



Evolution and impact of volcanic halogens in regional chemistry climate model simulations

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The objective of the work is to study the evolution of halogen species emitted by passively degassing volcanoes and their impact on atmospheric chemistry at the local and regional scales. We focus on the Ambrym volcano (Vanuatu) for which we have observations of BrO and SO₂ during a degassing event in January 2005. We use a regional chemistry climate model to test our understanding of volcanic plume chemistry. In particular, we investigate whether we can reproduce some of the salient features of observed and modelled volcanic plume chemistry reported in previous work, i.e. enhanced reactive bromine and chlorine species, increase of the BrO/SO₂ ratio with distance with the crater, ozone and OH depletion. We also investigate whether we can reproduce quantitatively observed values of SO₂ and BrO concentrations for the studied degassing event. Finally, we discuss the relative importance of the different degradation pathways of the volcanic gas source HBr. The impact of volcanic halogens on the chemical composition of the atmosphere at the local and regional scales is also quantified.