

Comparison of OH reactivity instruments in the atmosphere simulation chamber SAPHIR

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OH reactivity measurement has become an important measurement to constrain the total OH loss frequency in field experiments. Different techniques have been developed by various groups. They can be based on flow-tube or pump and probe techniques, which include direct OH detection by fluorescence, or on a comparative method, in which the OH loss of a reference species competes with the OH loss of trace gases in the sampled air. In order to ensure that these techniques deliver equivalent results, a comparison exercise was performed under controlled conditions. Nine OH reactivity instruments measured together in the atmosphere simulation chamber SAPHIR (volume 270 m³) during ten daylong experiments in October 2015 at ambient temperature (5 to 10° C) and pressure (990-1010 hPa). The chemical complexity of air mixtures in these experiments varied from CO in pure synthetic air to emissions from real plants and VOC/NO_x mixtures representative of urban atmospheres. Potential differences between measurements were systematically investigated by changing the amount of reactants (including isoprene, monoterpenes and sesquiterpenes), water vapour, and nitrogen oxides. Some of the experiments also included the oxidation of reactants with ozone or hydroxyl radicals, in order to elaborate, if the presence of oxidation products leads to systematic differences between measurements of different instruments. Here we present first results of this comparison exercise.