Atmos. Meas. Tech. Discuss., 2, C1207–C1208, 2010
www.atmos-meas-tech-discuss.net/2/C1207/2010/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Total peroxy nitrates (ΣPNs) in the atmosphere: the thermal dissociation-laser induced fluorescence (TD-LIF) technique and comparisons to speciated PAN measurements" *by* P. J. Wooldridge et al.

Anonymous Referee #1

Received and published: 2 February 2010

This paper presents an update on the TD-LIF technique for measuring total peroxy nitrates, including an analysis of potential interferences and techniques to reduce these interferences. A summary of the measurement campaigns as well as a summary of comparisons with speciated measurements are also presented. In addition to providing an update on the status of this instrument, the general agreement between the TD-LIF results and the speciated measurements suggest that there are not significant concentrations of unmeasured PAN-type compounds in the atmosphere. The paper

is well written and suitable for publication in AMT. I recommend publication after the authors have addressed the following minor comments:

In general, this paper demonstrates that the TD-LIF technique is capable of accurately measuring total peroxy nitrates with minimal interferences under most atmospheric conditions. However, production of NO_x by peroxy radicals and ozone reacting with NO, as well as production of PANs from the reaction of peroxy radicals with NO_2 can interfere with this technique under high NO_x conditions. This paper provides a detailed analysis of these interferences, and describes modifications to the instrument inlet to minimize these interferences. It appears that the interference is only significant for inlet configurations B and C under high NO_x conditions, and may explain the poor agreement between the TD-LIF measurements and the speciated PAN measurements during INTEX B and PIE where the instrument used inlet C. The paper would benefit from some additional details on the levels of NO_x observed during these measurements in comparison with the other measurements where the agreement between the TD-LIF measurements and the speciated measurements was better. A column in Table 1 or 2 that included the range of NO_x values observed and the percent correction associated with these NO_x levels would help to identify these episodes.

It is clear that the inlet A configuration, where the drop in pressure occurs prior to thermal dissociation is the most appropriate for a wide range of conditions, including high NO_x conditions, as the interferences are minimal in this configuration. However, it appears that the inlet C configuration will still be used for remote locations. Obviously there are advantages and disadvantages to using the inlet A configuration under all conditions, and the paper briefly mentions that there are trade-offs in sensitivity, power consumption, size, and interferences for each configuration, but does not provide details for each inlet configuration. A brief discussion of the disadvantages of using inlet A would help in the justification for using inlet C for remote locations.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 3055, 2009.