



## Global Observations of Oxygenated Volatile Organic Compounds

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This work focuses on global measurements of two oxygenated volatile organic compounds, formaldehyde (HCHO) and glyoxal (CHOCHO) with optical absorption spectroscopy from space and from the ground. Since both trace gases are important intermediates in the degradation of volatile organic compounds (VOC) in the troposphere these observations substantially add to our current knowledge on the emissions and the chemistry of VOC. Numerous VOCs, characterized by large temporal and spatial variability and having both anthropogenic and natural sources, are present in the atmosphere. They are related to air pollution, human health and climate change due to their importance for photochemical smog formation, changes of ozone levels and formation of secondary organic aerosol. But in spite of their significance, their global source and sink budgets are still not well understood.

Here for the first time global long-term observations of both HCHO and CHOCHO are presented. The results were obtained by applying the differential optical absorption technique (DOAS) to spectra measured by the satellite instruments GOME (since 1995), SCIAMACHY (since 2002), and GOME-2 (since 2006) covering more than one decade of observations. The annual and seasonal variation of these species is examined above some photochemical hot spots. Case studies illustrate the significance of biogenic emissions and of biomass burning for the global distribution of the OVOC. Furthermore, formaldehyde and glyoxal measurements with ground-based MAX-DOAS instruments have been used to validate the satellite observations and to investigate the diurnal variation of these important compounds.