

Sulphur dioxide and bromine monoxide emission inside the volcanic plume of Reventador, Ecuador

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Reventador volcano has been actively degassing since a paroxysmal eruption in 2002 after 26 years of quiescence. Summer and autumn 2017 were characterized by frequent ash explosions, lava- and pyroclastic flows. Despite being active for more than 15 years, not many plume gas measurements have been undertaken at Reventador volcano so far, mostly because of its remote location and cloudy climate.

We present three days of Sulphur dioxide (SO_2) and bromine monoxide (BrO) slant column densities, SO_2 emission rates as well as BrO/SO_2 molar ratio inside the plume of Reventador during a field campaign from the 19th - 21st September. During the observation period, Reventador was quite active, often showing several ash explosions every hour.

We measured UV spectra using two MAX-DOAS instruments, scanning through the plume slightly downwind of the plume. The spectra are evaluated using Differential Optical Absorption Spectroscopy (DOAS).

During the first day we retrieved SO_2 slant column densities up to 4×10^{17} molec/cm² and BrO SCDs up to 4×10^{13} molec/cm² quickly after an explosion on two occasions, which quickly fall under the detection limit in less than 10 minutes. SO_2 fluxes of maximum 1 kg/s are calculated. During the second day we observe SO_2 SCDs varying between 2 and 6×10^{17} molec/cm² and BrO SCDs of $4 - 7 \times 10^{13}$ molec/cm² throughout the whole day. SO_2 fluxes between 0.5 and 2 kg/s are reached and we calculate a mean daily BrO/SO_2 molar ratio of $8.3 \times 10^{-5} \pm 8 \times 10^{-6}$ inside the plume.