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Retrieval of HCHO from MAX-DOAS measurements at the high-altitude alpine station of Jungfraujoch (46.5°N, 8.0°E)

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Formaldehyde (HCHO) plays an important intermediate role in the atmospheric photo-oxidation pathways. It is produced during the oxidation of methane and many non-methane volatile organic compounds (NMVOCs) which participate to the formation of tropospheric ozone and secondary organic aerosols. HCHO is also directly released by biomass burning and fossil fuel combustion and to a lesser extent by vegetation. Measuring this species is therefore of major importance for air quality and climate change monitoring.

In this presentation, HCHO near-surface concentrations and vertical column densities are retrieved from MAX-DOAS measurements performed at the high-altitude station of Jungfraujoch (3580m asl) in the Swiss Alps from July 2010 till December 2012. Although being most of the time located in the free troposphere, this station can be temporarily affected by pollution events originating from the valley, leading to a local increase of air pollutant concentrations. The capability of the MAX-DOAS technique to retrieve HCHO in such high-altitude location is investigated. The spatial representativeness and the impact of cloud cover on the measurements is also discussed. For verification purpose, our retrievals are compared to collocated FTIR observations, taking into account the difference in vertical resolution between both techniques. Simulations from the 3D-CTM IMAGES are also used to further assess the observed seasonal and diurnal cycles of HCHO surface concentration and vertical column.