

Covid-19 Outbreak and Interdisciplinary Research

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Abstract

This interdisciplinary discussion paper is based on the satellite data analysis of aerosol load present in the atmosphere before and after the COVID-19 spread. From the analysis it is seen that the aerosol load present in the atmosphere due to many anthropogenic activities reduced appreciably. Authors have analysed last 20 years (2000-2019) Moderate Resolution Imaging Spectroradiometer (MODIS) data sets derived Aerosol Optical Depth (AOD) data at 550nm wavelength band. The AOD anomaly brought out from COVID-19 week shows appreciable reduction in AOD over the entire Indian sub-continent, except few pockets of Central and South West pockets India. This may be due to the delay in shutdown process of the industrial units present in these areas. This analysis is further brought out a message for future that we should use the air polluted resources judiciously.

Keywords: Lock down, covid-19, aerosol optical depth (AOD)

Introduction

As we are all aware COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and 1st case in India came in light on 6th March-2020. Keeping the severity of the virus spread India announced completely lock down in three phases

- i) 25th March-2020 to 15th April-2020,
- ii) 16th April-2020 to 03rd May-2020 and
- iii) 4th May-2020 to 17 May-2020 followed by Jantakurfew pledge on 22nd March-2020 (14 hours, 07:00 am to 09:00 pm).

India is diverse country in cultural, socio-economic, demographic and academia point of view. Indian Government took initiative and issued the general guidelines for each and every group of society peoples (approximately 1.3 billion) like general public, doctors, policemen's, essential service peoples etc. In-spite of all efforts of Government due to disparities of various sectors of society and migrant workers problems COVID-19 cases (till 14th May 08:00 IST) was officially reported as 49219 active, 26234 cured and 2549 deaths. The nature of the COVID-19 spread or mutations have varied experience all over the globe, this leads to another difficulty in diagnose the exact nature of the virus. Even the life cycle of this new virus is completely different from the other viral infections in the past. Sometimes its behaviour reflects contrary to the natural behaviour as nature itself has some periodicity or signature of understanding its events. This pandemic increase and global spread and deaths of the COVID-19 cases almost in all age groups forced to look into all sectors of society its best way to move forward. In this direction a group of elite people's working day and night interdisciplinary way to search the optimum solution in terms of vacancies, economy, social and emotional life of country,

natural balance and changes observed in nature globally after shutdown the various activities. This lockdown and shutdown anthropogenic activities throughout the globe generate an interdisciplinary confluence of all sectors of elites. In this way the current theme is very appropriate to discuss interdisciplinary experiences. Past studies by Dey *et al* (2004) [1], El-Askary, *et al* (2004,2006) [2] & Gautam *et al* (2013) [4] of remote sensing data over Indo Gangetic Plain (IGP) of India shows appreciable increase dust load mainly in pre monsoon and winter season.

In this presentation we have seen certain natural events features analysed from the satellite data before and after of the COVID-19 events. This analysis will be very useful in making the roadmap of future activities or planning in a more self-reliant way.

Data and Methodology

Aerosol Total Optical Depth (AOD) data of Moderate Resolution Imaging Spectroradiometer (MODIS) utilized for this study is globally available at the following link: <https://modis.gsfc.nasa.gov/data/>. This data is global and we have extracted for Indian Subcontinent and calculate Long Period Average (LPA) of 20 years. Then we have taken 01st to 07th April -2020, COVID-19 as reference week and calculate anomaly from LPA. This departure from reference week over Indian Subcontinent generated graphically and presented in this paper.

Results and Discussions

We know that Aerosol Optical Depth (AOD) is the degree to which aerosols prevent the transmission of light by absorption or scattering of light over a vertical column of unit cross section. The aerosol optical depth generated from 20 years data (2000-2019), known as Long Period Average (LPA) at 1⁰

x 1⁰ MODIS data (Figure 1) shows that Indo Gangetic Plain (IGP) is one of the main contributors of aerosol load in India. This potential contribution is reduced appreciably over the IGP region (Figure 2) during the lock down period of COVID-19 spread in India. This information is very useful for deciding our anthropogenic activities in a balanced way. It is well known that dust is a potential contributor of respiratory diseases. So, reduction in dust load is favourable to boost up the immunity of the peoples of each age group. These results of this analysis are suggestive to regulate the industrial, agricultural, social and economical etc in a phased manner. This will support the lives as well as environmental balance of the entire ecosystem.

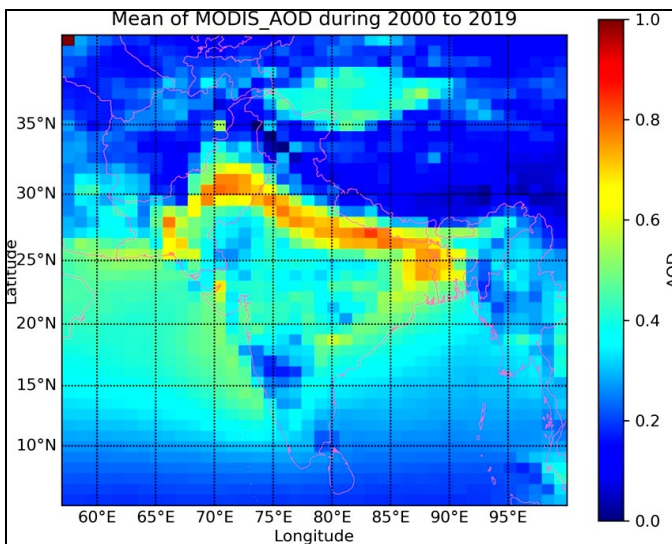


Fig 1: Mean of MODIS-AOD data (year 2000-2019)

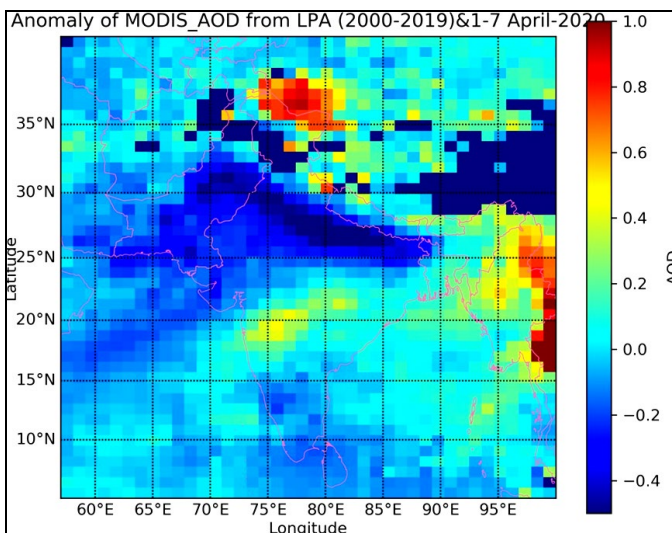


Fig 2: Anomaly of MODIS-AOD from COVID-19 week AOD

Concluding Remarks

The following points are brought out from the above study

1. There is an appreciable reduction of the Aerosol Optical Depth over IGP area and almost in entire Indian sub-continent during Lock down period of COVID-19 spread.
2. By examining the potential zone of AOD we can decide the commercial, social or economical activities in a phased manner.
3. Some pockets in India shows marginal decrease of AOD values , this may be delay shutdown of commercial or industrial activities or local influx of moist convection suspended quasi stationary over the area for few days.

References

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