



Bromine oxidation in volcanic plumes

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Volcanoes are very strong sources of hydrogen, carbon, sulphur and halogen compounds, as well as of particles. Some gases only behave as passive tracers; others interact and affect the formation, growth or chemical characteristics of aerosol particles in a complex system. Recent measurements of halogen radicals in volcanic plumes showed that volcanic plumes are chemically very active. Kinetic considerations (Oppenheimer et al., 2006) and detailed calculations with an atmospheric chemistry model (Bobrowski et al., 2007) explain the halogen chemistry mainly with photochemical reactions involving both, the gas and particle phase. They reproduce the measured gas-phase concentrations quite well. However, temporal evolution of BrO in the early plume is not well described in the models. The understanding of chemical kinetics of BrO formation is still not complete.

Recent measurement results (Vogel et al., 2008) do not fit with initial model calculation. The new data lead to the suggestion that the BrO formation could be much faster during the first few minutes after emission than initially suggested.

Old and recent data sets will be confronted, compared and possible causes of their differences discussed. The measurements considered were taken at Mt. Etna (Italy), Villarica (Chile), and Popocatepetl (Mexico) volcanoes. Additionally, at Mt Etna the emission consists of up to four individual plumes from four summit craters. The differences between the individual plumes have been investigated during the last years and will be presented.