



Halogen and sulphur chemistry in volcanic plumes

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Bromine oxide has been measured in the plumes of several slowly erupting volcanoes. We compared field measurements from Mt. Etna, Italy with results from a one-dimensional model that was initialised with volcanic plume compositions according to a thermodynamic model. Assuming an "effective source region" where plume air is being mixed with ambient air at still high temperatures we were able to reproduce the measurements for BrO and SO₂ very well (Bobrowski et al., 2007). The model resolves the vertical dilution of the plume and includes a parameterisation for the horizontal entrainment of background air as well as a detailed set of gas-phase and aqueous-phase reactions. We will show details of the chemical plume evolution trying to understand previously underestimated mixing ratios of chlorine oxides under cloud-free conditions and under situations where clouds form in the volcanic plume. Furthermore we will present results of the speciation of sulphur compounds in the volcanic plume, with a critical evaluation of the evolution with time of H₂S and SO₂ extending the work in Aiuppa et al. (2007).