



Methane retrieval over UK industrial targets using Hyperspectral Remote Sensing

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Methane (CH₄) is becoming increasingly important towards mitigating climate change due to its shorter atmospheric lifetime and much stronger warming potential per molecule than Carbon Dioxide (CO₂). For this purpose, detecting and quantifying CH₄ localised point sources is key due to the current uncertainties in the attribution of individual sources to regional budgets and the CH₄ trend. Of specific interest is the anthropogenic component from fossil fuels, agriculture and waste, where monitoring and reducing emissions is possible.

We will present an investigation into localised CH₄ sources in the United Kingdom using aircraft hyperspectral imagery with metre-resolution. To obtain the data, a flight campaign was conducted with NERC-ARF in May 2018 using AisaFENIX Hyperspectral sensor onboard British Antarctic Survey Twin Otter Aircraft. The target focus was on major emitters as identified in the UK emission data inventory NAEI, one of them being an oilfield where ground-based data was also collected.

We evaluate two retrieval techniques including a Full Physics approach (UoL retrieval algorithm) and a Singular Value Decomposition method following the methodology developed originally for the AVIRIS instrument. Resulting from the application of these retrieval schemes, a preliminary analysis of the aircraft observations has yielded CH₄ enhancements that can be subsequently utilised to map plumes over entire scenes and to evaluate the emission inventory.