

Review of In-Situ Mass Spectrometers Applied to Volcanic Activity Monitoring

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The continuous measurement of SO₂ emissions and other gases such as He, CO₂, H₂S, are an important complementary tool in the prediction of volcanic eruptions. Detection of real time changes in molecular gas concentration levels and flux are important indicators of new magma rising from the magmatic chamber that can lead to a catastrophic eruption.

In-situ mass spectrometry applied to volcanic environments offer an opportunity to obtain measurements of precursor gases in an active volcano. This analytical technique, enabled through miniaturization, automation and rugged components together with remote control, allows real time, long term evaluation of gas activity at volcanoes.

There have been several research initiatives and multiple projects that have brought MS to volcanoes for the purposes described above. The scope of this poster is to present a review of the research conducted to date on the use of mass spectrometer instruments for monitoring in-situ volcanic gas emissions.

The review includes only those projects using “in situ” mass spectrometry, not taking into account projects which involve the analysis of gas samples at the lab. It is intended to explore the different target gases, operating conditions of each of the prototypes and systems used, providing a data base of instruments, system components, and lesson learned.