

Review of “Measurement report: Ammonia in Paris derived from ground-based open-path and satellite observations”

This paper analyzes NH₃ measurements from the IASI instrument on the Metop-B and Metop-C platforms and from a miniDOAS instrument located in the center of Paris. The two datasets are shown to be correlated overall and also on seasonal and weekly time scales. These analyses suggest that traffic is the very significant source of NH₃ in Paris, except in the spring. A source contribution approach (PSCF) uses the miniDOAS data and ERA-5 meteorological fields to demonstrate that transport from agricultural regions to the northeast, east and southeast dominates in the spring. The contribution from traffic is further confirmed by comparisons with weekly and daily traffic and NO₂ data.

This is a clearly organized and well written paper that adds to the growing body of work on NH₃ sources and variability in large urban areas. It requires only minor revisions to be acceptable for publication.

Technical comments

1. The authors need to make clear in the section 2.1 that there is only one miniDOAS instrument and provide its location. This becomes apparent later in the paper, but it would make the earlier sections clearer if stated up front.
2. On line 62 comment on why there are pollution episodes every spring in Paris.
3. Is the center of the IASI pixel used to determine if it falls within the averaging box? If yes, please state this.
4. While the authors do discuss the trade off between analysis box size and number of IASI samples, to justify their choice of a 50 km window, given the high spatial variability of NH₃ it is certain that the air masses sampled by IASI and the miniDOAS are very different. Could the high correlations in spring between the two datasets be attributed to the fact that the main sources of NH₃ are outside Paris? Do the authors think that the lower correlations in spring and fall could be in part due to urban sources playing a larger role, which may drive greater variability within the 50 km box? Any further comments on the spatial variability issue?
5. On line 173 the authors state that correlations between the IASI and miniDOAS observations are independent of atmospheric temperature and PBL height, and point to Figure S1. This figure is not very convincing. And it contradicts the statement in section 3.3.2 (and in the conclusions) that the miniDOAS observations are sensitive to the PBL height, as they measure a local concentration, while the FTIR (and IASI) are not, as they measure columns. Thus it is difficult to believe that the correlation does not depend on PBL height. I suggest either removing the statement, or clarifying it by calculating and showing the correlations within temperature and PBL bins.
6. The PSCF is shown for all data points and for spring. I suggest showing this function for summer and fall also. If it shows that the NH₃ sources in these seasons are within the urban area, it would provide an additional argument to the importance of urban sources.

Minor revisions

Line 1 :Title is odd: I would remove the “measurement report” phrase.

Line 36: ...which plays a role in ...

Line 62: ... are observed almost every spring ...

Line 69: ... their variability ...

Line 99: ... day and night, and does not suffer from sampling artifacts, since it does not use a filter or inlet, unlike other commonly used instruments (*also provide examples of instruments, not just references*)

Line 101: Using ammonia measurements obtained from the miniDOAS at the QUALAIR super-site (40 meters above ground level, <https://qualair.fr/index.php/en/english/>) in the Paris city-center, Viatte et al. (2021) demonstrated the contribution of NH₃ to particulate pollution events that occurred

Line 117: ... 2020], which is built from observations recalibrated into a global assimilation model at a 30 km resolution.

Line 132: Using the hourly ...

Line 145: we used the oversampling method described by van Damme et al. (2018), which takes into account the real elliptical sizes of each IASI pixel...

Are the values in this map ever used in the analysis? Please clarify.

Line 212: ... because of the multiple high pollution events ...

Line 230: city center. Note that ...

Line 258: ..., in the spring of 2020, 2021 ...

Line 278: ... top row ...

Line 279: *Make blue dot larger*

Line 317: *suggestion for Figure 5: always use the darker color for miniDOAS*

Line 380: ...assessed using joint observations ...

Line 390: ...due to fertilizer spreading ...

Line 393: The PSCF analyses indicate that the agricultural regions to the east and northeast within 100 to 200 km from Paris city-center have the greatest impact on the NH₃ budget in Paris.

Figure S3: *cite source for these data.*