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Isoprene and Biomass Burning Emissions from Satellite Observations: Synergistic use of HCHO and NO_2 Trace Gas Measurements

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We present case studies for combined HCHO and NO_2 satellite observations, derived from GOME measurements. Launched on the ERS-2 satellite in April 1995, GOME has already performed continuous operations over 8 years providing global observations of the different trace gases. In this way, satellite observations provide unique opportunities for the identifications of trace gas sources. The satellite HCHO observations provide information concerning the localization of biogenic isoprene emissions and biomass burning (intense source of HCHO over the Amazon basin region and in central Africa). The HCHO data can be compared with NO_2 results to identify more precisely the tropospheric sources (biogenic isoprene emissions, biomass burning events, human activities). For example the HCHO emissions situated in the northern part of the Amazon basin region are not correlated with forest fires. Only the southern part of the HCHO emissions correlates with the measured forest fires and also with the NO_2 concentrations. The northern part of the Amazon basin HCHO concentrations can be attributed to biogenic isoprene emissions over the rain forest. In this case study the NO_2 emissions are mostly due to the biomass burning. There seems also to be a dependence between the NO_2 emissions during biomass burning and the vegetation type: NO_2 correlate with HCHO over Africa (grassland fires) but not over Indonesia (forest fires). In south America, an augmentation of the NO_2 concentrations can be observed with the fire shift from the forest to grassland vegetation.