

Scanning UV Gas Imaging System (SUGIS) for remote measurements of volcanic gas emissions

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The passive DOAS technique can be used for remote measurements of volcanic gas emissions. This work describes the construction of a scanning imaging DOAS system that can measure gases with spectral signatures in the range between 290-385 nm. The device is based on a combination of a UV-spectrometer USB2000+ and an azimuth-elevation scanning mirror system. In addition it includes a telescope, a video camera, a GPS receiver and a notebook. Cloud imaging is accomplished by scanning the field of view with the moving mirror. For each pixel a spectrum is recorded. The slant column densities for each pixel are retrieved using a non-linear radiative transfer model in combination with the Levenberg-Marquard algorithm. The results are visualized in a false color image, which is overlaid on the video image. This allows identification, imaging and tracking of the cloud. Two devices have been built for simultaneous measurement of the cloud from different directions. In this case a developed 3D Tomography algorithm and the generation of a 3D cloud model are possible. The paper describes the system and presents some test measurements.