Taha et al., report an approach to quantifying peroxynitric acid and peroxyacyl nitrates (PNs and PANs) by combining the techniques of differential thermal dissociation (TD), peroxy radical chemical amplification (PERCA) and cavity ring down spectrum for NO_2 detection (CRDS), named TD-PERCA-CRDS. The instrument has single channel (on-off mode), duel channel (background NO_2, background + amplified NO_2) and four channel detection modes (differential temperature measurement). The chemical amplification module is optimized by injecting 0.6 ppm NO and 1.6% C_2H_6, the chain length (CL) is range from 20 to 70. They found that the measurement was suffered with the ambient O_3 interferences by thermal dissociating O_3 to O above 150 ^oC and the following reaction with ethane; the differential temperature TD-PERCA-CRDS at 60-110 ^oC was also unfeasible in ambient due to the unknown interferences in ambient air. Compared with TD-CRDS /LIF/CAPS, this technique still can't be well performed in field measurement, while the adding of PERCA provide a way to improve the detecting capacity of PNs and PANs to several pptv level. Overall the manuscript is well written and would be of interest and contribute to the community, I recommend this paper to be published on AMT subject to these comments below.

Major comments:

1. This instrument can calibrate the CL for several PNs or PPN produced in the lab at certain temperature and RH, but the CL is highly varied for different kinds of peroxynitric acid and peroxyacyl nitrates in ambient conditions, which also prevent the application of field measurement.
2. Is it possible to carry out the simultaneous measurement of CIMS with the four channel detection measurement in ambient condition to look insight of the unknown species? CIMS measurement might provide some useful information about the unknown interference.

Specific comments:

1. Line 105, if the majority of the experiments conducted by single-channel TD-PERCA-CRDS, the schematic figure of the single channel is worth to be shown in

Figure 1.

2. Line 45 and line 457: “10s to a few 100s” change to “tens to a few hundreds of”.
3. Line 228, it is not necessary to set the single sentence to a paragraph.
4. The format of tables (1-6) does not conform to the academic norm.
5. Section 3.5.2, suggest the authors unify all the units to be pptv.
6. Line 893 the legend in Figure 7. (A): “Legend Sample time series of PNA observed by TD-PERCA-CRDS in the reference, NO_2 channel (shown in **green**) and PERCA channel (**grey**).” is not consist with the description in line 274, please correct it.
7. Is figure 8(A) only show part of the data presented in figure 7(A), as we can see the maximum NO_2 in figure 7(A) was about 20 ppbv while in figure 8(A) the maximum was only 16 ppbv. The authors should clarify it.
8. Figure 10 shows the CL dependence on the radical concentration (PAN, PPN and PNA), the PNA seems decreasing with the increasing of PNA concentration, and in line 320-335, no text gave the description or explanation about PNA dependence, I suggest adding some words to describe the CL dependence on the PNA concentration.
9. I suggest the authors summarizing the existed TD techniques that applied in the field measurement of peroxynitric acid or peroxyacyl nitrates, which offers convenience to the readers and contributes to the community.