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# Impact of COVID-19 on AOD

## preliminary results

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*Norwegian Meteorological Institute - Metno*

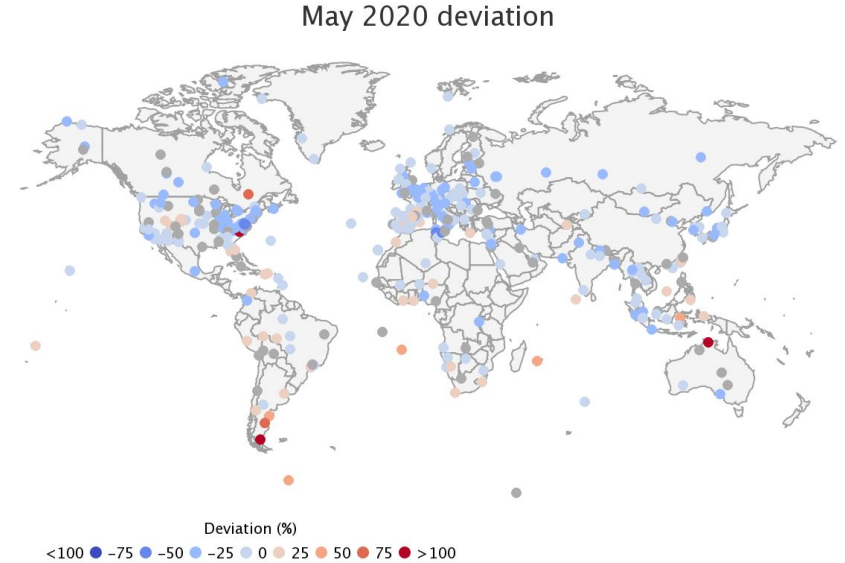
## AOD deviation

Hypothesis: The reduction of the anthropogenic activities might conduct to a decrease of AOD in 2020. The impact of those reduced activities is expected to be less important on AOD than on  $\text{NO}_2$  or  $\text{O}_3$  concentrations as it is influenced by natural particles. Also, as a columnar property we might expect less impact than for  $\text{PM}_{10}$  concentrations.

$$\text{AOD}_{\text{dev}}(\text{site}, m) = \frac{\text{AOD}_{2020}(\text{site}, m)}{\text{AOD}_{\text{clim}}(\text{site}, m)} - 1$$

Results available at:

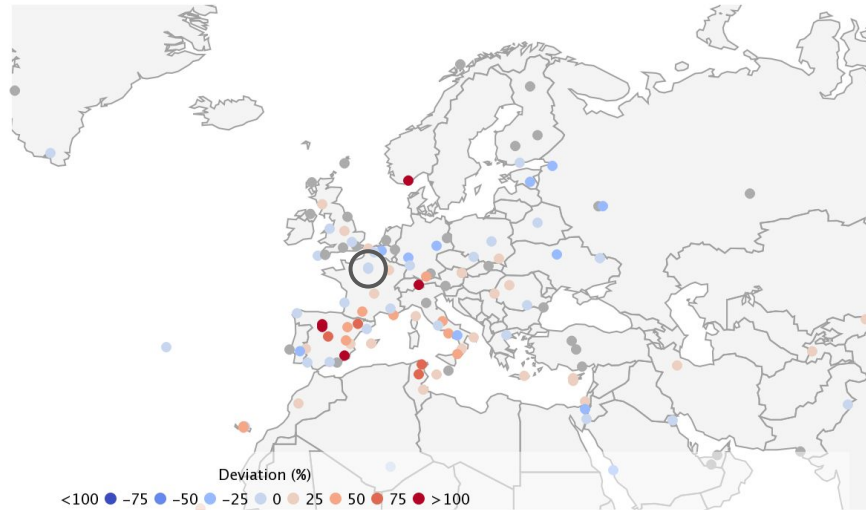
<https://aerocom-trends.met.no/covid-19.php>



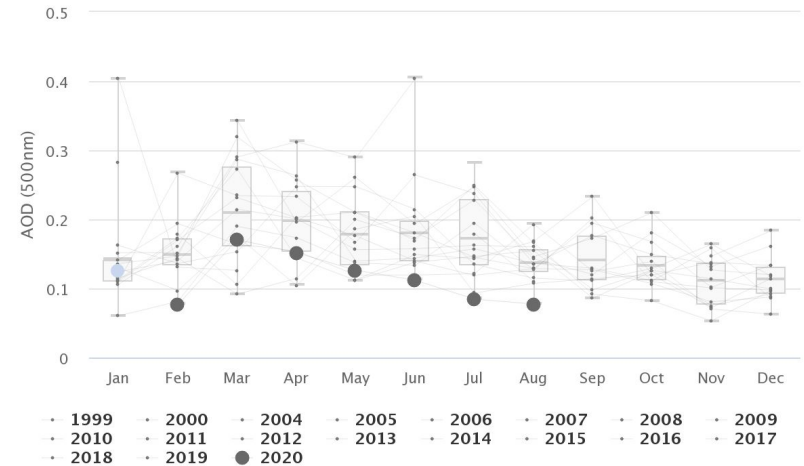
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

January 2020 deviation



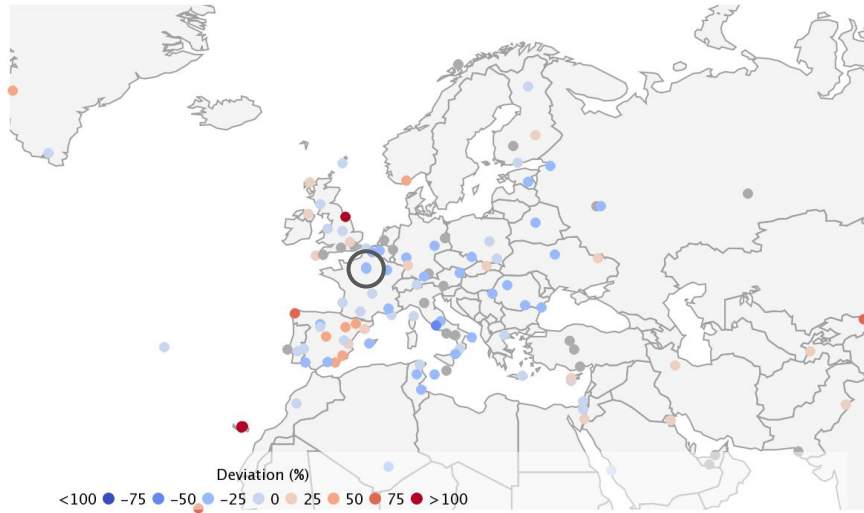
Paris (-11.3%)



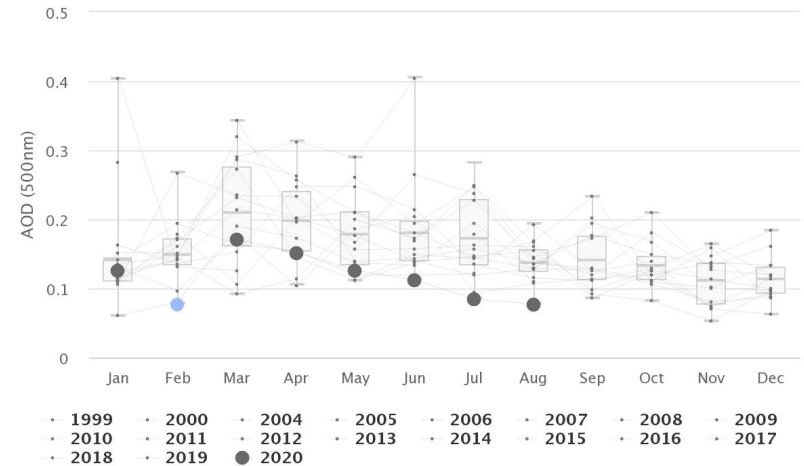
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

February 2020 deviation



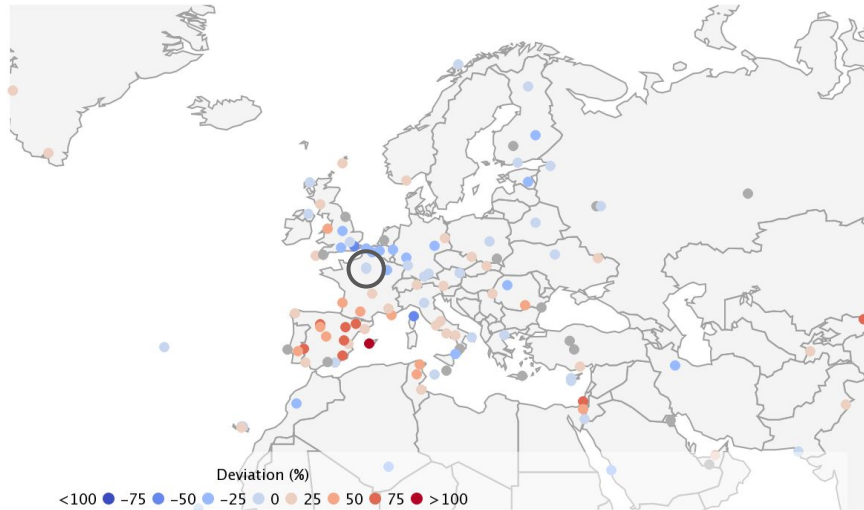
Paris (-48.9%)



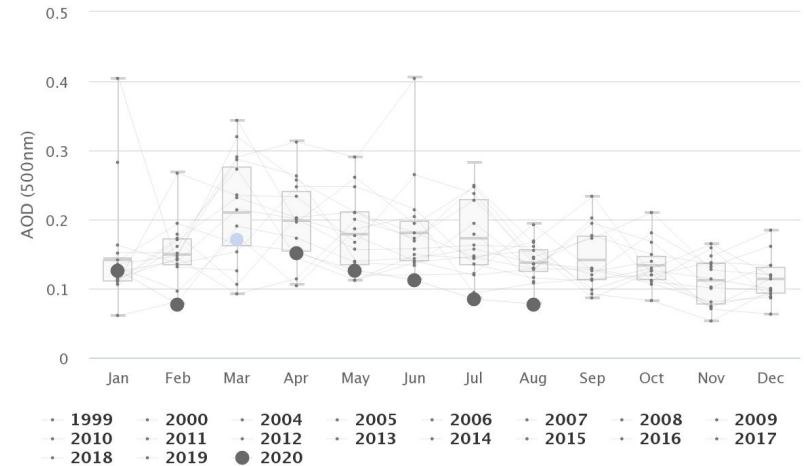
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

March 2020 deviation



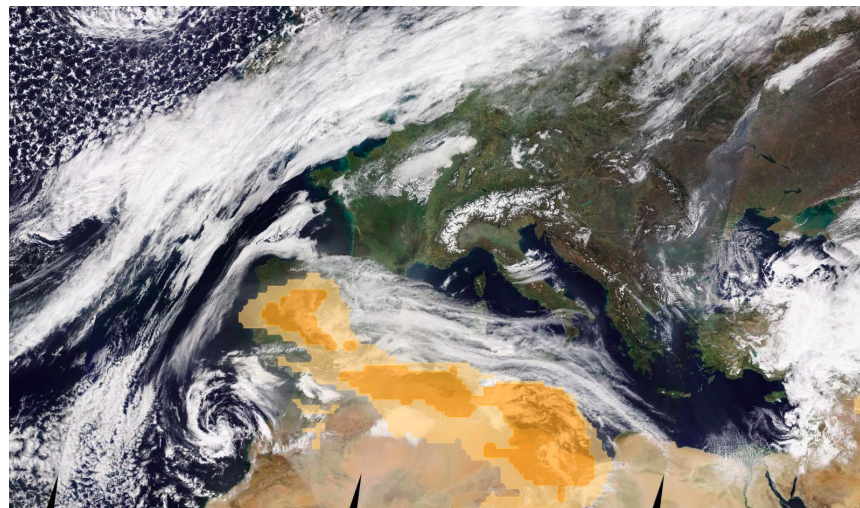
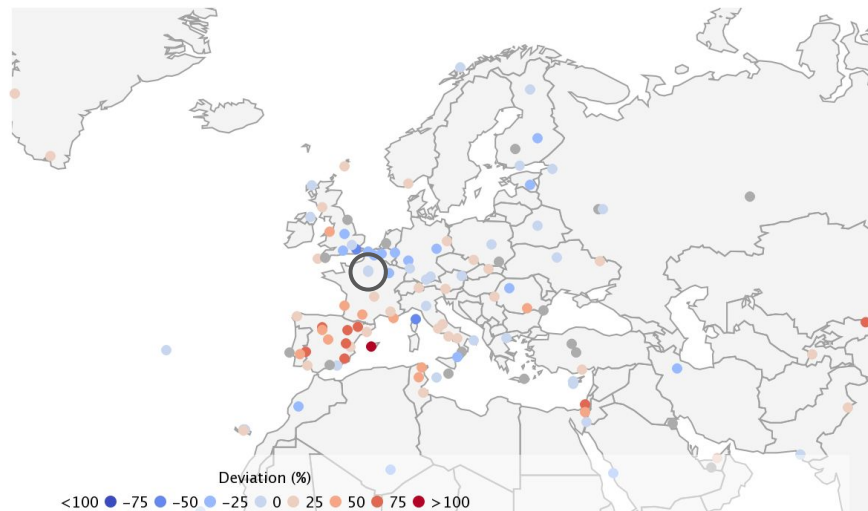
Paris (-18.9%)



# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

March 2020 deviation

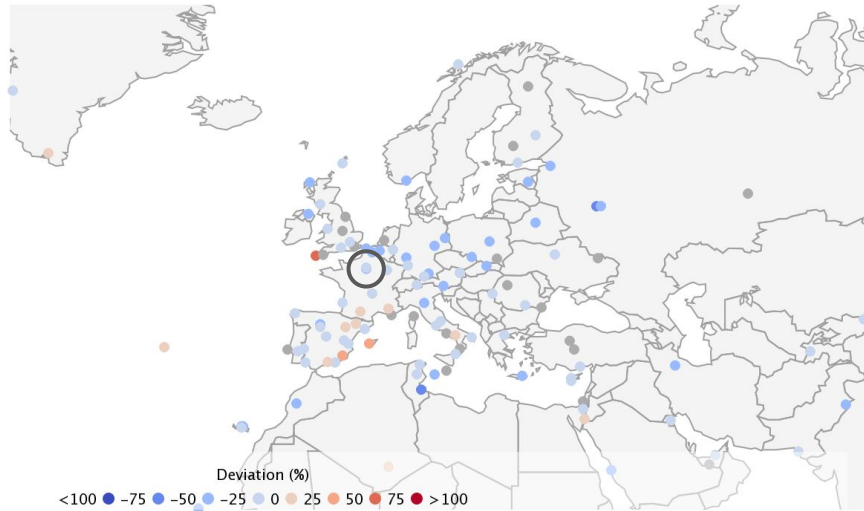


Dust outbreak, March 18<sup>th</sup> 2020 (source: <https://aerocom-alerts.met.no>)

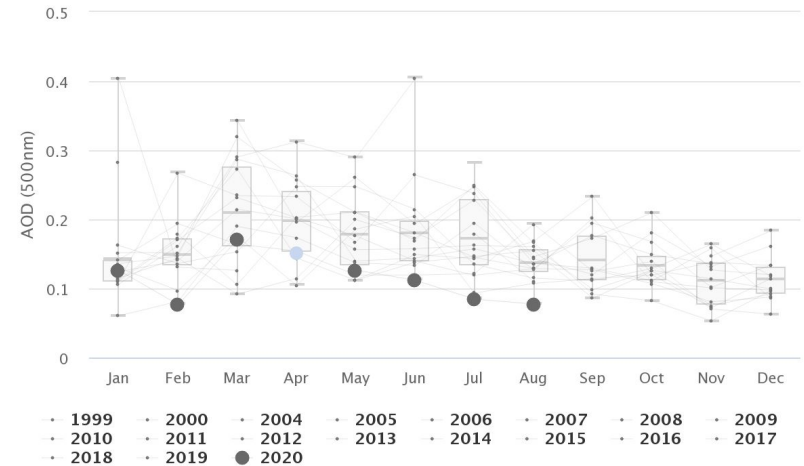
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

April 2020 deviation



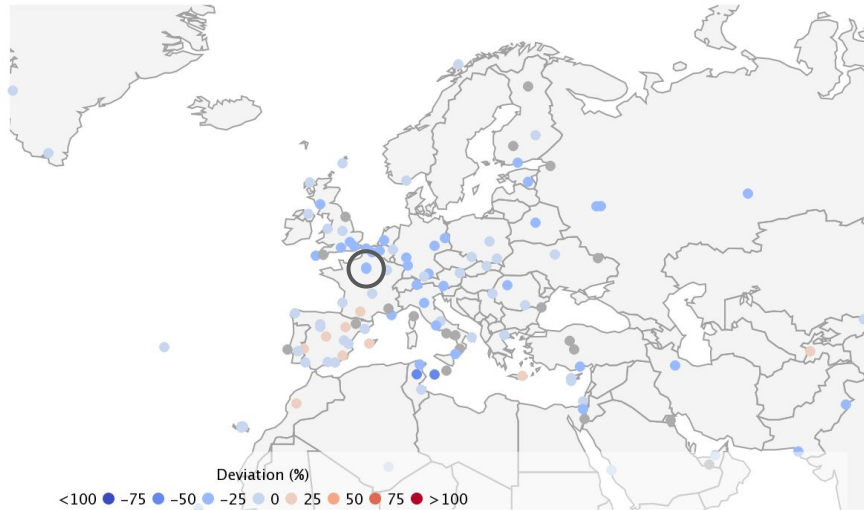
Paris (-23.0%)



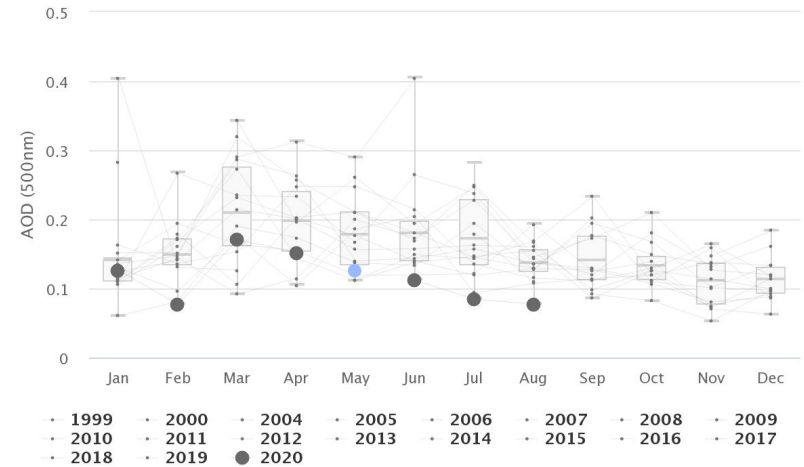
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

May 2020 deviation



Paris (-29.1%)

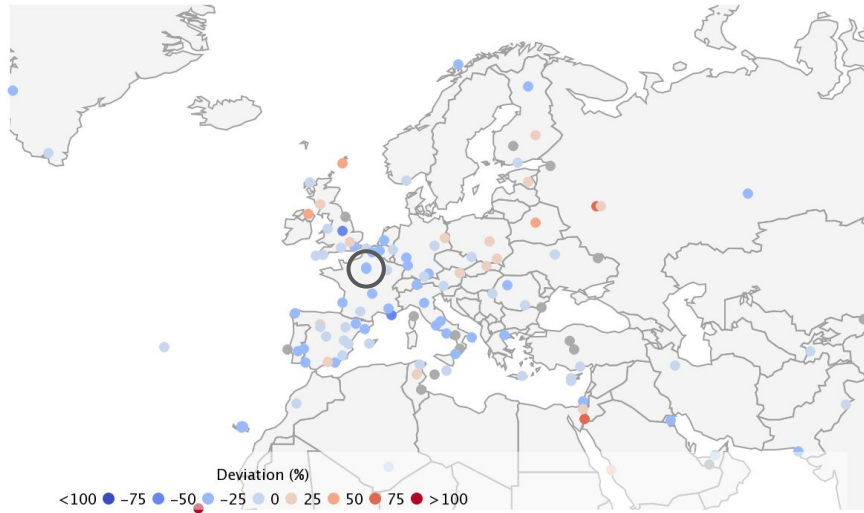




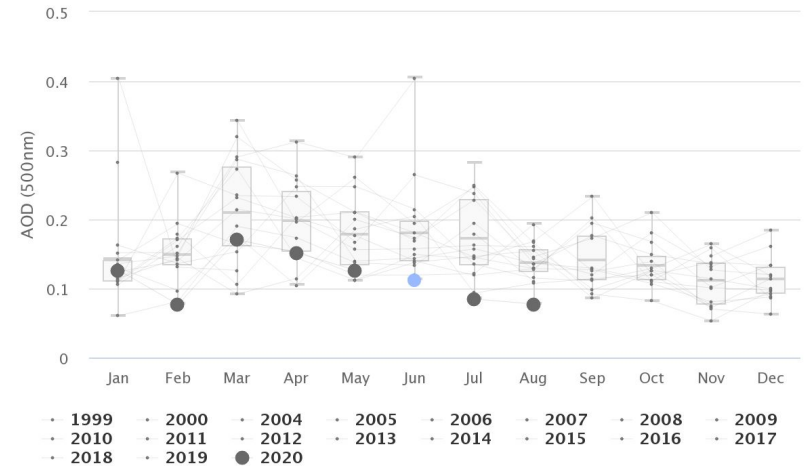
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

June 2020 deviation



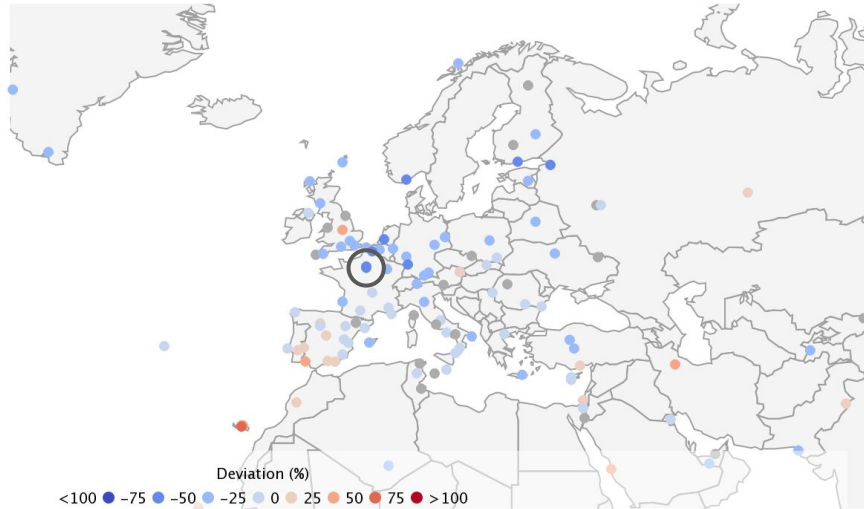
Paris (-38.2%)



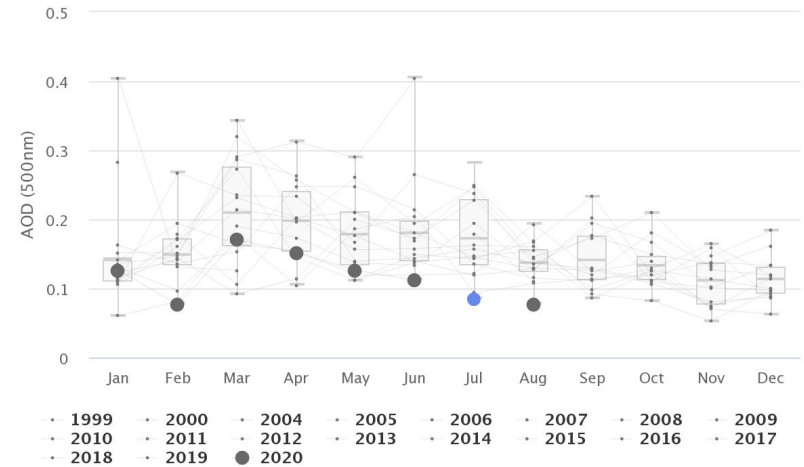
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

July 2020 deviation



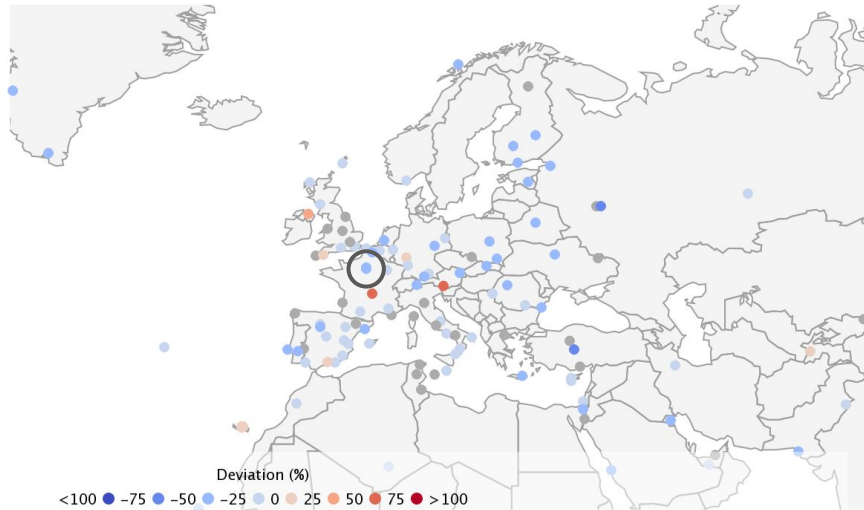
Paris (-50.8%)



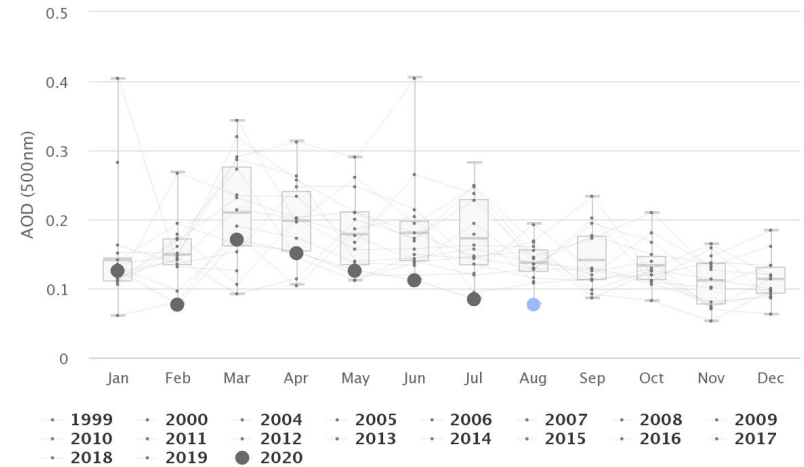
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Europe

August 2020 deviation



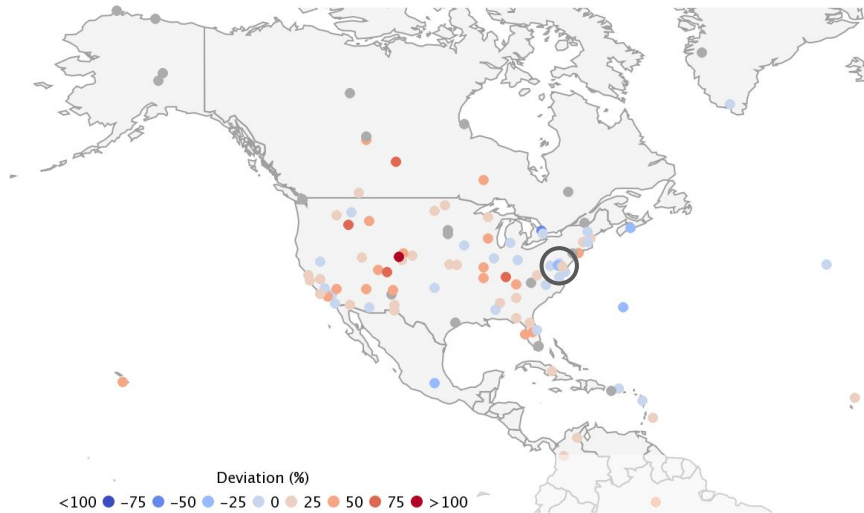
Paris (-43.6%)



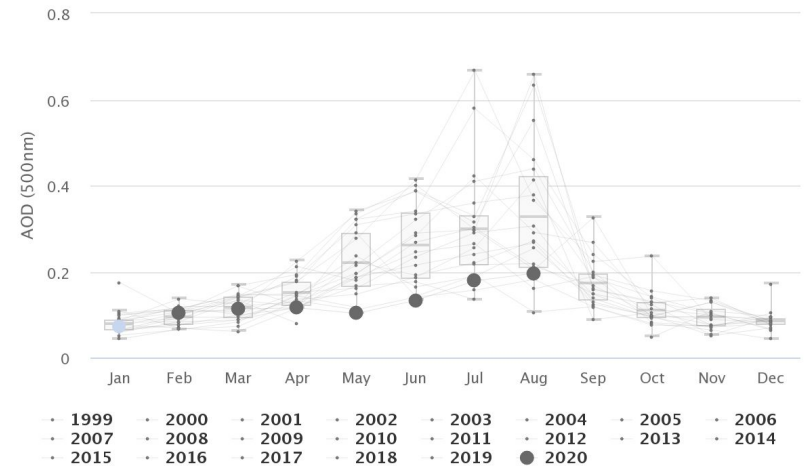
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

January 2020 deviation



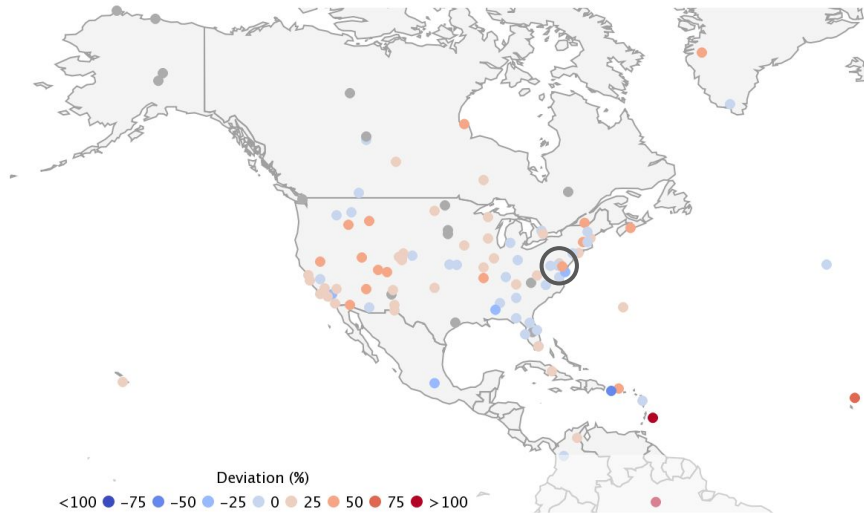
MD\_Science\_Center (-5.6%)



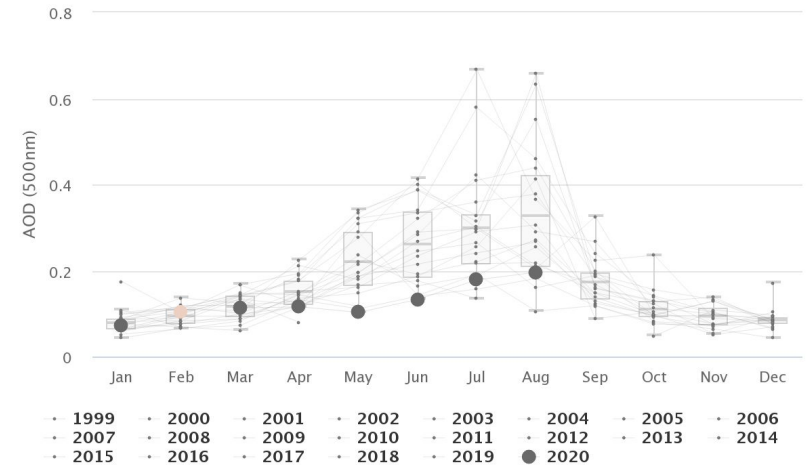
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

February 2020 deviation



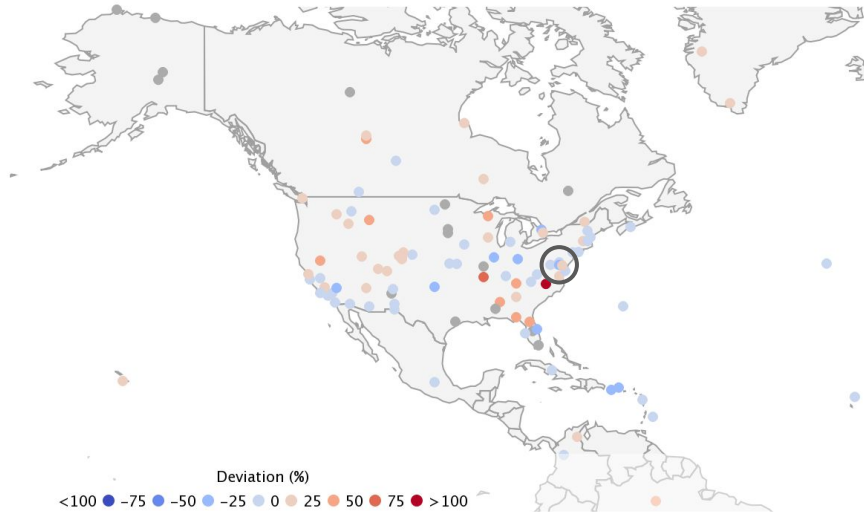
MD\_Science\_Center (9.5%)



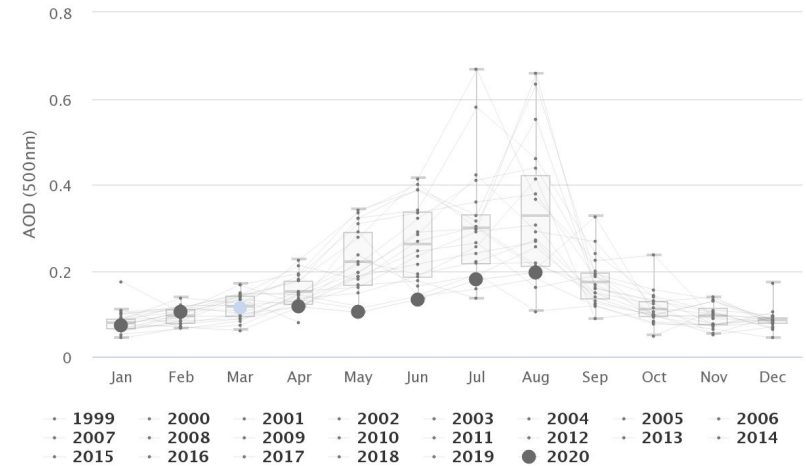
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

March 2020 deviation



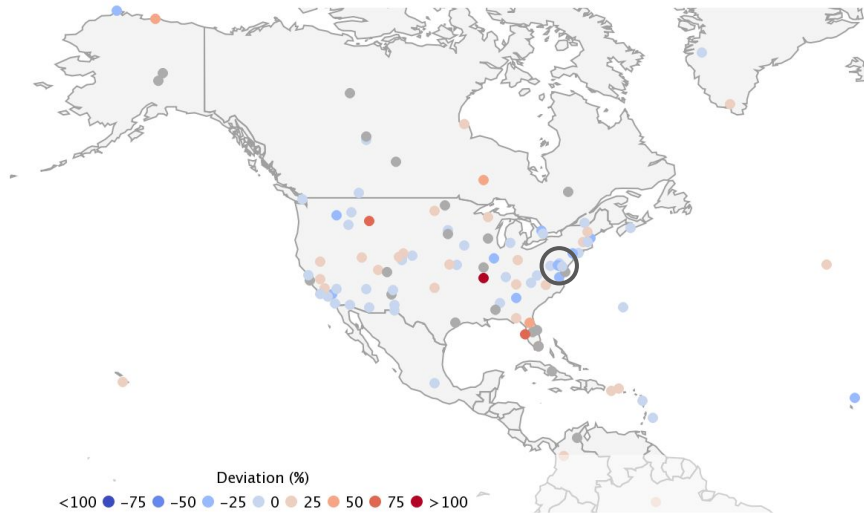
MD\_Science\_Center (-3.3%)



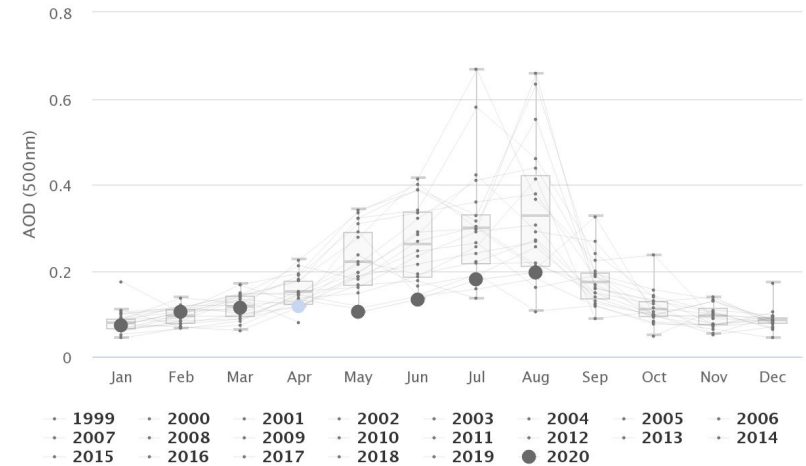
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

April 2020 deviation



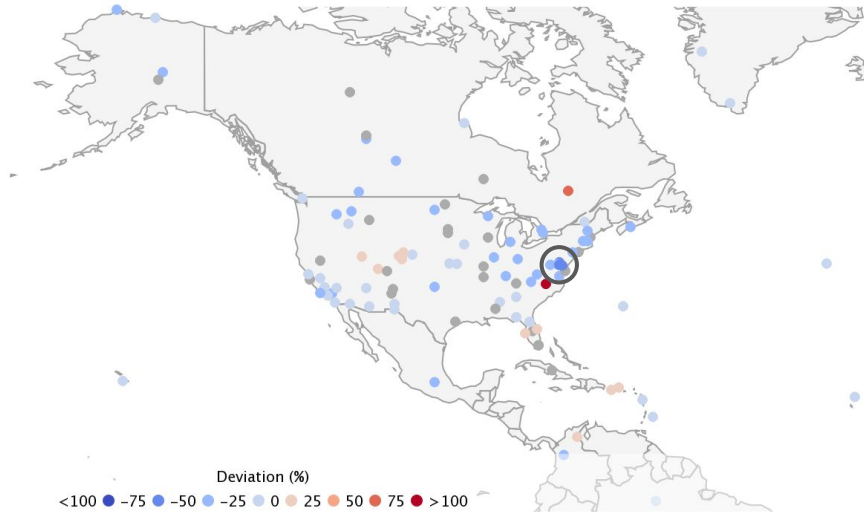
MD\_Science\_Center (-23.0%)



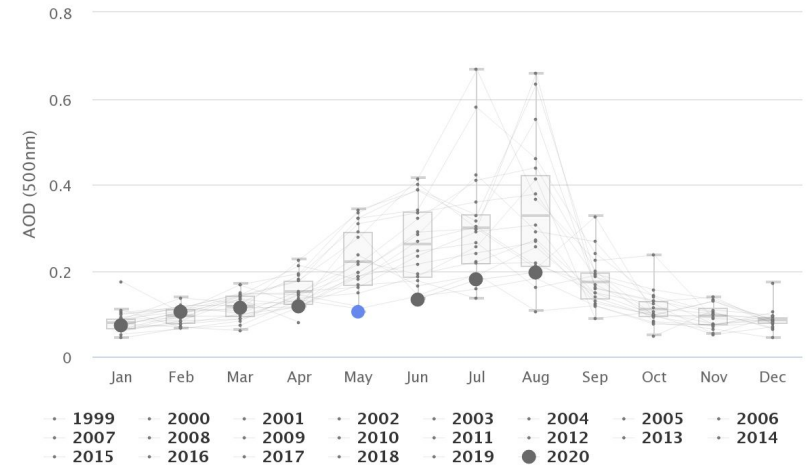
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

May 2020 deviation



MD\_Science\_Center (-53.3%)

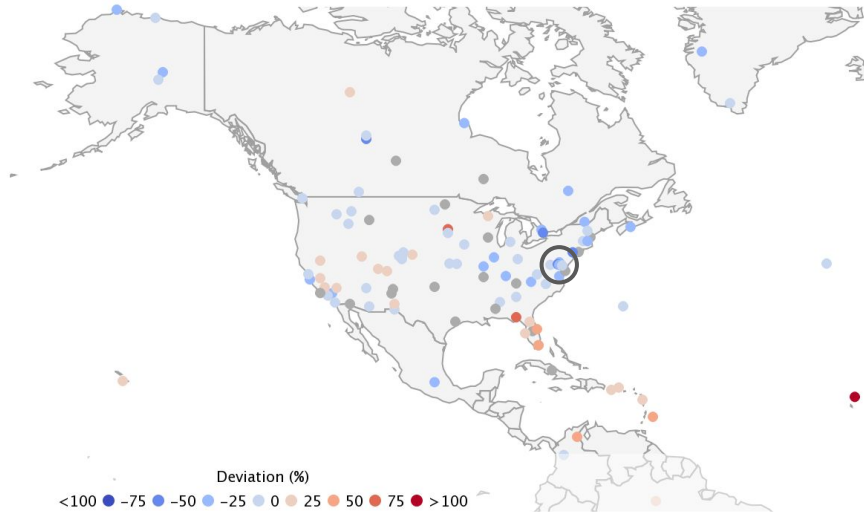




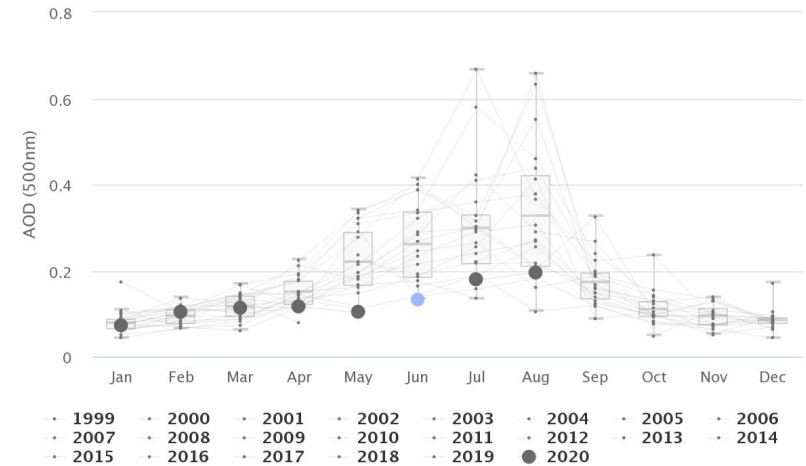
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

June 2020 deviation

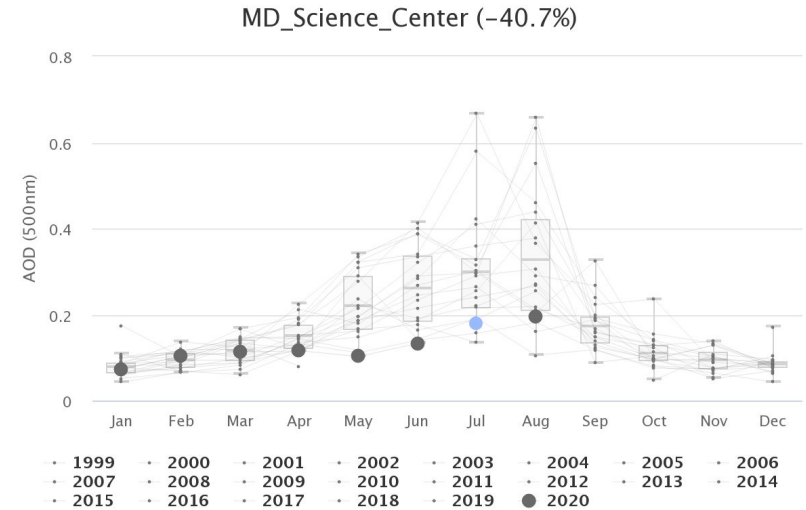
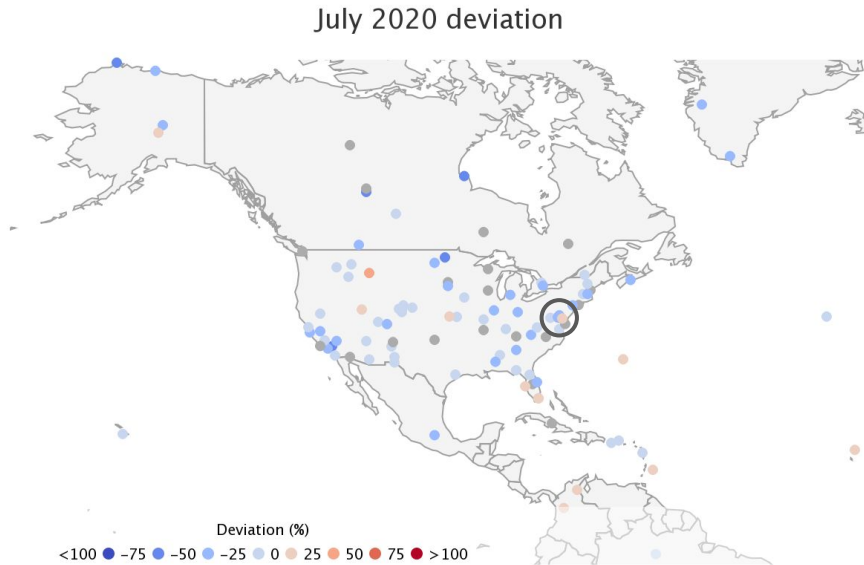


MD\_Science\_Center (-49.4%)



# Impact of COVID-19 on AOD - Preliminary Results

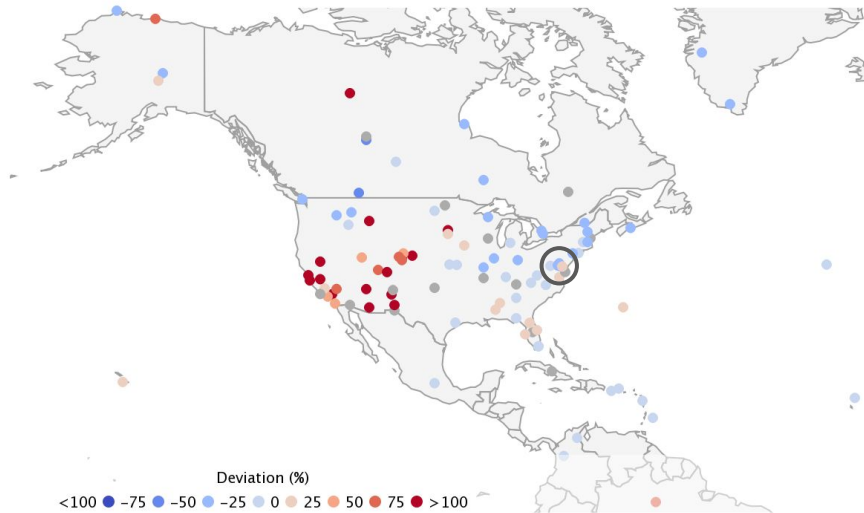
## AOD deviation in North-America



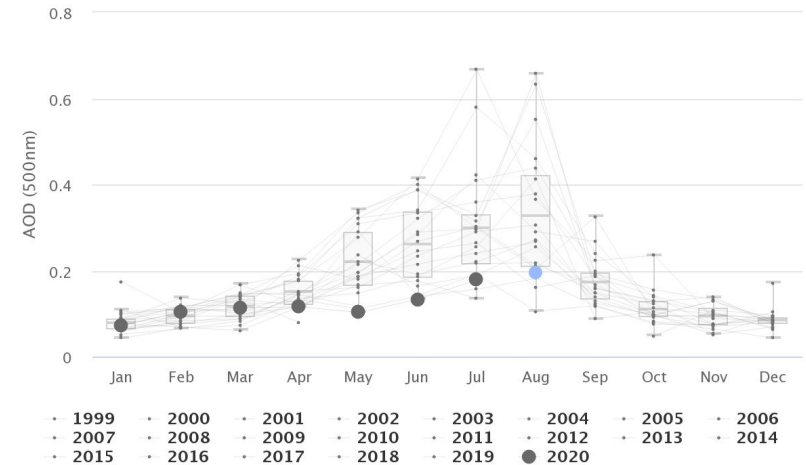
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

August 2020 deviation



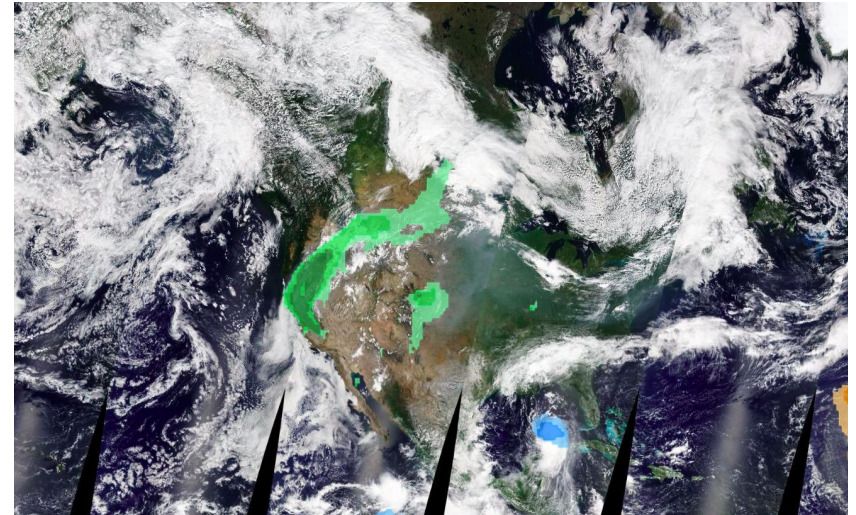
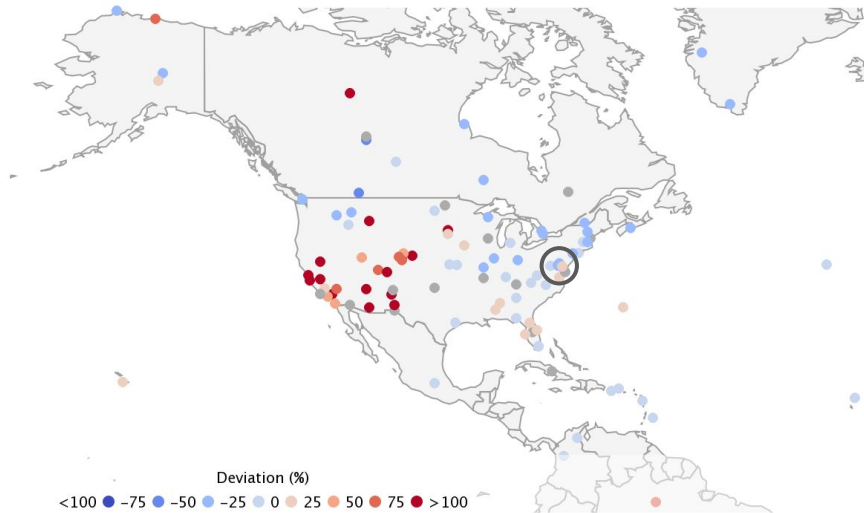
MD\_Science\_Center (-40.3%)



# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in North-America

August 2020 deviation

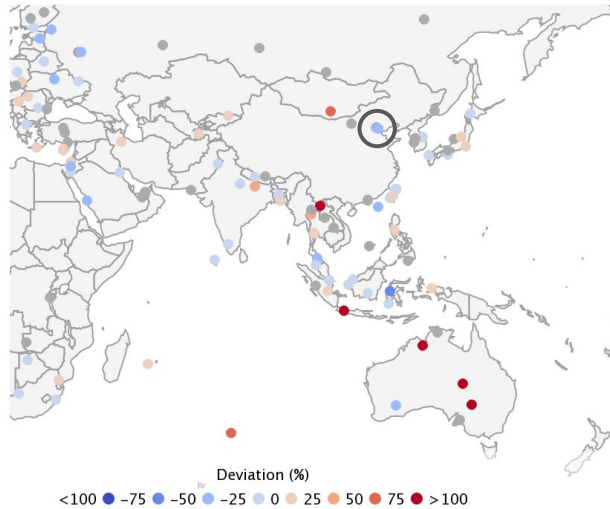


Biomass burning, August 10<sup>th</sup> 2020 (source: <https://aerocom-alerts.met.no>)

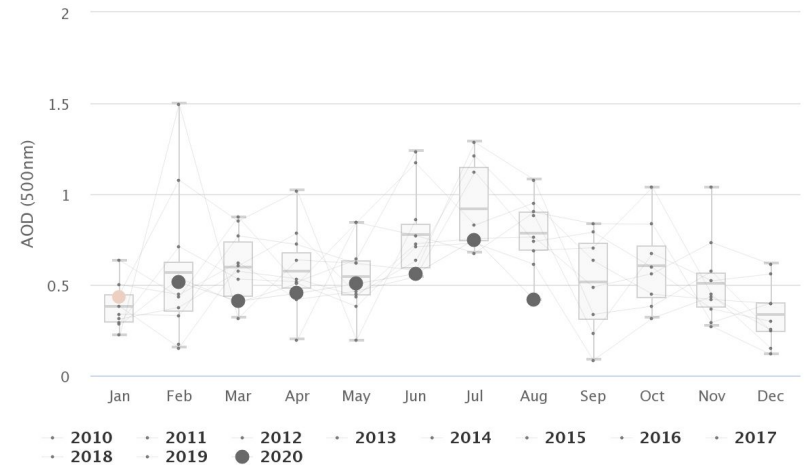
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

January 2020 deviation



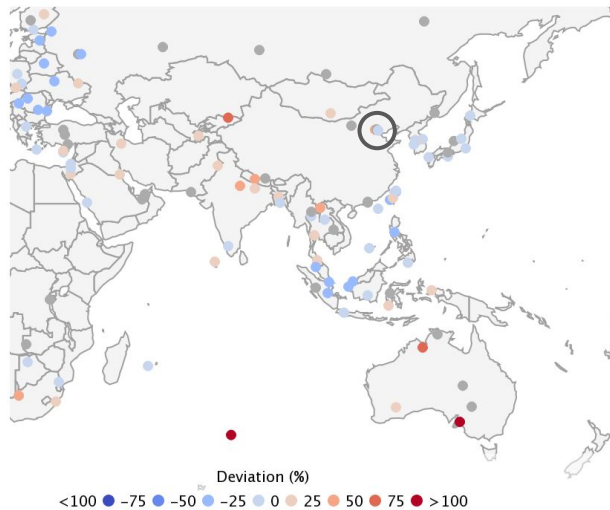
Beijing\_RADI (12.0%)



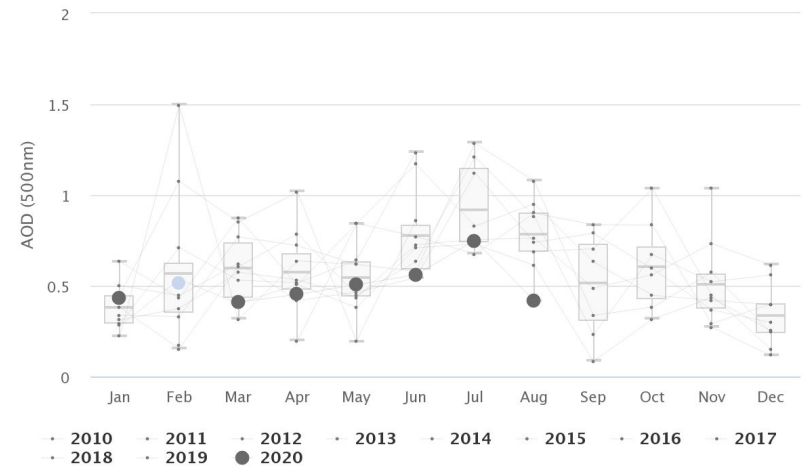
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

February 2020 deviation



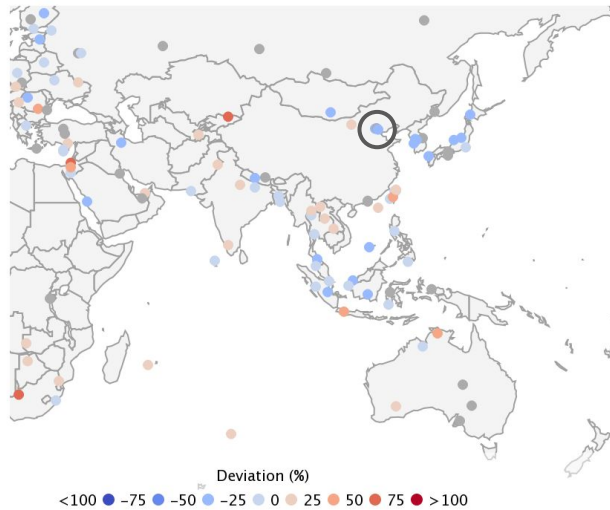
Beijing\_RADI (-9.5%)



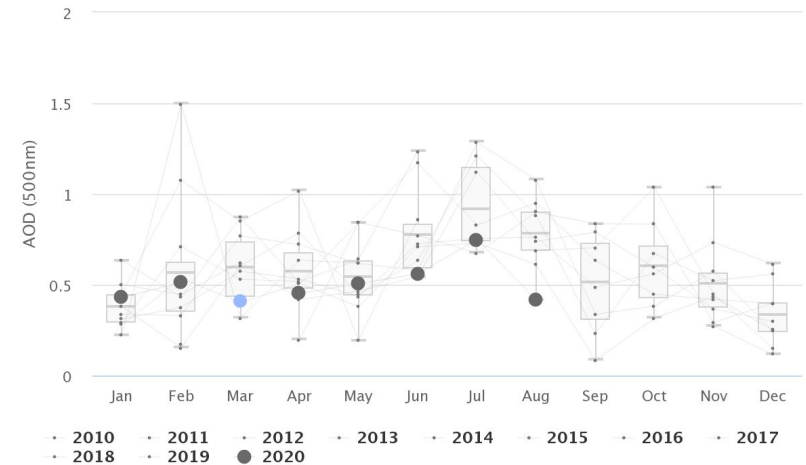
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

March 2020 deviation



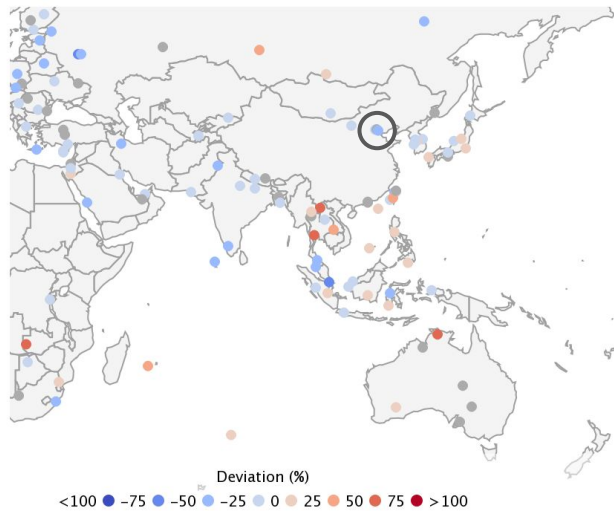
Beijing\_RADI (-31.2%)



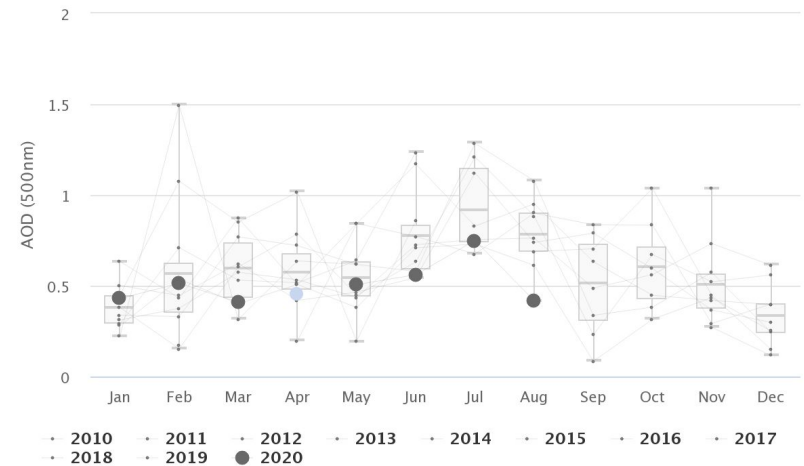
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

April 2020 deviation



Beijing\_RADI (-20.9%)

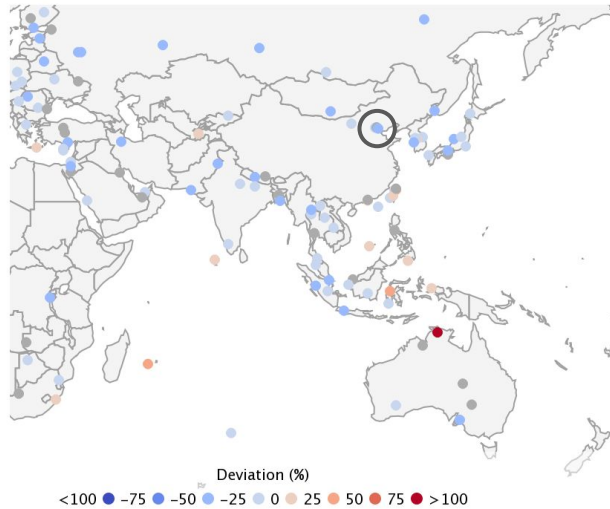




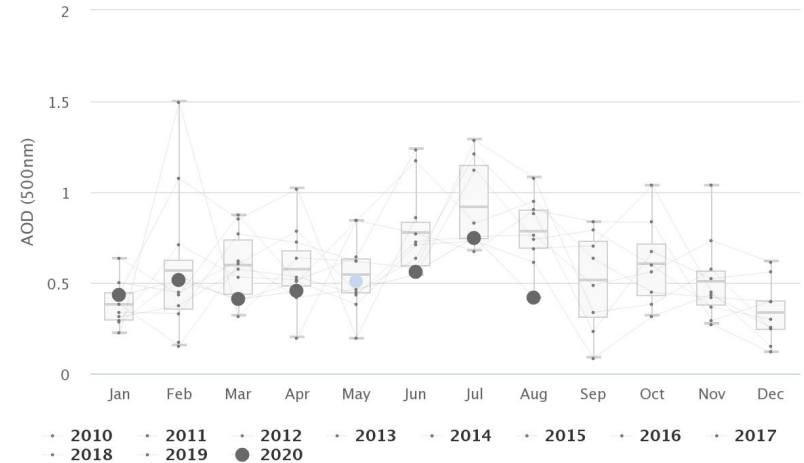
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

May 2020 deviation



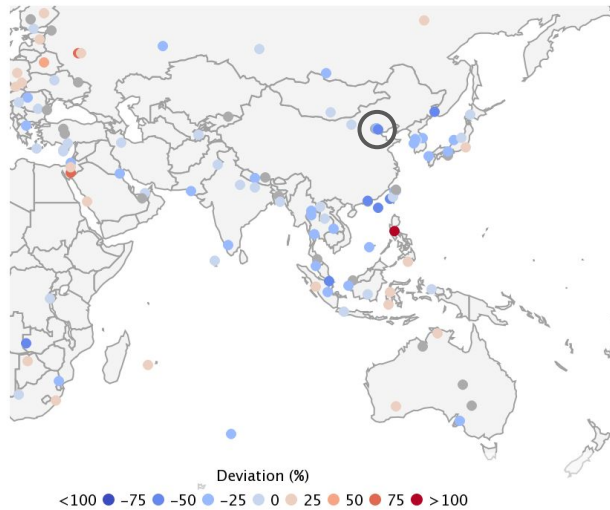
Beijing\_RADI (-7.0%)



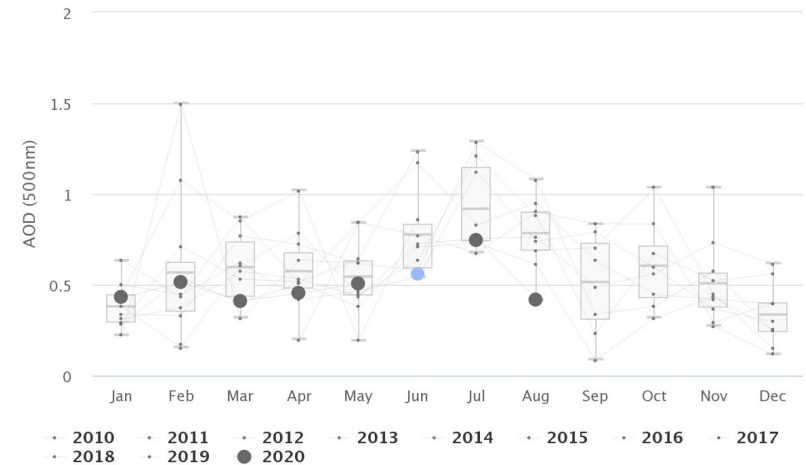
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

June 2020 deviation



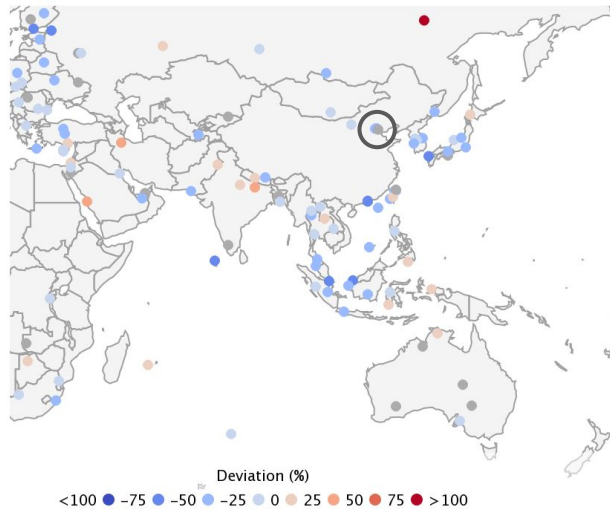
Beijing\_RADI (-28.0%)



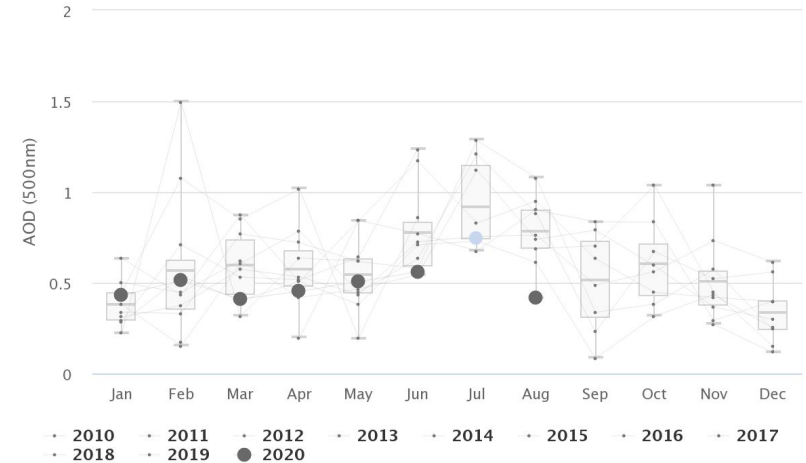
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

July 2020 deviation



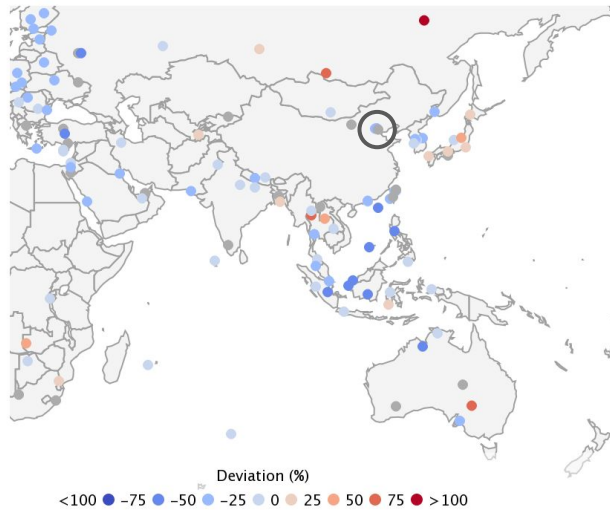
Beijing\_RADI (-18.4%)



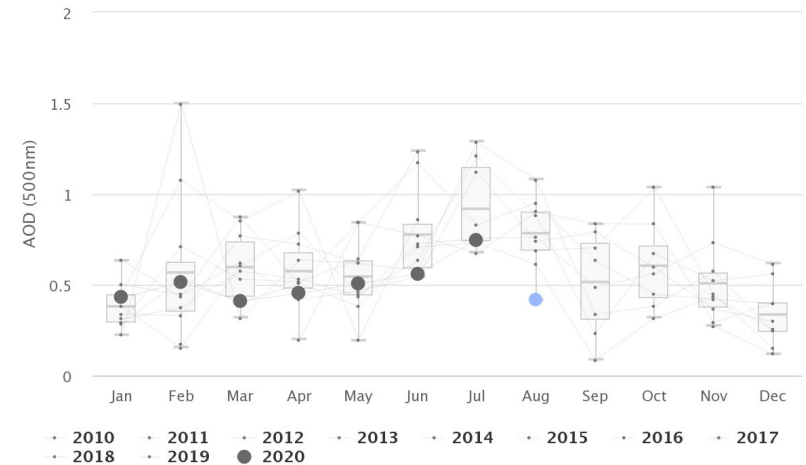
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in Asia-Australia

August 2020 deviation

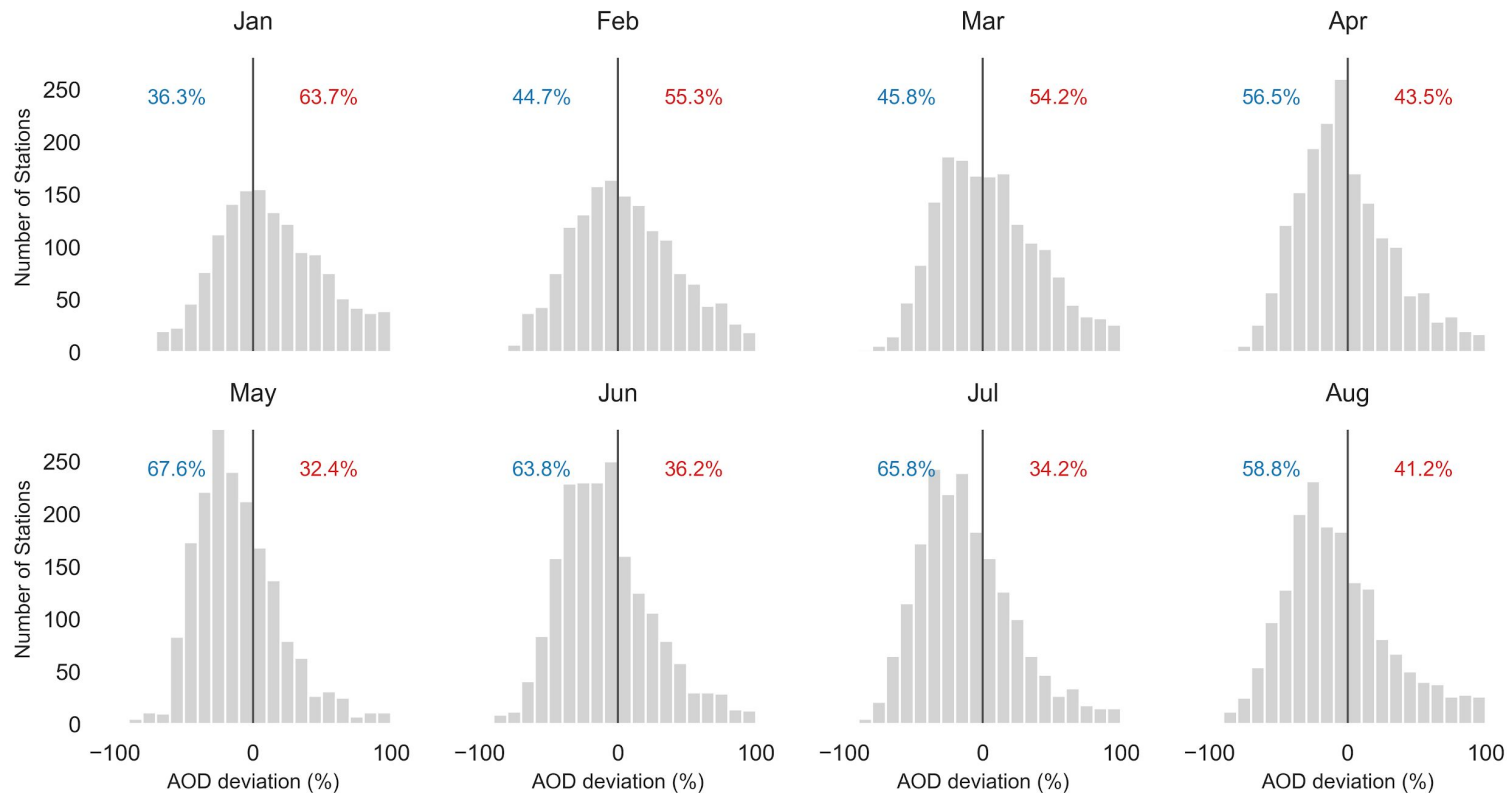


Beijing\_RADI (-46.6%)



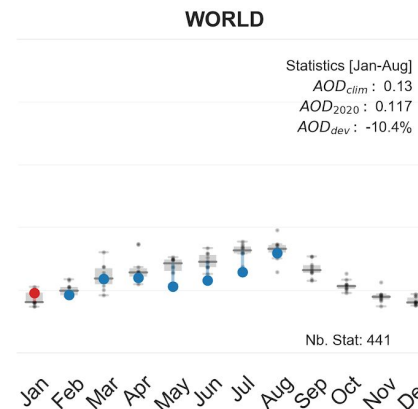
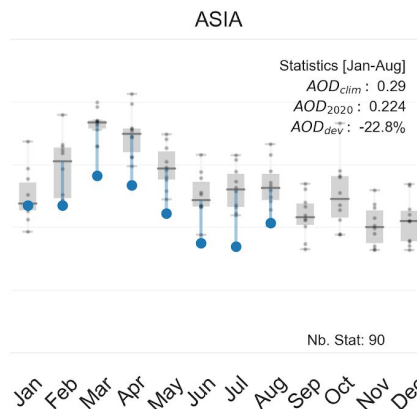
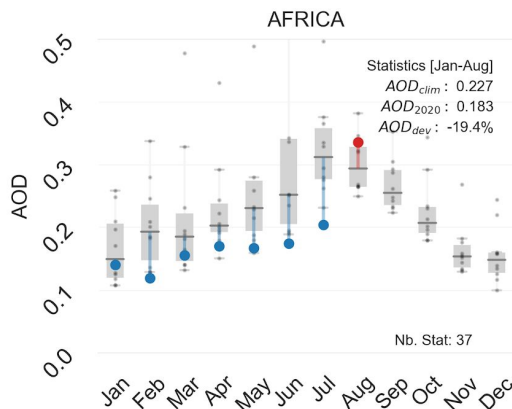
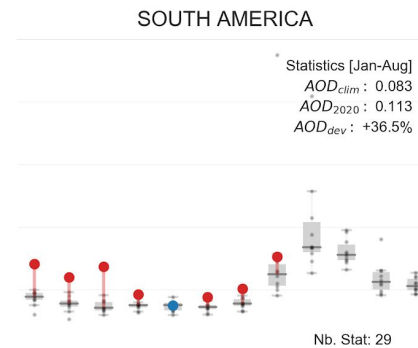
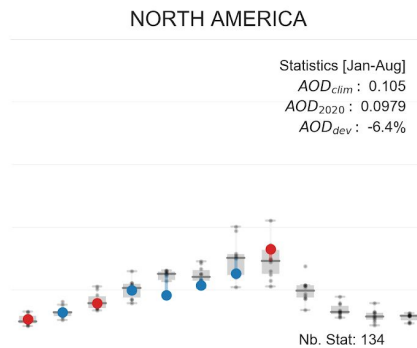
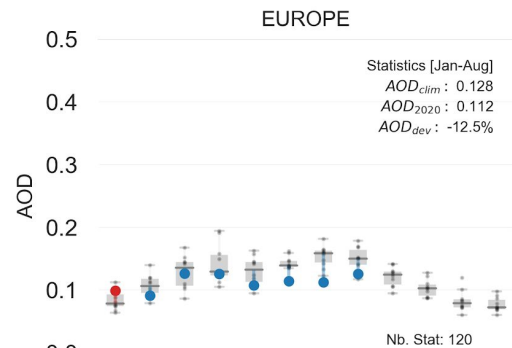
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation - Some global statistics



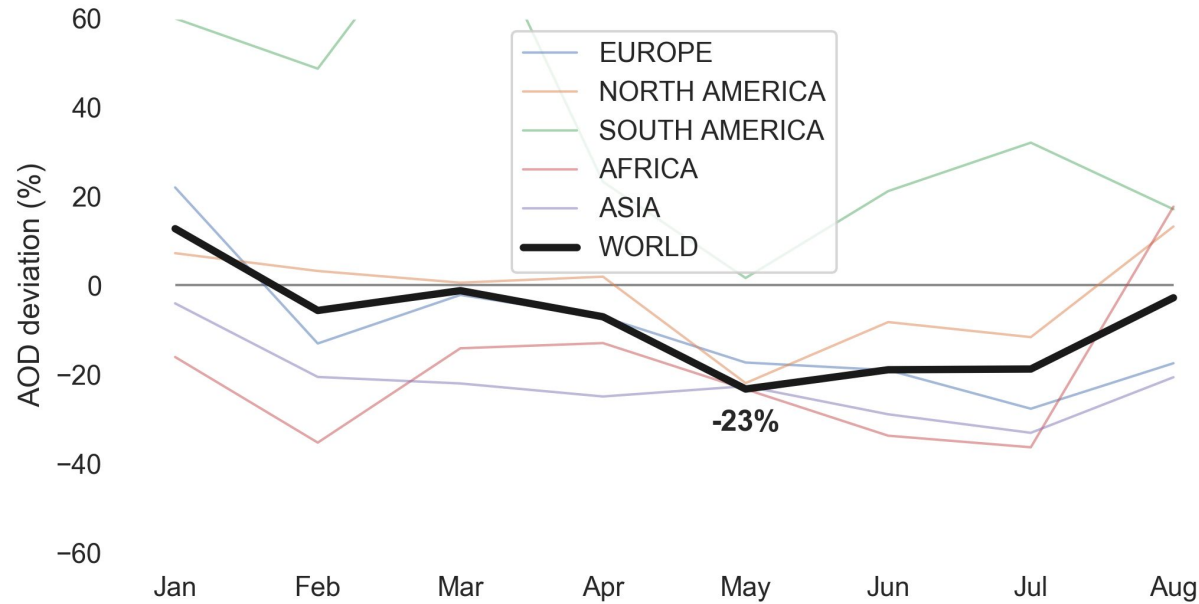
# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation - Regional analysis



# Impact of COVID-19 on AOD - Preliminary Results

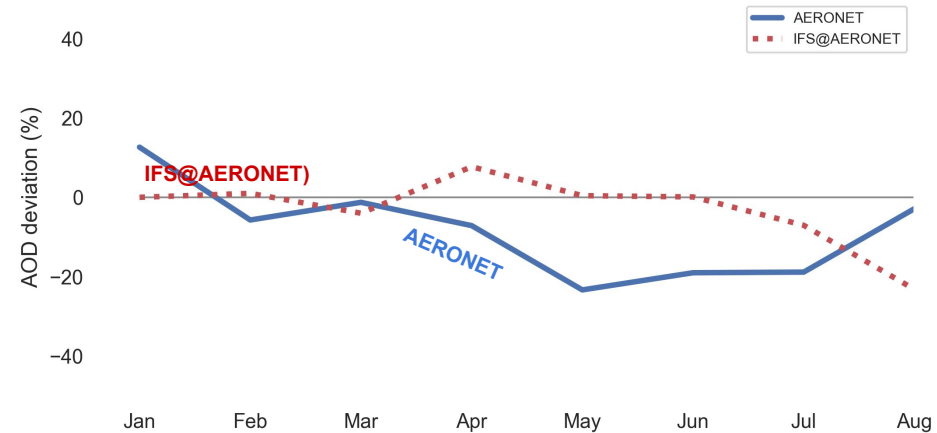
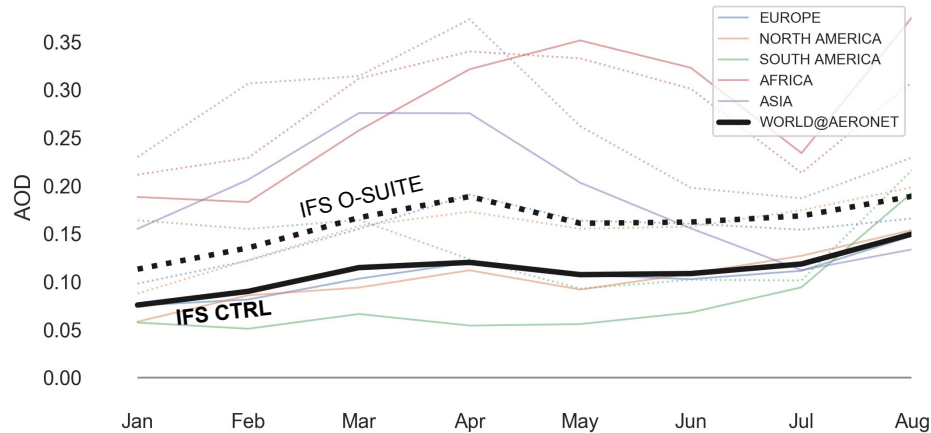
## AOD deviation - Regional analysis



# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in ECMWF-IFS (CTRL/O-SUITE)

IFS CTRL: no assimilation / IFS O-SUITE: satellite AOD assimilation (MODIS)



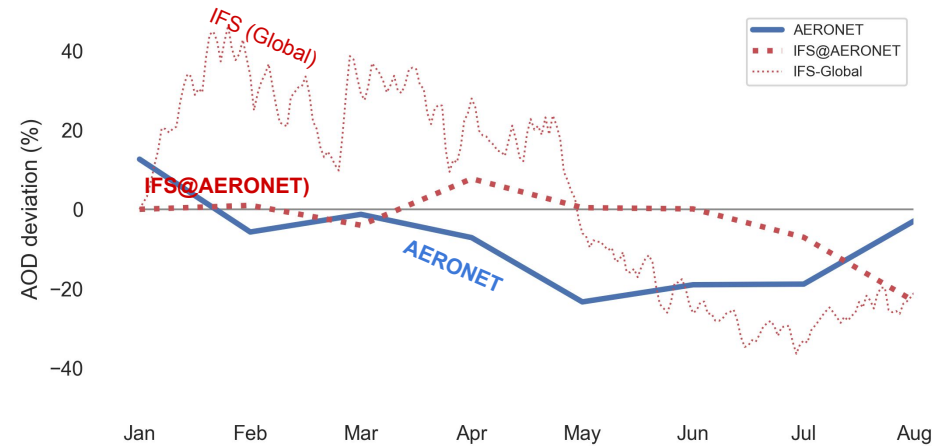
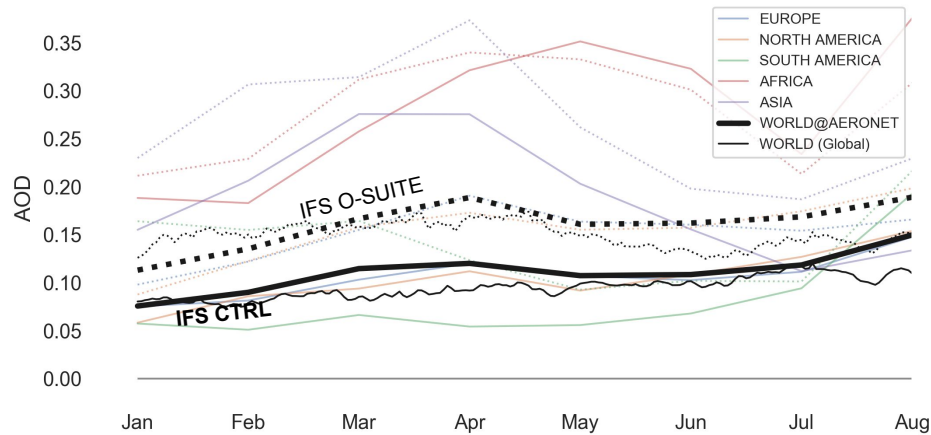
\* IFS: relative bias between O-SUITE and CTRL normalised to the relative bias in January.



# Impact of COVID-19 on AOD - Preliminary Results

## AOD deviation in ECMWF-IFS (CTRL/O-SUITE)

IFS CTRL: no assimilation / IFS O-SUITE: satellite AOD assimilation (MODIS)



\* IFS: relative bias between O-SUITE and CTRL normalised to the relative bias in January.