



OH-Quantification through global scale trace gas measurements from the NOAA cooperative flask sampling network

Jan Pollmann (1,2), Detlev Helmig (1), Jonathan Williams (2), Jacques Hueber (1), Pieter Tans (3)

(1) Institute of Arctic and Alpine Research, Boulder, CO, USA, (2) Max Planck Institute for Chemistry, Mainz, Germany, (Pollmann@mpch-mainz.mpg.de / +49-6131-305576), (3) National Oceanic and Atmospheric Administration, Boulder, CO, USA

More than 1700 duplicate flask samples from the National Oceanic and Atmospheric Administration Earth System Research Laboratory (NOAA-ESRL) cooperative air sampling network were quantified for NMHC and other trace gases between August 2005 and December of 2006. Reaction with the OH radical is the main sink for atmospheric hydrocarbons and carbon monoxide. Other atmospheric trace gases (e.g. sulfur hexafluoride, SF₆ and hydrogen H₂) also measured by the cooperative network have OH-independent sinks. These dependencies allow using variability analysis for calculating the seasonal average OH mixing ratio for the more than 30 different flask sampling sites that were included in this study. Highest OH mixing ratios were calculated for the tropical regions at an average of 4×10^6 molec cm⁻³. OH mixing ratios decreased towards the high northern and southern latitudes. OH summer mixing ratios were 10^6 molec cm⁻³ in the northern hemisphere compared to 7×10^5 molec cm⁻³ (December – February) in the Southern Hemisphere. Winter mixing ratios in both hemispheres were on the order of 10^5 molec cm⁻³. A comparison of the derived values with direct OH measurements from multiple campaigns shows good agreement with this indirect method for OH determination. However, comparisons with model predictions show significant differences, in particular for the tropical and mid northern latitude regions.