

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2020-1227

Anonymous Referee #1

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Referee comment on "Measurement report: An assessment of the impact of a nationwide lockdown on air pollution – a remote sensing perspective over India" by Mahesh Pathakoti et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1227-RC1>, 2021

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Review for Pathakoti et al., "**Measurement report: An assessment of the impact of a nationwide lockdown on air pollution – remote sensing perspective over India**"

Here authors use tropospheric NO<sub>2</sub>, CO and AOD<sub>550nm</sub> observations from OMI, TROPMI and MODIS satellite instruments to quantify changes in atmospheric composition during different phases on lockdown in India. Authors show that composition changes are non-uniform over India and some region even indicate increase in tropospheric NO<sub>2</sub> column or AOD<sub>550nm</sub>, that could be attributed in the changes in fire activity or changes in meteorological fields. However, there are still significant shortcomings in the manuscript. I would recommend the manuscript for publication, if authors can address some of the concerns mentioned below.

Major Comments :

- Authors did not use simple spell check available in Microsoft word. It is not easy to review a manuscript with so many spelling mistakes and/or forgotten spaces.
- Data processing section is very vague. I could not understand which data version is used, how level 2 data was converted in level 3, or which data quality flags are used. It would be good idea to write in detail (or provide Python code in the Appendix). I will also strongly recommend authors to upload processed data file on some online repository such as <https://zenodo.org>, so that interested readers can compare it against their processing method.
- Numbers in Figure 10 are not easy to read. Just add a table either in the manuscript or in a Material containing percentage changes in TCN and AOD for individual states for different phases.

Minor comments:

- Please correct all the grammatical mistakes.
- Affiliation looks very odd, there is comma after the name. Is it necessary to mention so many Divisions? Have a look at some good reference paper and follow the standard.
- There is only one TROPOMI instrument so just say define S5P-TROPOMI once and the use just TROPOMI throughout, same with OMI. For MODIS, you can try to keep corresponding platform names.
- Line 769: Try to use some standard tool to manage the references. Alono et al., should be placed somewhere at the top.
- Line 16: May2020 – May 2020
- Line 17: Phase IV
- Line 19 : sectors “space” were halted during lockdown (LD) “space” which
- Line 20 : followed then “space” (phase-I and phase-II)
- Lines 34-25 –Aqua and Terra are platforms not satellite instruments.
- Line 45: Tian et al., 2020 is about China, so say (e.g. Tian et al., 2020)
- Line 54: burnings
- Line 72 : remove “only”. Also use appropriate reference for both as CO emission sources and lifetime estimates that are known for few decades.
- Aerosols in not correct. Use “aerosol” throughout the manuscript.
- Line 88 to 90- Are you discussing about India?
- Line 93: Follow ACP guideline for citation.
- Line 100-103: Confusing sentence, reword it.
- Line 110: Just sharpen the sentence to say what is new in this study.
- Line 126: Write bit better description. Also write Version numbers and proper references (e.g. Lamsal et al., 2021, AMT for OMI V4 data or if you are using it.)
- Line 143: As per table 1, it should be ERA5. ERA-interim stops in 2019.
- Line 147: January 2014 should be enough if you don’t want to write 31<sup>st</sup>
- Line 149: You do not detrend data to remove interannual variability. You detrend it to remove long-term changes.
- Line 153: Do you mean individual states in India?
- Line 155: What is climatological. Monthly/weekly or daily mean values for all years are subtracted from the daily values? OK, I noticed on line 220 that you are using daily valux. But processing description is somewhat scattered (sometimes it is daily and sometimes it is weekly or averaged over different period. Try to be bit more consistent.
- Line 155 : were calculated
- Line 159: remove “which was”
- Line 162 : Do you mean quality flags?
- Line 163: reword it. Region of interest used twice in once sentence. Do you mean your resample quality flags as well?
- Line 168: thereafter or Then after?
- Line 219: again detrending does not remove inter-annual variability.
- Line 228: if you redefining TCN and do it for TCC or don’t do it altogether.
- Line 236 – Figure 2: use slash (/) for dates at figure titles. It is somewhat confusing to read 01.01.20-07.01.20 that 01/01/20 to 07/01/20.
- Line 240-241- Seems to be far fetched. Do you have any evidence?
- Line 259: Are you sure of steel and cement industries near NCR . If it is true, it would

be great if you can give some web link with the industry name and their capacities. I tried to find some information in the reference that was included but no luck.

- Line 260: What about central west region (e.g. Gujarat), it shows significant increase during phase I LD.
- Line 263 – were given
- Line 275: sea breeze effects are ok for coastal area but inlands (e.g. Hyderabad, Bangalore)? Also confusing explanation. Why this effect should be minimum during normal years? I think it must be meteorology in the South India is way different than the North India or it might be due to sampling error.
- Line 306- years - year
- Line 320 – authors -> Lal et al.,( 2020)