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An improved Glyoxal retrieval from OMI satellite data

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Glyoxal (CHOCHO) originates from natural and anthropogenic activities similar to formaldehyde (HCHO). It is the smallest of the alpha-dicarbonyls and the most predominant in the atmosphere. It is an intermediate product in the oxidation of most VOCs and an indicator of secondary aerosol formation in the atmosphere. Among others, CHOCHO is a product of the oxidation of isoprene, alkyne, and aromatic hydrocarbons. CHOCHO is not influenced directly by vehicle emissions, because direct CHOCHO emissions are believed to be small. CHOCHO has a short lifetime (few hours) in the presence of sunlight, because it is removed from the atmosphere by photolysis and reaction with OH. Also, CHOCHO is removed by dry and wet deposition. For atmospheric observations, CHOCHO is of interest as it has slightly different sources than HCHO, and can be used as indicator of the rate of photochemical VOCs processing, because in contrast to HCHO it is not produced in the oxidation of methane.

Atmospheric CHOCHO columns can be determined by remote sensing using the Differential Optical Absorption Spectroscopy (DOAS) method. This sensitive technique has been used both from the ground applying active and passive DOAS and from satellite. Global fields of HCHO and CHOCHO have been retrieved from GOME, SCIAMACHY, GOME-2 and OMI measurements.

Some aspects of CHOCHO retrievals still have to be improved, including possible spectral interferences over water and better correction of cloud and aerosol effects, in particular in cases of biomass burning when atmospheric aerosol levels are high.

This study is focused on a new CHOCHO OMI product, including preliminary test of spectral interference with liquid water over ocean regions and comparison with CHOCHO retrievals using GOME-2 measurements over oceans and continental regions.