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GOSAT BESD XCO_2 Retrieval: Improvements of the Radiative Transfer Model

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Carbon dioxide (CO_2) is the most important anthropogenic greenhouse gas contributing to global climate change. Column-averaged dry air mole fractions of CO_2 (XCO_2) as retrieved from near-surface sensitive measurements of satellite instruments such as SCIAMACHY onboard ENVISAT and TANSO on GOSAT have the potential to provide important missing global information on the sources and sinks of CO_2. This however requires to meet challenging accuracy requirements.

In order to retrieve XCO_2 from SCIAMACHY, the Bremen Optimal Estimation - DOAS (BESD) retrieval algorithm has been developed. After the end of the ENVISAT mission in March 2012, the only satellite instrument with high sensitivity near the surface is TANSO onboard GOSAT (launched 2009). To obtain a consistent global long-term XCO_2 data set from these two instruments, a modified version of the BESD algorithm is also used for the retrieval of XCO_2 from GOSAT. BESD requires computational expensive online radiative transfer calculations. In order to improve accuracy and computational efficiency, the radiative transfer model SCIATRAN has been modified. Results from these improvements are presented.