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The effect of the ambient nitrogen monoxide (NO) on the quantification of the total OH reactivity levels in Paris (MEGAPOLI winter campaign 2010).

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Hydroxyl radical (OH) is the most important oxidant of the troposphere, maintaining its self-cleansing capacity. Nowadays, the total atmospheric reactivity with OH can be measured by different techniques including the recent method developed by Sinha et al. (2008). This method consists in monitoring the concentration of a reactive molecule so-called 'OH tracer' (here pyrrole, C4H5N) through a small glass reactor by Proton Transfer Reaction - Mass Spectrometer (PTR-MS). The values obtained in the presence and in the absence of ambient air allow the quantification of the total OH atmospheric reactivity.

This method was deployed for the first time in Paris during the EU - MEGAPOLI (Megacities: Emissions urban, regional and Global Atmospheric POLlution and climate effects, and Integrated tools for assessment and mitigation) winter campaign (January 15 – February 15 2010). The campaign was characterized by different air masses: oceanic from the west and continental from the north-east area. The Paris OH reactivity levels were influenced by these different air masses and will be discussed accordingly.

The difficulty in quantifying the Paris OH reactivity was the presence of high levels (from 1 to 100 ppbv) of atmospheric nitrogen monoxide (NO). Indeed, in presence of ambient NO, supplementary OH radicals are produced into the reactor and therefore the final OH reactivity level is under-estimated. Additional tests were performed in the laboratory after the campaign to study this interference. Different OH reactants (propane, isoprene, acetone and methanol) were used in order to quantify the extra-OH production. The results of these tests were then compared with the outputs of a 0D chemistry model simulating the OH evolution into the reactor.