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Strong ozone loss in atmospheric plume of Eyjafjallajokull

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We measured ozone concentrations in the atmospheric plumes of several volcanoes and found ozone to be strongly depleted compared to the background at each volcano. At Mt Etna ozone was depleted within tens of seconds from the crater whereas the ozone destruction in the plume of Eyjafjallajökull was maintained in 1–9 day old plumes. The most likely cause for this ozone destruction are catalytic bromine reactions as suggested by a model that manages to reproduce the very early destruction of ozone but also shows that ozone destruction is ongoing for several days. Given the observed rapid and sustained destruction of ozone, heterogeneous loss of ozone on ash is unlikely to be important.

In this presentation we will focus on results from Eyjafjallajökull (2010) but will also discuss data from St. Augustine (1976) and Mt. Etna (2004, 2009).