Report on A fast and precise chemiluminescence ozone detector for eddy flux and airborne application by Zahn et al.,

The paper describes the production of a “gusten-type” fast response detector. The basic technology of the detector has been in use for decades. The paper describes the mechanical and electrical set-up and the performance of the instrument and the development of an off an off the shelf device. It is clear that the work has been carried out with very careful attention and the supporting experimental evidence is impressive. However, whilst the authors suggest that they do not wish to discuss the performance of CI sensors discs, this may be the limiting factor and if they wish to market a dry chemiluminescence (CI) instrument for fast and precise measurement of ozone (O3), this will be a key parameter and I feel needs to be addressed.

The points that need to be addressed are

1. Page 6540. OH is not necessarily the most efficient oxidizer in the atmosphere. This will clearly depend on the oxidant level and rate coefficient and for some alkenes this lifetime w.r.t to NO_3 can be less than that via reaction with OH (see for example Wayne, R.P., Barnes, I., Biggs, P, Burrows, J.P., Canosa-Mas, C.E., Hjorth, J., Lebras, G., Moortgat, G.K., Perner, D., Poulet, G., Restelli, G., Sidebottom, H., 1991, The nitrate radical – physics, chemistry, and the atmosphere, Atmos. Environ. A 25: 1-203.)

2. Page 6546. What is the standard deviation of noise you are referring to? 1 σ, 3 σ, this needs to be defined.

3. page 6547. What is the Reynolds number of the flow? Also the flows are quoted in litres per minute, under what conditions? It is mentioned that the residence time is not limiting the measurements, however it can be shown that if the temperature within the cell decreases (e.g. to 250K). The time response will be reduced to 44 Hz as a result of changes in flow. This will ultimately limit the response and it will be less than that of the electronics. The effect of temperature on flows, and hence time response, needs to be expanded

4. page 6550, the quality of fit is given in terms of R2, however, the key parameter that is required for the precision is the error (and at what level) in the slope. Can this be quoted throughout the manuscript as well as R2.

5. page 6552, A lot of the calculations with regard to laminar flow etc assume a flow in a tube, the instrument as described is not a simple flow within a tube, The change in cross sectional area will have a large impact on the flow regimes and can induce turbulence et. Have the authors performed any flow simulations of their actual set up?

5. Calibration frequency and inter disc variability
It is clear from the work of Muller et al., than calibration for the devices is an issue. The nature of a dry CI instrument of that the calibration will vary with time as the dry CI disc decays, an inherent problem of the device. Whilst the authors have shown that more frequent calibration is key for one disc (not at odds with the finding of Muller et al.). What are the errors induced, and hence alterations in precision, as a function of time? At some

point the disc becomes unusable, how will this problem be overcome? What s the lifetime of the discs during operation> Clearly using 10 year discs could result in distinctly different results from newer discs. The main problem will ne with inter-disc variability, as described by Muller et al.. Some discs simply do not function as well as others, thus the precision will vary for each disc used. This needs to be discussed or perhaps even better data shown to how this varies.

Minor typographical errors
Pg 6543 line 2, this should be fan not van
Pg 6542 line 25, should this be copper rather than cupper
Pg 6543 line 9, adverse conditions would more seem to suggest high Temperature, low temperature, do you rather mean awkward field sites?