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Global Retrievals of CO_2 and CH_4 from GOSAT

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The first observations of greenhouse gases from a dedicated satellite sensor are now available with the launch of the Japanese Greenhouse gas Observing SATellite (GOSAT) on 23 January 2009. GOSAT provides global measurements of total column CO_2 and CH_4 from its shortwave infrared (SWIR) bands which are well suited to improve our knowledge of greenhouse gas surface fluxes, specifically for regions which are poorly sampled by surface sites. However, the requirements on precision and accuracy of the retrieved columns are stringent, representing a major challenge for trace gas retrieval algorithms and potential biases introduced by spectral interference from atmospheric aerosols and clouds as well as uncertainties in spectroscopy and instrument calibration need to be minimized and characterized.

In this presentation we will give an overview over the retrievals of the CO_2 and CH_4 columns using an optimal estimation retrieval algorithm and the validation activities against ground-based column retrievals from the Total Carbon Column Observing Network. We will also present detailed discussion of the comparison between our global CO_2 retrievals from GOSAT with model calculations from the GEOS-Chem global 3-D transport model to test the consistency between model and observations and we will show some first results of a surface flux inversion from the global GOSAT CO_2 retrievals using an ensemble Kalman filter.