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*'Understanding volcanoes and society: the key for risk mitigation'*



## Forecasting Vog on the Island of Hawai'i

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Since the order of magnitude increase in sulfur dioxide emissions from Kīlauea Volcano on the Island of Hawai'i in 2008, there has been a corresponding increase in the incidence of volcanic smog (vog) downwind of the vents. The typical trade wind conditions carry the emitted sulfur dioxide within the planetary boundary layer to the southwest where it is advected northward affecting communities along the Kona coast, as well as villages directly downwind of the vents. Vog is a respiratory irritant and can cause increased challenges for those individuals with compromised lung function (asthma, COPD, emphysema) as well as health symptoms in the general population. To forecast vog conditions in local communities, we have modified the USGS volcanic ash dispersion model (Ash3d) to track the dispersion of sulfur dioxide and conversion to sulfate aerosols. To constrain the model, we use an archive of daily estimates of SO<sub>2</sub> gas emissions, downwind observations of ambient sulfur dioxide and PM<sub>2.5</sub> concentrations from sites maintained by the Hawaii Department of Health and the National Park Service, and an archive of high-resolution (hourly, 2.5 km) numerical weather prediction forecasts. Operational vog forecasts can help scientists, residents, and visitors with situational awareness of vog conditions.