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Carbon dioxide and methane over Europe

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Carbon dioxide (CO_2) is the most important anthropogenic greenhouse gas. Human activities, primarily fossil fuel combustion and deforestation, are responsible for a continuing increase of its atmospheric concentration. The oceans and terrestrial ecosystems currently act as sinks for atmospheric CO_2 and absorb approximately half of the anthropogenic emissions (IPCC, 2007). Ground-based solar absorption Fourier transform spectrometry (FTS) is a well-established remote sensing technique for the measurement of atmospheric trace gases and the most precise ground-based remote sensing technique to measure the total columns of atmospheric carbon dioxide. Our stations include Spitsbergen (78.92○N, 11.92○E), Orleans (47.96°N, 2.1°E), Bremen (53.11°N, 8.85°E) and Bialystok (53.2°N, 22.75°E). The latitude band between 30°N - 90°N of the Eurasian continent is a key region concerning greenhouse gases. We established a homogenized, well calibrated dataset of column CO_2 and CH_4 and used this dataset for source-sink estimates over Europe by the use of backward trajectory analysis. The Carbon Tracker Europe model is used to interpret our results and to identify sources and sinks of atmospheric carbon dioxide over Europe.