Review of Nomura et al., 2021: *Measurement report: Regional characteristics of seasonal and long-term variations in greenhouse gases at Nainital, India and Comilla, Bangladesh*

Nomura et al., present a new set of measurements from two sites on the Indian subcontinent, Nainital in northern India and Comilla in Bangladesh. Despite its large contribution to global greenhouse gas emissions, and the potential for future growth, atmospheric measurements from the region – required for top-down estimation of GHG emissions – are sparse. The analytical techniques described are appropriate, though I would like to see some additional information (see comments below), and the measurements themselves appear to be of high quality. For these reasons, the data presented merits publication in ACP, though I would like to see some consideration of the following points:

Major comments:
L103 – the authors state that they have estimated a small contribution from local sources. This might well be the case, but it would be good to know how this was estimated. The nearest populated region is fairly close for a background station, can the authors be sure that this urban area is not having a large effect on the measurements at NTL?

L112 – similar to my last comment, how can the authors be sure that CLA is not overwhelmingly influenced by local emissions. The inlet at CLA is fairly low (8 magl), and I would be concerned that local burning, agricultural emissions etc. might regularly 'drown out' regional signals. This requires some additional discussion in the main text.

L122 – given this is a 'measurement report', I would like to see some more detail on how the measurements were conducted. For instance, what was the procedure for analyzing CO_2 on the NDIR. Is the final measurement on average of a set-length injection? How often was the standard analyzed? It would also be good to see the average measurement precision for each species.

L169 – the back-trajectories shown are single particle trajectories. These trajectories don't appear to indicate when the particle is within close contact with the surface, and when it isn't. Without such information, the trajectories don't offer much additional information, e.g. a trajectory may originate over the Indo Gangetic Plain, but if the particle is many kilometers above the surface, it is unlikely to interact with potential sources? At the very least, this needs to be acknowledged in the main text.

L179 – I share the concerns of reviewer 1 with regards to the averaging of data into 10-day averages. It would seem to make more sense to calculate the long-term trends from the raw weekly data, as opposed to applying an average that in some cases only includes 1 data point. I would recommend calculating the long-term trends from the raw data or provide more detail on why a 10-day average is appropriate.

L280 onwards – I expect to see plenty of detail in a measurement report, but I found much of the results section to be overly verbose, to the point that it detracted from the main points of

discussion. I would suggest that the results section of the paper would benefit from some shortening, and that the authors concentrate on some of the more important findings. Specific examples:

- L263:300 – discussion of the different crop cycles is interesting, but does could be shortened and references condensed
- L454-482 – the conclusion that CO variability is linked to crop residue burning is compelling, however the same conclusion could be reached with significantly less text

Technical corrections:

L42-43 – end of first sentence needs restructuring

L43 – 'emerging' seems like a poor choice of word here. Perhaps 'developing' would be more appropriate

L82 – need to subscript CO2

L88 – 'believed to be'

L209 - 50–470 ppb of what?

L339 – typo 'fairy' needs to be corrected to fairly

L395 – the seasonality at Darjeeling is within the uncertainty of the seasonality estimated for CLA. Are the sources near to CLA similar to those at Darjeeling?

L492 – mainly should be 'main'