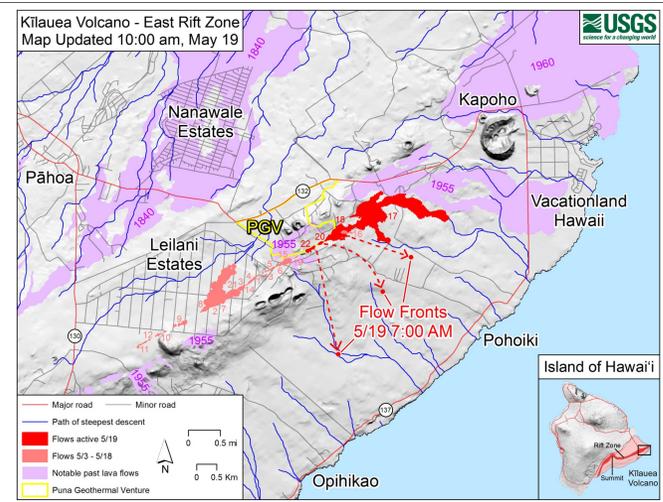
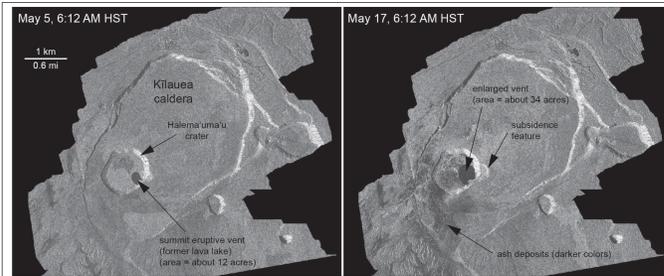


A Study for Hawaii Volcano Eruption in 2018

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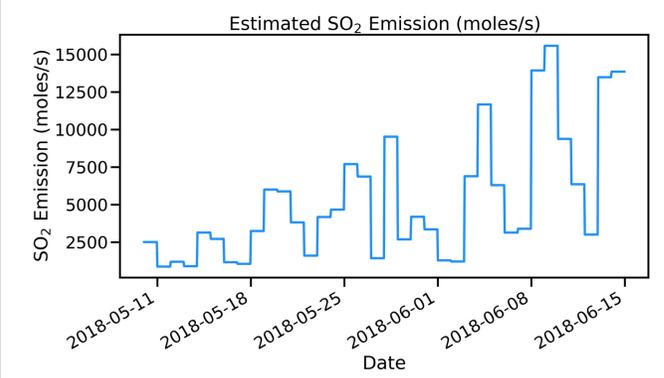
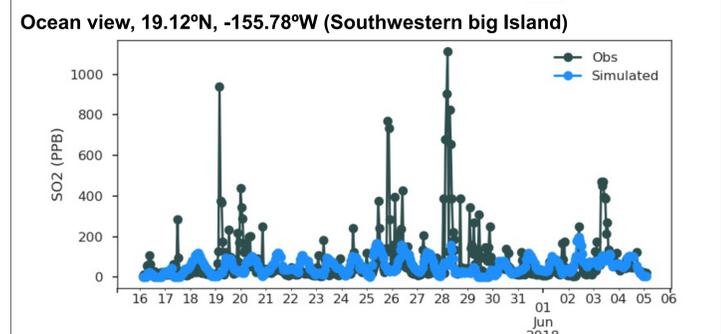
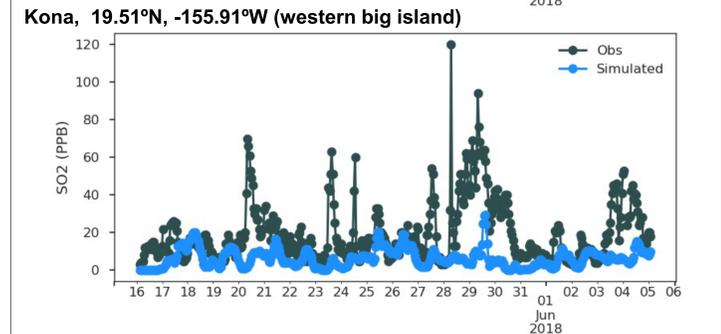
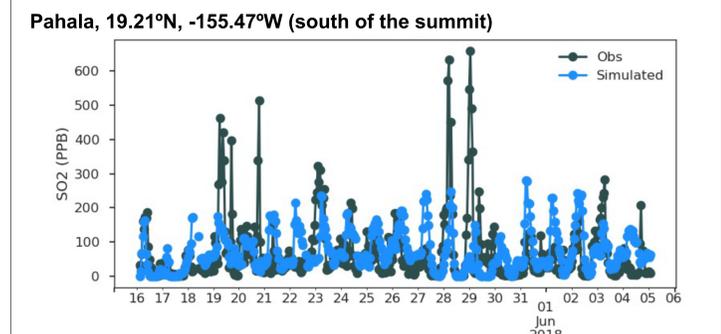
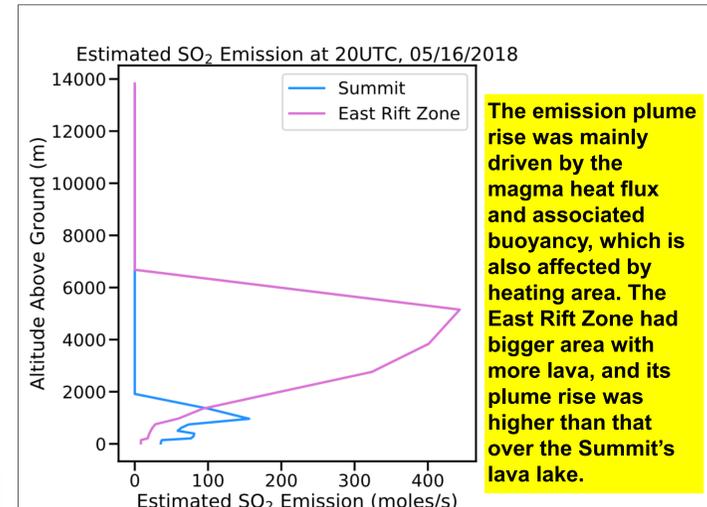
The Kilauea volcano in the big island of Hawaii erupted since May 2018. This eruption was not explosive, but still poured out about 145 million cubic meters of lava over 47 days (USGS). The major eruption occurred in two locations: the East Rift Zone (lava outflow region →) and the Summit (lava lake ↑).

Courtesy: USGS

Summary

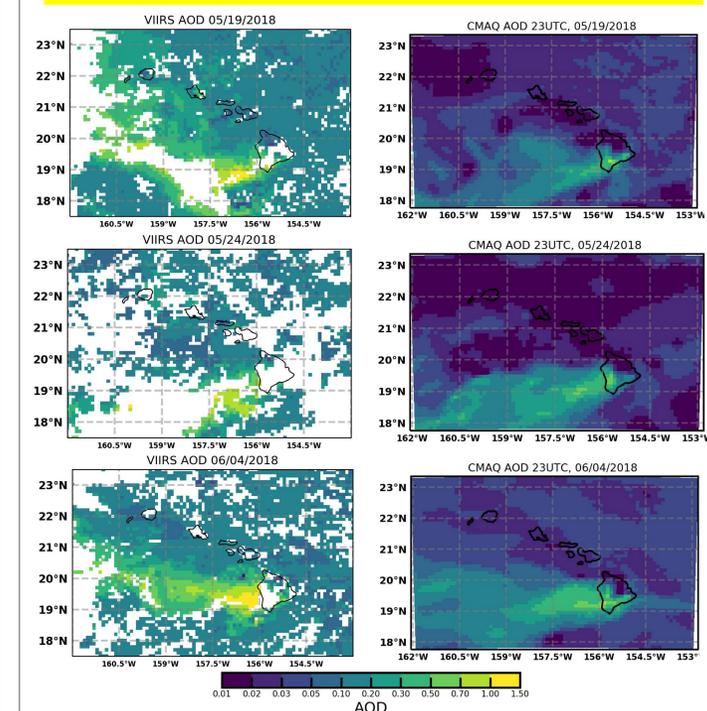
We studied the volcano erupt event for the Kilauea volcano over the Big Island of Hawaii from May-June, 2018. The volcano activities emitted significant amount of SO₂ and created the unhealthy VOG plumes. We developed a method estimating the SO₂ and ash emissions, and lava heat flux using the OMPS SO₂ product. The lava heat flux was used to drive the emission plume rise calculation in CMAQ, showing that the emission injection height from the East Rift Zone could reach middle troposphere. The CMAQ model results agreed well with the observations.

Thank You for Your Attention



Based on the OMPS daily SO₂ data, we estimated that combined SO₂ emission from the two locations is up to 15000 moles/s during the peak eruption periods. The CMAQ run (12km CMAQ 5.0.2 CB05-Aero6 driven by NAM meteorology) with this emission shows good agreement with the satellite data. The plume rise calculation is based on Pouliot et al. (2005), which was originally used for wildfire plume rise. The heat flux rate released from the volcano magma is about 1979 BTU/kg, assuming the magma was cooled from 1250°C to 30°C through its cooling lifetime.

Besides to its direct impact on SO₂, Kilauea volcano brought the sulfate and ash plumes to the downstream, and formed a clear enhanced AOD band, shown by the VIIRS AOD and CMAQ AOD.



Comparison to the AIRNow surface stations: SO₂ ↑ and PM2.5 ↓

