

SO₂ plume visualization and flux estimations from Popocatépetl volcano

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Popocatépetl volcano (19.023°N, 98.622°W, 5452 masl) is a passively degassing eruptive volcano with a current average emission of 5 kt/d of sulfur dioxide, which is located in the central front of the Mexican Transvolcanic Belt. It is approx. 60 km SE of Mexico City and 45 km NW from Puebla City. SO₂ emissions from the volcano are known to interact with urban pollution playing a role in the atmospheric chemistry and the formation of particles. Optical remote sensing techniques were deployed during March 2006 to study the dispersion of the volcanic plume and to quantify the SO₂ fluxes. A Scanning Infrared Gas Imaging System (SIGIS) was used to acquire passive IR spectra at 4 cm⁻¹ resolution in a two-dimensional array, from which a false-color image was produced representing the degree of correlation of a specific gaseous pollutant. A real-life animation of the SO₂-distribution from the volcanic plume allows understanding dispersion phenomena in various atmospheric conditions. Passive DOAS instruments installed both on ground and from an ultra-light aircraft, allowed for discrete SO₂ column measurements below the plume. Flux estimations were done using wind profiles from balloons launched periodically.