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Long-term analysis of carbon dioxide and methane column-averaged mole fractions retrieved from SCIAMACHY

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Carbon dioxide (CO_2) and methane (CH_4) are the two most important anthropogenic greenhouse gases contributing to climate change. Despite their importance our knowledge about their variable natural and anthropogenic sources and sinks has significant gaps. Satellite observations can add important global scale information on greenhouse gas sources and sinks provided the data are accurate and precise enough and are sensitive to the lowest atmospheric layers where the variability is largest. High sensitivity to near-surface greenhouse gas concentration changes can be achieved using reflected solar radiation in the near-infrared/shortwave-infrared (NIR/SWIR) spectral region. SCIAMACHY onboard ENVISAT (launch 2002) was the first and is now besides TANSO onboard GOSAT (launch 2009) the only satellite instrument currently in space covering important absorption bands of both gases in this spectral range.

Global SCIAMACHY nadir observations from the time period 2003-2009 have been used to retrieve carbon dioxide and methane column-averaged mole fractions (which are the quantities needed for inverse modelling to get information on the sources and sinks) constituting seven years of greenhouse gas information derived from European EO data and offering temporal overlap with GOSAT. These new improved WFM-DOAS multi-year global data sets extending afore existing retrievals will be presented and discussed including an analysis of the long-term characteristics and comparison of the retrieved mole fractions with independent data, e.g., a first analysis of how the SCIAMACHY results compare with GOSAT retrievals for the overlapping time period.