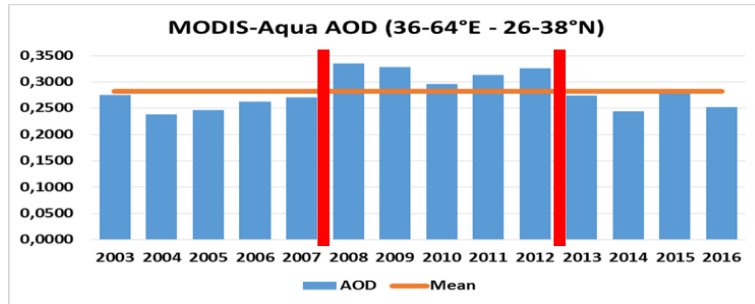
NCEP/NCAR Reanalysis  
Surface Precipitation Rate (mm/day) Composite Mean



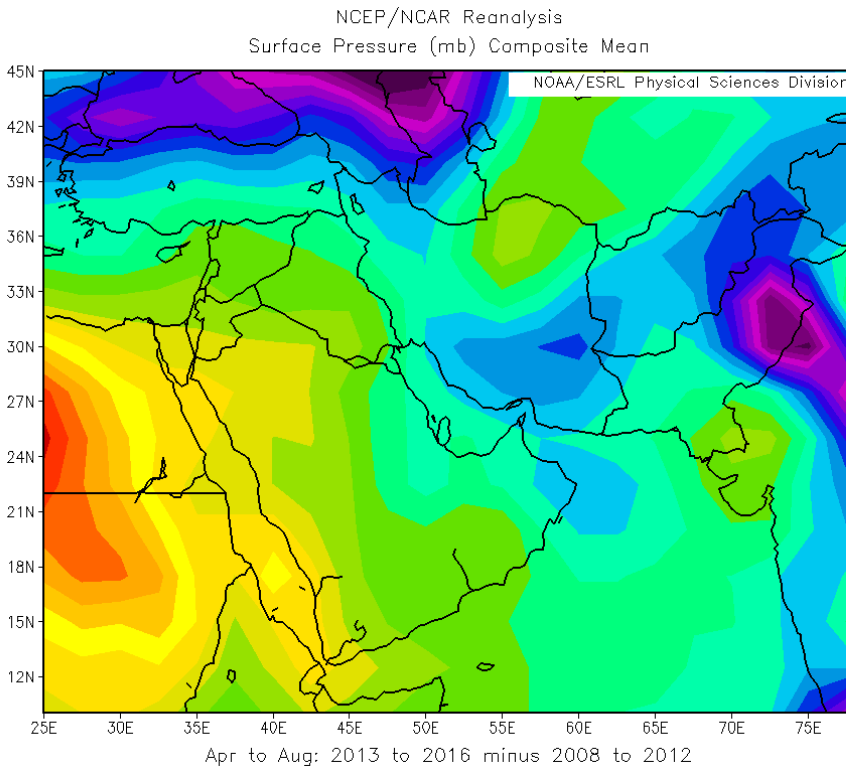
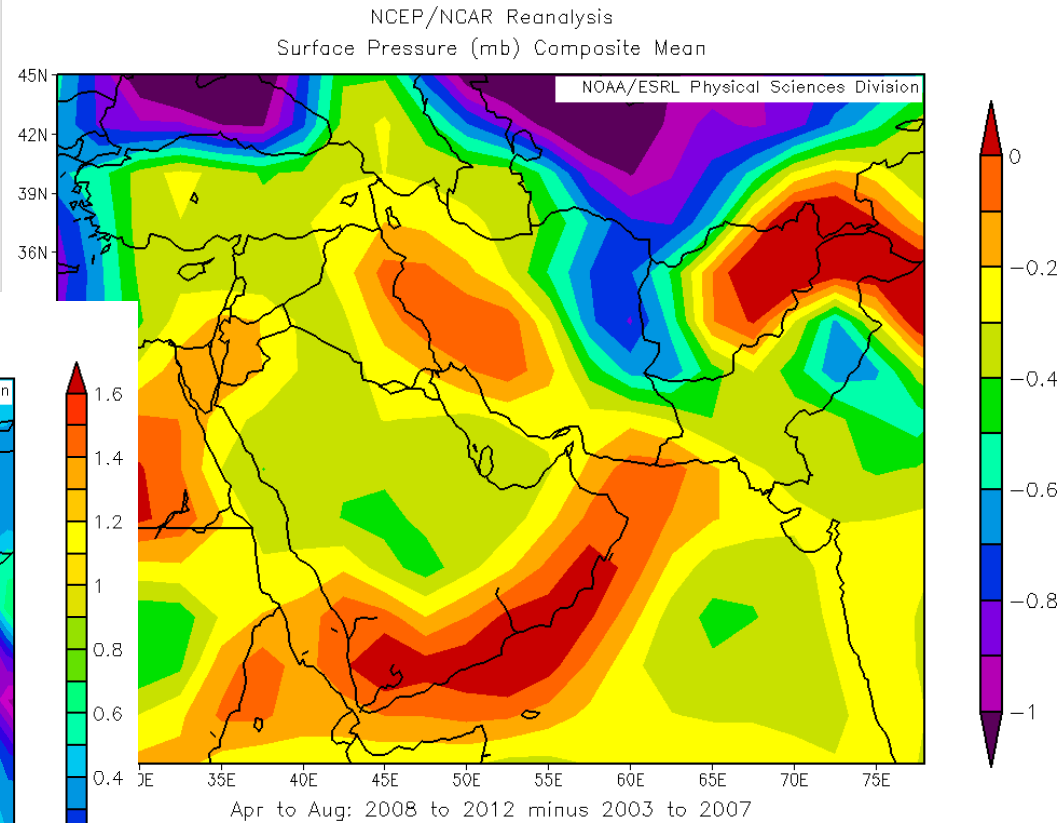
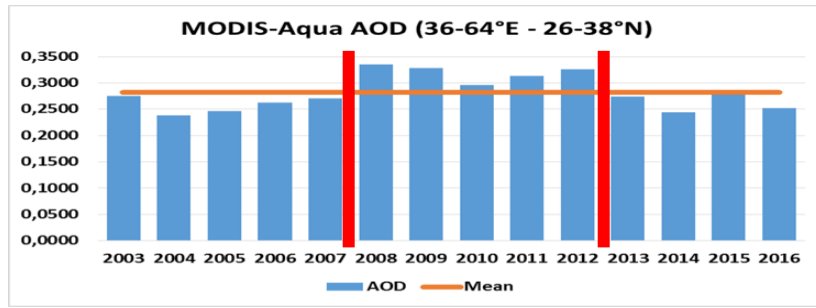
NCEP/NCAR Reanalysis  
Surface Precipitation Rate (mm/day) Composite Mean



<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>

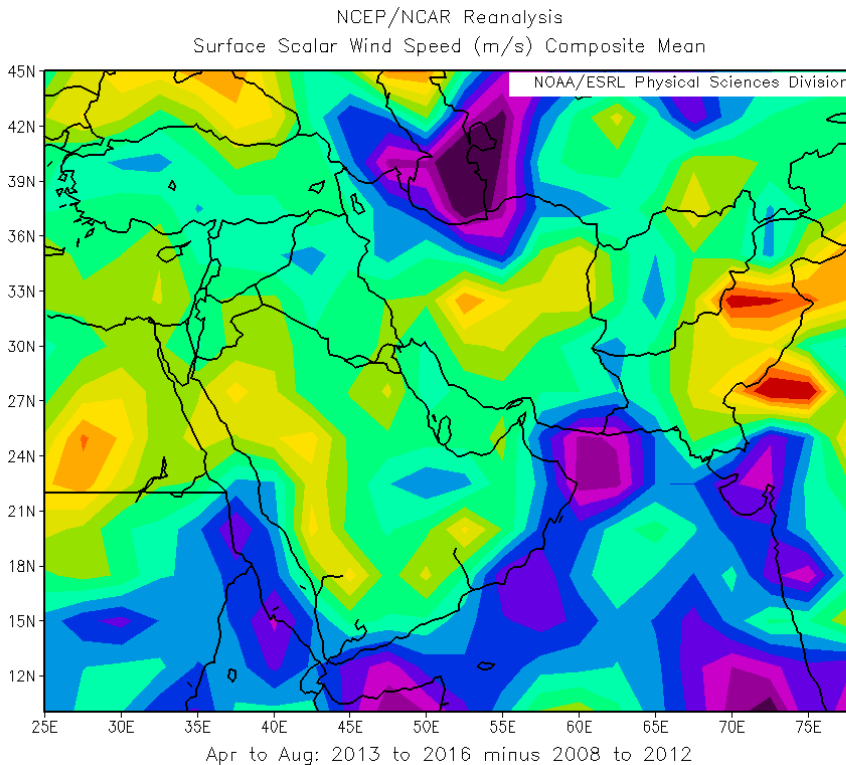
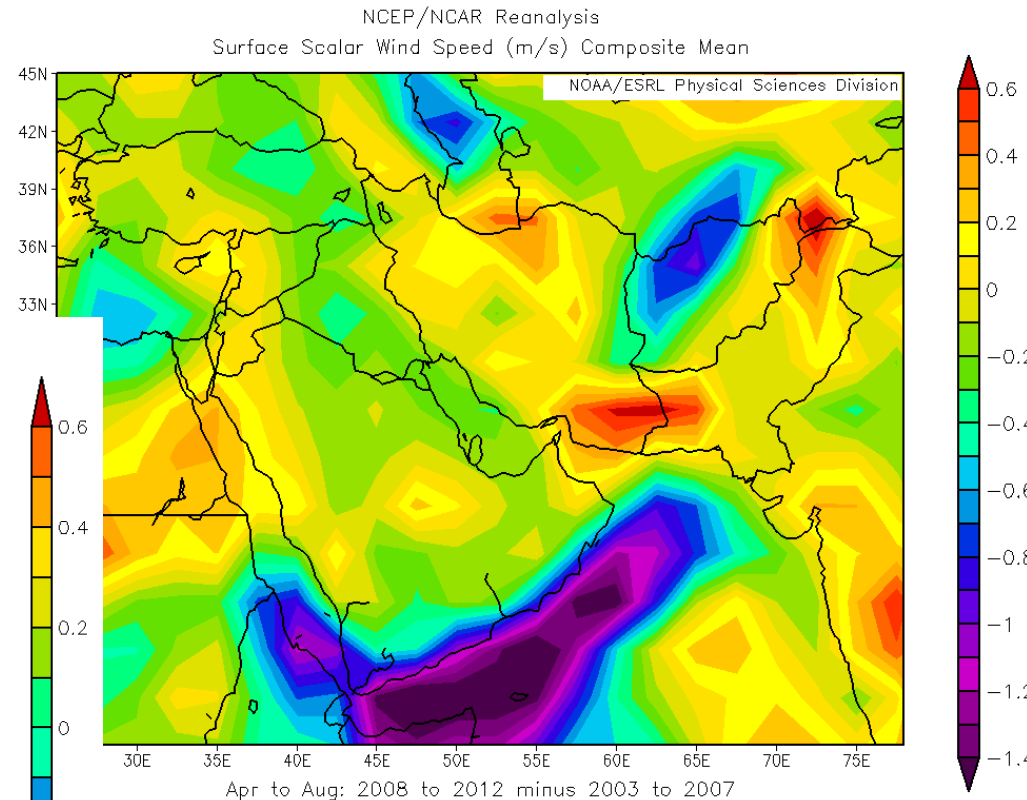
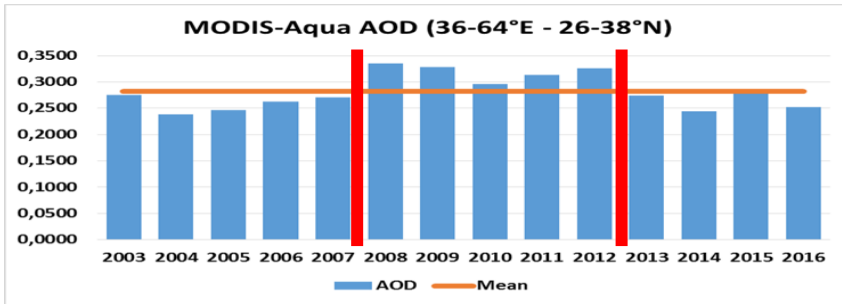


<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>

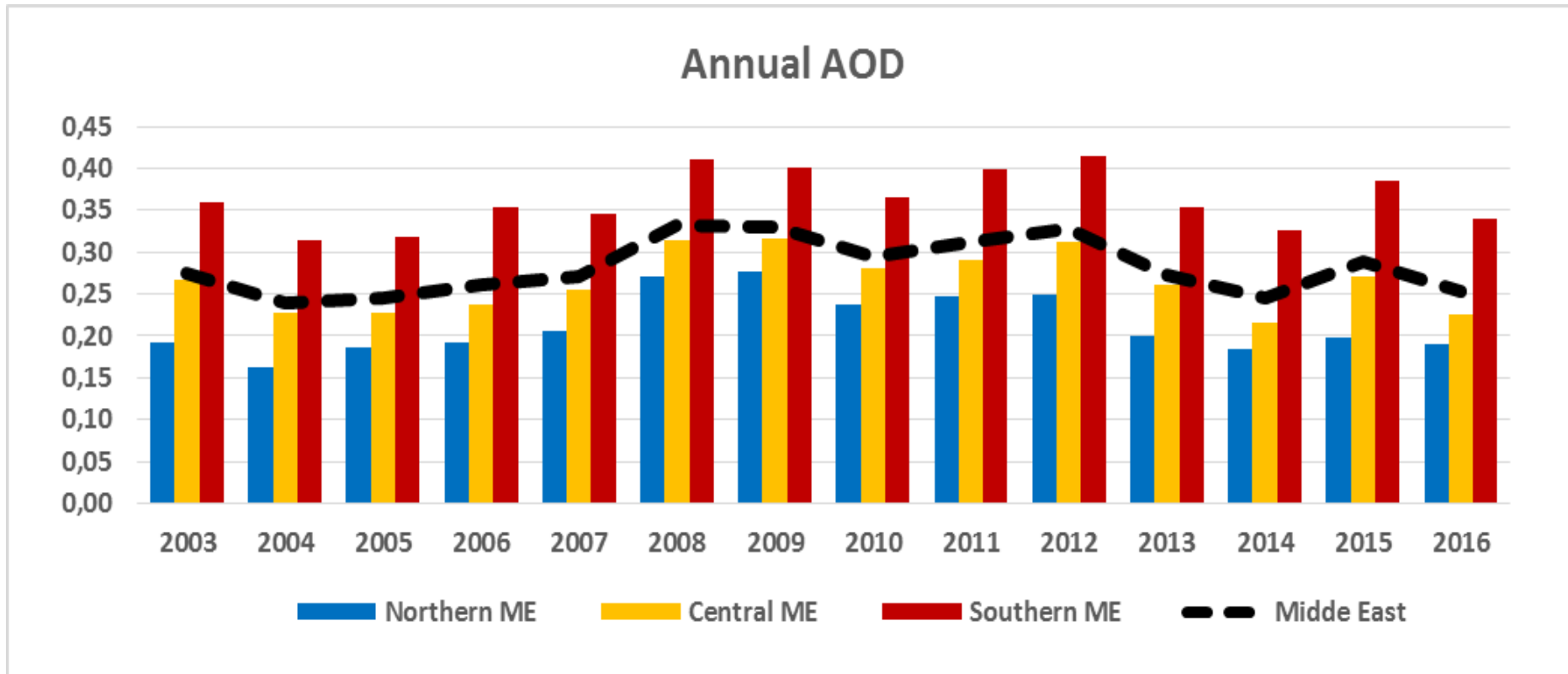




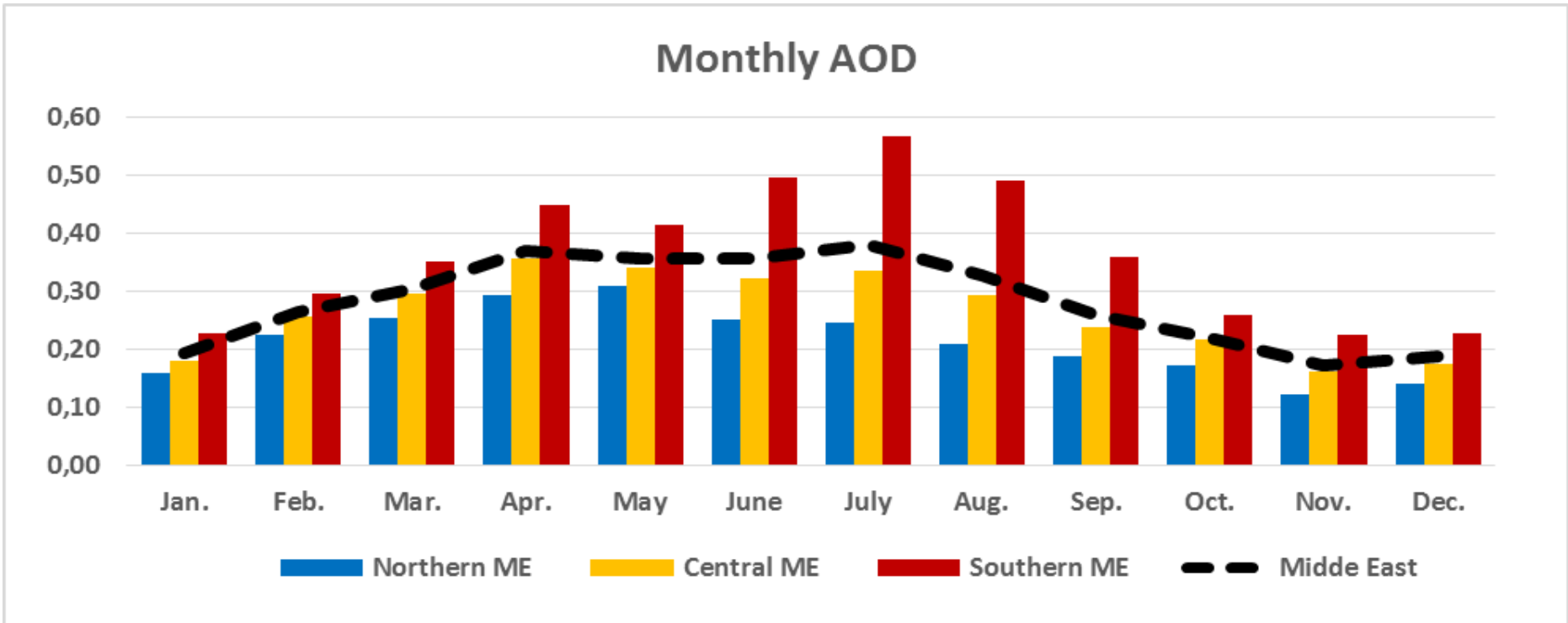
<https://www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl>



Annual AOD values of the Central Middle East almost follow the averaged values of the Middle East Region as expected, while higher values of AOD are observed in the Southern ME.

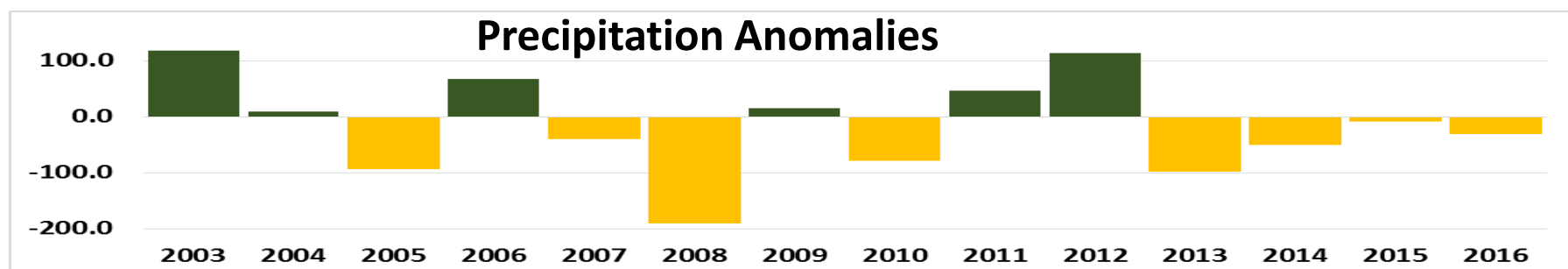
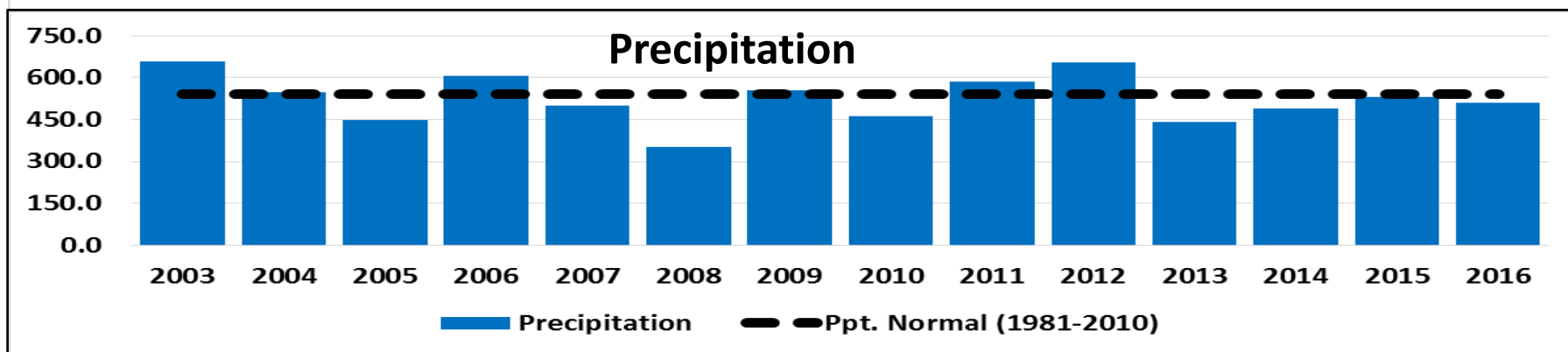
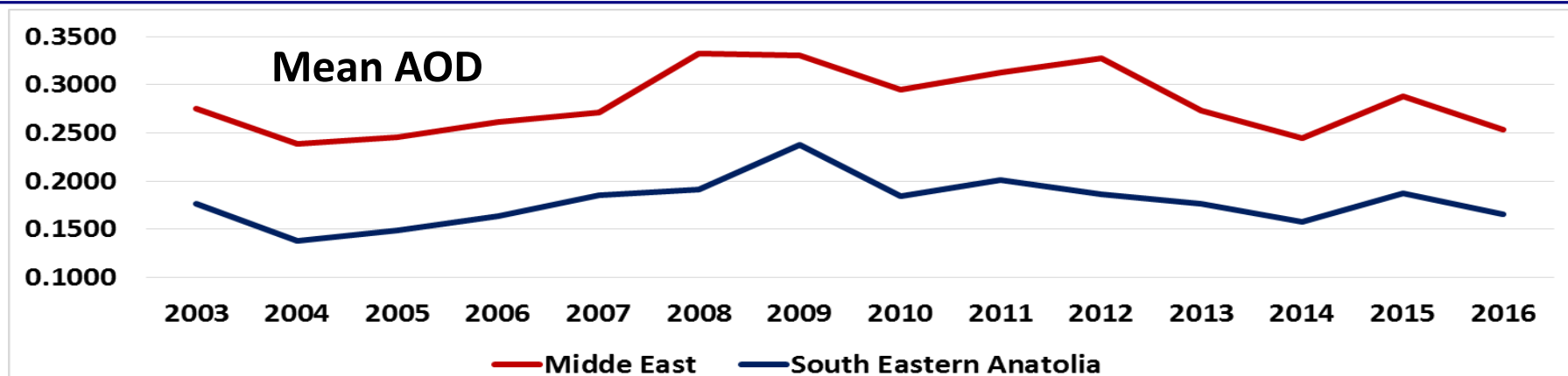


The highest AOD in the Northern and Central Middle East are in spring. On the other hand, the Southern Middle East exhibits a different seasonal pattern with a maximum AOD value in July.





# AOD & Precipitation Analysis





# Thank you for your attention...

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**Turkish State Meteorological Service**  
**Research Department**

**25-27 October 2017, Istanbul**

