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9. Bridging the gap between bottom-up and top-down methods

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Airborne in-situ sampling over Europe during CoMet

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Abstract text

During May and June 2018, a large campaign aimed at atmospheric measurements of greenhouse gases over Europe called CoMet (Carbon Dioxide and Methane Mission) has taken place. Within CoMet we used the German research aircraft HALO, equipped with in-situ and remote sensing instrumentation, for characterisation of the CH_4 and CO_2 distribution over Europe, including the signature of larger point sources located throughout the continent. The main aims are the validation of onboard remote sensing as well as satellite borne remote sensing against the in-situ measurements traceable to WMO scales. A further objective the provision of data for validation of atmospheric transport models such as used in global and regional inversions.

On HALO, continuous in-situ measurements of CO_2, CH_4, CO and H_2O were performed with the use of a modified CRDS instrument dubbed JIG (Jena Instrument for Greenhouse gas observations). Additionally, a large set of discrete air samples was collected with JAS, the Jena Air Sampler, for laboratory analyses of CO_2, CH_4, N_2O, CO, SF_6, H_2, as well as isotopes ^{13}C in CO_2, ^{18}O in CO_2, ^{13}C and ^{2}H in CH_4 throughout the atmosphere over points of interest.

This presentation will discuss the initial results of the observations obtained with JIG and JAS

instruments during the CoMet mission, many of which were collected during vertical profiles over ICOS atmosphere stations. Comparison between the forecasted CO_2 and CH_4 fields will also be discussed using products generated with CAMS (Copernicus), high-resolution WRF-GHG (MPI-BGC) and MECOn (DLR) modelling frameworks. A sensitivity analysis, including the impact resulting from utilising different emission inventories, is also envisaged.