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Shipborne solar absorption measurements of CO_2, CH_4, N_2O and CO and comparison with SCIAMACHY WFM-DOAS retrievals

T. Warneke[1], R. de Beek[1], M. Buchwitz[1], J. Notholt[1], A. Schulz[2], V. Velazco[1], and O. Schrems[3]
[1]Institute of Environmental Physics, University of Bremen, Bremen, Germany
[2]Alfred Wegener Institute for Polar and Marine Research, Potsdam, Germany
[3]Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

Abstract. CO, CH_4, N_2O and CO_2 were retrieved from high resolution solar absorption spectra obtained during a ship cruise from Capetown to Bremerhaven in January/February 2003 by Fourier Transform Infrared (FTIR) spectroscopy. Precisions of better than 0.5% for the column averaged volume mixing ratios (VMR) of CH_4 and CO_2 are achieved using of O_2 as a reference gas. Shipborne FTIR-measurements of CO and data from SCIAMACHY/ENVISAT retrieved by the Weighting Function Modified Differential Optical Absorption Spectroscopy (WFM-DOAS) retrieval algorithm show qualitatively the same latitudinal variations. WFM-DOAS data of CH_4, N_2O and CO_2 measured over sea exhibit a great spread. The spread is significantly reduced for satellite measurements over land and a reasonable agreement can be obtained if the shipborne data are compared with the closest SCIAMACHY measurements over land. The number of comparisons is too small to draw conclusions. However, by including only WFM-DOAS data with small errors the shipborne and WFM-DOAS data compare within 5% for CH_4 and CO_2 and within 30% for N_2O.

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