

# Investigating VOC sources using a homogenized glyoxal retrieval

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In the last decade, the number of studies on glyoxal (CHOCHO) retrieval from both space-borne and ground-based instruments using the Differential Optical Absorption Spectroscopy (DOAS) method has increased. Glyoxal is an intermediate product in the oxidation of most volatile organic compounds (VOCs), which are emitted from biogenic, pyrogenic, and anthropogenic sources. Due to its short lifetime, CHOCHO can be used as tracer of VOC sources together with formaldehyde (HCHO). While CHOCHO and HCHO chemistry and sources are similar in many respects, the variation in their production yield can be used to better constrain source attribution of VOCs.

This study focuses on the homogenization of glyoxal retrieval algorithms for (a) the Scanning Imaging Absorption Spectrometer for Atmospheric Chartography (SCIAMACHY), (b) the Ozone Monitoring Instrument (OMI), and (c) the two second Global Ozone Monitoring Experiment spectrometers (GOME-2 on Metop-A and -B). Overall, the retrieved glyoxal column amounts from the homogenized retrieval algorithm show similar seasonal behavior and high correlation among the instruments over selected regions. In addition, the combination of four instruments provides more than 12 years of glyoxal measurements, which are used for the investigation of the temporal variability of VOC on a global scale. Additionally, CHOCHO and HCHO are used for the identification of VOC emission sources by computing the ratio of glyoxal to formaldehyde and correlating it with indicators of biogenic emissions (enhanced vegetation index, EVI) and fires (fire radiative power, FRP).

