A fully automated ground based FTIR system for measurements of atmospheric CO2 and CH4 columns

M. C. Geibel, D. G. Feist and M. Heimann

Max Planck Institute for Biogeochemistry, Jena, Germany (mgeibel@bgc-jena.mpg.de)

Modeling sources and sinks of important atmospheric greenhouse gases like CO2 and CH4 correctly is quite difficult since our knowledge of the global carbon cycle is incomplete. One major uncertainty is the role of plants in the global CH4 cycle. Measurements of CH4 from SCIAMACHY on Envisat for example showed a mismatch between the data and modeled global CH4 distributions. Further investigations of this unresolved issue are necessary.

Ground-based measurements of the total column atmospheric CH4 and CO2 distribution are needed for the validation of satellite measurements. Unfortunately such measurements are very sparse, especially with the required high accuracy and particularly in the tropical regions. Ground based FTIR instruments can provide the necessary accuracy but need also to be able to observe the total column of O2 in order to relate the CH4 and CO2 column measurements to the total air mass.

The Atmospheric Remote Sensing group (ARS) of the Max Planck Institute for Biogeochemistry in Jena, Germany, is currently making the final preparations for installing such an FTIR instrument. As a fully automated measurement system it will be installed in the tropics, presumably on Ascension Island. This instrument will be able to observe the temporal variation of CH4 and CO2 and the results will be interpreted with the help of global source and sink models as well as local flask sample measurements. Additional validation with aircraft measurements and a ship borne FTIR are planned. The instrument will be part of the Total Carbon Column Observation Network (TCCON) that will provide ground-truth data for the validation of the Orbiting Carbon Observatory (OCO) satellite. It will provide an ideal validation site for future

satellite measurements of CO2 and CH4 in the very active tropical region.