



## **Modeling and remote sensing of Volcanic Sulfur Dioxide**

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# Modeling and Remote Sensing of Volcanic Sulfur Dioxide

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Many volcanic eruptions result in the injection of sulfur dioxide ( $\text{SO}_2$ ) past the planetary boundary layer, sometimes delivering  $\text{SO}_2$  into or past the Upper Troposphere/Lower Stratosphere (UTLS). Volcanic  $\text{SO}_2$  ejections affect aviation, public health, and may have consequences on weather and climatology. Here, we discuss mechanisms of  $\text{SO}_2$  conversion to sulfate and sulfuric acid ( $\text{SO}_4^{2-}$ ,  $\text{H}_2\text{SO}_4$ , respectively) and possible parameterizations in the Weather Research Forecasting with Chemistry (WRF-Chem) model. Using WRF-Chem, we demonstrate the transport and chemistry of  $\text{SO}_2$  after the eruptions of Kasatochi in 2008 and Eyjafjallajökull in 2010. Using in situ and remote sensing data from these eruptions, we then comment on the accuracy and feasibility of WRF-Chem simulations to model sulfur dioxide from volcanoes. We conclude with observations and model results on sulfur dioxide emission lifetimes and their affects on local meteorology and chemistry.