We would like to thank the reviewer for the helpful suggestions and have made changes to the manuscript to reflect the suggestions made. Individual comments from the reviewer are bolded below with our response in italics.

Review of Judd et al. -- Evaluating the impact of spatial resolution on tropospheric NO2 column comparisons within urban areas using high-resolution airborne data
The authors investigate the impact of spatial variability on correlative studies for the validation of satellite trace gas products with ground-based instruments. High resolution airborne imaging DOAS measurements from GeoTASO, ground-based Pandora, and two OMI satellite products are used. The paper is generally well written and of significance for the validation of satellite trace gas retrievals. I therefore recommend publication in AMT after some minor revisions.

General comments
The introduction should contain an overview of existing airborne imaging DOAS systems
We have added a short literature review of other mapping spectrometers in the introduction.

Information about the campaign is scattered in the manuscript. A solution could be a campaign sections, with a description of the target sites (urban/rural, # of inhabitants, industrial emitters…), as well as a description of the measurement conditions (Date, time of day, SZA, AOD, meteorology…) maybe as a table… Here you should also give an overview of the flights presented in this study to help the reader

We have added a campaign section at the beginning of section 2. This includes an overview of the purpose of each campaign, number of flights, total hours, areas measured as well as some discussion on typical meteorology and SZA and a table that summarizes some details about each flight.

I could not find any information about the DOAS fit settings used (except the fit window). Please provide that information (cross-sections, I0, Ring, …), e.g. in a table.
We have added information about the DOAS fit under the Airborne NO_2 retrieval section (now Section 2.4.1).

You often refer to differences in spatial resolution of the a priori inputs. It would be nice if you could provide the spatial (and temporal?) resolution of the SP and BEHR products.
The spatial resolution of the a priori input to the AMF calculation is finer for BEHR than SP. Discussion about the specific differences on surface reflectivity, terrain pressure, and NO2 profile are added to the OMI section.

You often state that the Pandora measurements are representative up to a certain pollution scale. In my opinion this statement is not correct. The representativeness depends on the spatio-temporal variability of NO2 at the Pandora location. You use an NO2 threshold to filter out data with large variability, but the magnitude of NO2 itself is not an indicator for the representativeness. I think you should amend the manuscript to reflect the differences between the physical reasons (variability) and the methodology (filtering by threshold).
We agree with this statement and in hindsight believe the original statement was worded poorly (and backwards, as it is the spatial scale of the satellite retrieval that may not be representative of the

features Pandora is observing). We amended the text to reflect these points and attempted to more clearly express the purpose of applying the thresholds. Please see the appropriate areas of the abstract, Sect 3.2, and conclusions in the revised submission to see how these points were edited to emphasize these conclusions.

Detailed comments & technical corrections: Page	Line	Comment
2	26ff	**You mention: "development of […] instruments" but you then only write about GeoTASO. I think you also had GCAS in mind. I suggest to explicitly mention it. Here you could also refer to other instrument previously used.** *Added GCAS as well since this is also a NASA supported instrument. There is also now a short literature review on other airborne spectrometer research efforts as well.*
2	35	**"… such as NO2." NO2 is not a product, but a chemical species. Suggestion: NO2 tropospheric vertical column densities.** *Added tropospheric vertical column densities as suggested.*
3	21	**What is the field of view in degrees?** *It is 45 degrees, which is stated within the section.*
4	3	**Is the spectral resolution constant over the spatial dimension? If not, how does it vary?** *The spectral resolution does not vary over the spatial dimension (within 0.01nm).*
4	7	**How many spectra are co-added for the 250m (or what is the speed of the aircraft)** *The across track dimension is separated into 33 across track positions with ~30 images per bin. For the along track dimension, the code considers the median aircraft speed at altitude (typically about 100 m/s) and then calculates how many along track spectra are needed to get closest to 250m. Typically, it comes results in around 300 spectra coadded to get 250 x 250 m.*