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NOVAC - A global network for volcanic gas monitoring

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This paper presents the global network, NOVAC (Network for Observation of Volcanic and Atmospheric Change), aiming at automatic gas emission monitoring at active volcanoes worldwide. Data from the network will primarily be used for volcanic risk assessment but also for geophysical research, studies of atmospheric change and ground validation of satellite instruments.
A novel type of instrument, the Scanning miniaturized Differential Optical Absorption Spectroscopy (mini-DOAS) instrument, is applied in the network to measure volcanic gas emissions by UV absorption spectroscopy. The instrument is set up 5-10 km downwind of the volcano under study and typically 2-4 instruments are deployed at each volcano in order to cover different wind directions and facilitate measurements of plume height and plume direction.
Two different versions of the instrument have been developed. Version I was designed to be a robust and simple instrument for measurement of volcanic SO2 emissions at high time-resolution with minimal power consumption. Version II was designed to allow the best possible spectroscopy, and enhanced flexibility in regard to measurement geometry at the cost of larger complexity, power consumption and price.
In the paper the project is described as well as the developed software, the hardware of the two instrument versions, measurement strategies, data communication and archiving routines. As of December 2008 a total of 46 instruments have been installed at 18 volcanoes worldwide. As a typical example the installation at Tungurahua Volcano in Ecuador is described, together with some results from the first 21 months of operation at this volcano.