



Ultra-sensitive and selective detection of Nitrous acid (HONO) in the atmosphere by the LOPAP technique

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In the present study, a simple instrument (LOPAP) for the ultra-sensitive detection of nitrous acid (HONO) is presented. In the instrument, HONO is sampled in a stripping coil in an external sampling unit, which can be placed directly in the atmosphere of interest. Thus, known artificial HONO formation in sampling lines by heterogeneous and photochemical processes is minimized. Two channels are used to correct for known interferences against e.g. mixtures of NO₂ and diesel exhaust components. The instrument has a time response of 2-7 min and a detection limit of 2-0.2 pptv and thus, is the most sensitive known HONO instrument.

The instrument was validated against the DOAS technique, both in the field and in a large smog chamber under various conditions. Since sampling artefacts and interferences were taken into consideration, excellent agreement was obtained between these techniques during daytime as well as night-time, which is in contrast to known intercomparison studies between chemical instruments and the DOAS technique. It is demonstrated that chemical instruments, which do not measure and do not correct interferences may significantly overestimate daytime concentrations of HONO caused by unknown interferences. This is of particular importance for the quantification of the recently proposed strong daytime source of HONO.