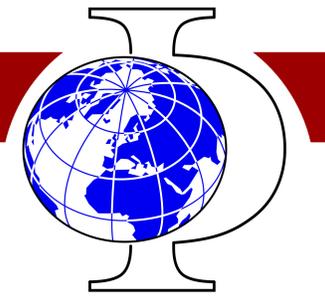




UNIVERSITÄT HEIDELBERG INSTITUT FÜR UMWELTPHYSIK



Im Neuenheimer Feld 229, 69120 Heidelberg
www.iup.uni-heidelberg.de

Atmosphere and
Remote Sensing

Aquatic Systems
and Biochemical Cycles

Radiometry and
Paleo Climate

Terrestrial Systems
and Geophysics

Air-Sea
Interaction

Master's project

Imaging of atmospheric trace gases in volcanic plumes

Background: Many atmospheric trace gases can be detected and quantified by spectrally analysing light, which traverses the atmosphere. Thereby the measurement has no impact on the process to be studied. This is essential for studying highly reactive trace gas species, which play a major role in many important atmospheric processes (ozone and halogen chemistry, air pollution, volcanic plumes, etc.).

These kind of measurements are successfully performed since decades using a telescope and a grating spectrometer (Differential Optical Absorption Spectroscopy, DOAS). However, the spatio-temporal resolution is too low to resolve many atmospheric processes (e.g. local emissions of point sources, such as volcanoes) and therefore limits their observation.

There is a high interest in novel measurement techniques with increased spatio-temporal resolution, i.e. fast imaging techniques for atmospheric trace gases. Our approach is to replace telescope and spectrometer by a wavelength selective element (in our case a Fabry-Pérot interferometer) and a camera.

Bromine monoxide is a short-lived (reactive) intermediate species in many volcanic plumes when mixing with the atmospheric background. Studying its spatio-temporal evolution in the plume would allow to further assess the suitability of in-plume BrO/SO₂ ratios (routinely measured at many volcanoes) as a proxy for volcanic activity and hazard forecast.

Work plan:

- Implement / further develop and characterise Fabry-Perot Camera prototypes
- Perform measurements in the field
- Data analysis and interpretation

Requirements:

- Willingness and motivation to work on and to contribute to a bit riskier project
- Enthusiasm for at least two out of three: air, light, volcanoes
- Experience/interest in optics, electronics and programming
- Willingness to participate in field campaigns

Kontakt:

J. Kuhn jkuhn@iup.uni-heidelberg.de, INF229, R334
C. Fuchs cfuchs@iup.uni-heidelberg.de
N. Bobrowski nbobrows@iup.uni-heidelberg.de
Prof. U. Platt: uplatt@iup.uni-heidelberg.de

