

Information from the German SCIAMACHY Validation Team

Fourier-Transform-Infrared (FTIR) measurements for the SCIAMACHY-Validation

FTIR-spectroscopy uses the sun or the moon as the source of infrared radiation and absorption spectra are recorded. These spectra allow to derive column densities of 20 different atmospheric trace gases. Pressure broadening of the lines allows to retrieve profiles for some gases. Especially the high number of different gases that can be retrieved from FTIR measurements simultaneously makes this technique highly important for the validation of SCIAMACHY (Scanning Imaging absorption Spectrometer for Atmospheric Chartography), which is a payload of the ENVironmental SATellite ENVISAT.



Lunar measurements at Ny Alesund
Operator: AWI / IUP Bremen

The northernmost station where FTIR spectra for the SCIAMACHY validation are recorded is the Koldewey station in Ny Alesund, Spitsbergen at 79°N.

Since there is polar night from November to February, solar measurements can only be performed between March and October. To obtain information about the atmospheric trace gases during the winter, the instrument is slightly modified, and lunar measurements are performed at full moon (+/-2 days).

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About 10° further south Kiruna, Sweden's northernmost municipality, is located. Together with the Institute för Rymdfysik Kiruna (IRF) the FZ Karlsruhe runs an instrument which is located in the Optical Lab of the IRF. This instrument is partly remote controlled and operated from Karlsruhe.



FTIR-solar-tracker on the top of the optical lab in Kiruna, Sweden
Operator: FZ Karlsruhe



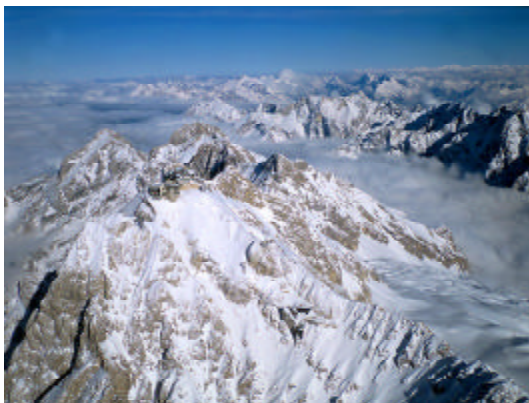
View from the new FTIR-observatory in Bremen
Operator: IUP Bremen

In Germany, FTIR-measurements are performed at two stations, one in Bremen, in northern Germany and one at Germany's highest mountain, the Zugspitze, in southern Germany. In Bremen, the instrument is located in the physics building of Bremen University. Currently the instrument is shared with the laboratory group.

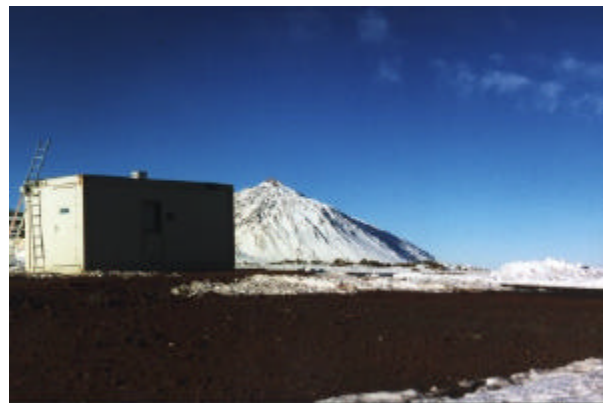
In January 2004, a new instrument that is dedicated solely to atmospheric observations will be installed in a laboratory on top of the new environmental physics building.

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The FTIR instrument at the Zugspitze is run by IMK-IFU (Garmisch-Partenkirchen) via remote control. An additional FTIR instrument is currently installed at the IMK-IFU Garmisch ground station which is located only few kilometers apart from the Zugspitze in horizontal distance. The new instrument will be also operated on a continuous long-term basis to complement the Zugspitze series for both tropospheric research studies and satellite validation. The southernmost FTIR instrument of the German validation team is located on Tenerife Island. It is placed at Izaña Observatory, 2367 meters above sea level.



FTIR-instrument on Germanys highest mountain, the Zugspitze
Operator: IMK-IFU Garmisch



FTIR container in front of Pico del Teide on Tenerife Island
Operator: FZ Karlsruhe

In addition to the continuously operated ground-based stations, an FTIR instrument is employed on the research vessel Polarstern. The most recent FTIR measurements onboard Polarstern were conducted in October/ November 2003 during a cruise from Bremerhaven to Capetown. The spectrometer for the measurements on the ship is installed in a specially designed container. This 9t-container was then placed on the deck above the ships bridge.

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The solartracker on top of the container is able to compensate for the ships movements for wind-strengths up to 7Bft. The careful and time consuming preparation of the spectrometer for its operation on the ship was rewarded by a technically trouble-free working spectrometer during the whole cruise. Also the weather was reasonable good and allowed to measure high-resolution-spectra at 16 of 21 days. These spectra will be used to study the latitudinal variation of atmospheric trace gases and a latitudinal effect on ENVISAT data quality in more detail.



Polarstern, Atlantic

**The white container on the deck above the bridge contains the FT-spectrometer
Operator: AWI / IUPBremen**

The social highlight of the cruise was the equatorial baptism. During this traditional ceremony, people who cross the equator for the first time have to go through a circuit of different stations. The circuit is not really a pleasure for those people who are being baptised and one usually looks forward to finish the circuit by kissing slime on the foot of seagod Neptuns wife Thetis. It normally takes some days until the skin of the baptised people stops smelling after the fishblood that was rubbed on it.

This work is supported by the German Aerospace Center (DLR) and German Federal Ministry of Education and Research (BMBF). Further information can be found under: <http://www.iup.physik.uni-bremen.de/gcvos>.