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Constraining Carbon Surface Fluxes with GOSAT Column Observations of CO_2 and CH_4

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The first dedicated greenhouse gas sensor GOSAT was launched in 2009 and we have now global GOSAT soundings of CO_2 and CH_4 columns for more than four years. Much progress has been achieved in instrument calibration, spectroscopy and retrieval algorithm development and retrievals of CO_2 and CH_4 approach now accuracies of around 0.3% when compared to ground-based validation sites, but some regions that lack validation sites such as deserts tend to show somewhat larger biases. The GOSAT column data has now sufficient accuracy to provide constraints on surface fluxes especially when used in combination with surface data

In this presentation we will describe the recent updates to the CO_2 and CH_4 retrievals from GOSAT carried out at University of Leicester and we will give a characterization of errors from comparisons to ground-based column retrievals from the Total Carbon Column Observing Network (TCCON). We report regional monthly CH_4 and CO_2 fluxes from GOSAT column data using an ensemble Kalman filter (EnKF) and the GEOS-Chem chemistry transport model and compare these posterior values against those inferred from surface mole fraction data.