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OH and HO2 in the troposphere over Europe

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Reactions with radicals are the main self-cleansing mechanism of the atmosphere. A wide range of chemical compounds emitted by human activities such as industrial processes and traffic, and also by vegetation and animals, are oxidised by reactions with radicals, ultimately leading to their removal from the atmosphere. The most important radical is OH, which is photochemically produced in the atmosphere.

Aim of the HOOVER (HOx Over Europe) campaigns was to study the seasonal and latitudinal dependencies of radical photochemistry in the free troposphere over Europe. Two HOOVER campaigns have been undertaken, an autumn campaign which took place in October 2006 and a summer campaign in July 2007. Flight tracks from Germany to northern Europe (Kiruna, 67°N) and to southern Europe (Sardinia, 39°N) provide an insight into the latitudinal HOx distribution
Here we present data for OH and HO2 collected during both HOOVER campaigns, supplemented with other trace gas measurements, and compare them with simulated OH and HO2 from a constrained box model.

Convective transport of polluted boundary layer air masses changed the oxidation capacity of the free troposphere in summertime compared to autumn. Outstandingly high OH mixing ratios were observed in the outflow of a convective system over eastern Germany, indicative of enhanced photochemistry in the upper troposphere. The HOx budget will be discussed in dependence on season and latitude, with a special focus on the influence of convectively transported boundary layer air masses.