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Gasmet™ FTIR application note

Soil Greenhouse Gas Analysis

KEY WORDS

- Greenhouse gas
- Soil flux
- Nitrous Oxide (N_2O)
- Climate Change

PRODUCTS

- DX4015 Portable FTIR Gas Analyzer

OVERVIEW

Measurement of Greenhouse gases released from soil and water surface forms an important part of climate change study. Microbial activity in the soil or for instance the melting of permafrost releases Greenhouse gases such as Methane and Nitrous Oxide into the atmosphere. Measurement of the concentration for these gases inside an open-bottom soil chamber placed on the soil over time tells the emission rate (flux) per chamber footprint area.

MEASUREMENT TECHNIQUE

A portable DX4015 FTIR gas analyser with built-in pump is connected to the soil chamber with PTFE tubes taking air sample from the chamber into the analyser and returning the sample to the chamber. Non-destructive FTIR measurement leaves the gas composition unchanged and in a closed loop like this the concentration increases over time, which enables calculation of greenhouse gas flux and the monitoring of diurnal (24 hour cyclic) changes in the production of greenhouse gases. An FTIR instrument is uniquely suitable for field work:

- FTIR can measure a variety of gases in a single measurement, eliminating the need for multiple instruments
- FTIR is routinely zeroed with nitrogen or synthetic air, no span calibration gases are needed
- DX4015 operating temperature range (0 … 40 ^{o}C short term) is ideal for field work
- DX4015 is portable (16 kg), rugged and field proven in Arctic greenhouse gas monitoring campaigns

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Typical greenhouse gas application. Other gases and measuring ranges are available.

Gas	typical range	unit
Water vapor	0 - 5	vol-%
Carbon dioxide	0 - 2000	ppm
Methane	0 - 15	ppm
Nitrous oxide	0 - 5	ppm
Ammonia	0 – 15	ppm
Carbon monoxide	0 - 50	ppm

This application note is meant to be an informative example of typical application where Gasmet analyzers could be used. This is not a technical specification sheet. Information in this document is subject to change without prior notice. Optimal product configuration is application dependent, and exact application details such as detection limits, components included in the application, etc depend on process and/or measurement site details and may vary. Please, contact your local Gasmet sales representative to get information specific to your needs.