Title:	Total OH reactivity measurements in Paris during the 2010 MEGAPOLI winter campaign
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Abstract:	Hydroxyl radicals play a central role in the troposphere as they control the lifetime of many trace gases. Measurement of OH reactivity (OH loss rate) is important to better constrain the OH budget and also to evaluate the completeness of measured VOC budget. Total atmospheric OH reactivity was measured for the first time in an European Megacity: Paris and its surrounding areas with 12 million inhabitants, during the MEGAPOLI winter campaign 2010. The method deployed was the Comparative Reactivity Method (CRM). The measured dataset contains both measured and calculated OH reactivity from CO, NOx and VOCs measured via PTR-MS, GC-FID and GC-MS instruments. The reactivities observed in Paris covered a range from 10 s−1 to 130 s−1, indicating a large loading of chemical reactants. The present study showed that, when clean marine air masses influenced Paris, the purely local OH reactivity (20 s−1) is well explained by the measured species. Nevertheless, when there is a continental import of air masses, high levels of OH reactivity were obtained (120–130 s−1) and the missing OH reactivity measured in this case jumped to 75%. Using covariations of the missing OH reactivity to secondary inorganic species in fine aerosols, we suggest that the missing OH reactants were most likely highly oxidized compounds issued from photochemically processed air masses of anthropogenic origin.
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