

## **Observation of greenhouse gas point sources using airborne remote sensing measurements**

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### **Abstract**

The two most important anthropogenic greenhouse gases CO<sub>2</sub> and CH<sub>4</sub> account for approximately 63 % and 23 % of the radiative forcing since preindustrial times and their emissions have to be reduced drastically to slow down global warming. While for CO<sub>2</sub> the main anthropogenic emission sources are comparably well known, anthropogenic CH<sub>4</sub> emission source locations and source strengths are often not that well known. As of now, the spatial resolution of satellites is still too low to pinpoint single sources (e.g. TROPOMI: ~7x7 km), or they are able to only detect very strong sources (e.g. GHGSat, ~50x50m resolution, > 2 kt hr<sup>-1</sup>). Airborne remote sensing measurements can provide additional information and monitoring capabilities of potential emission sources.

In this talk, I first present an adaption and application of the Weighting Function Modified Differential Optical Absorption Spectroscopy (WFM-DOAS) algorithm to data of the hyperspectral imaging remote sensing instrument AVIRIS-NG to retrieve CH<sub>4</sub> enhancements and detect point sources. I examine the uncertainties in the retrieved enhancements due to model assumptions and compare the resulting enhancements with other already established retrieval algorithms.

Furthermore, I show possible improvements for a second retrieval of CH<sub>4</sub> and CO<sub>2</sub>, FOCAL originally developed for OCO-2 satellite observations. The application of an absorption only approximation to MAMAP data is presented, as well as first results of the FOCAL-AIR scattering model using simulated measurements.

Finally, the current status of the new imaging remote sensing instrument MAMAP-2D light will be shown.