Geophysical Research Abstracts
Vol. 21, EGU2019-11057, 2019
EGU General Assembly 2019
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Monitoring of SO_2 and NO_2 emission rates of power plants and refinery in Tenerife through mini-DOAS measurements in mobile-terrestrial position

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Air pollutants injected into the atmosphere represent a serious global problem for human health and the environment. Two of the most prolific pollutants are SO_2 and NO_2. This study - which was carried out over twelve months in 2018 - has determined the levels of SO_2 and NO_2 injected by the two thermo-electric plants and the refinery in Tenerife, Canary Islands. To carry out this study, a remote sensing technique was used in land mobile position, using a mini-DOAS (MINIaturized Differential Optical Absorption Spectroscopy). Two miniDOAS were used, one for each component. To calculate the SO_2 and NO_2 concentrations (ppm•m-1) within a vertical column, the telescopes were configured in the UV range for SO_2 and visible wavelength for NO_2. The results come from a total of 910 measurements carried out at the refinery and both power plants between January and December, 2018. To calculate the flow of each pollutant, we used the wind speed data from the nearest meteorological station to each testing site (station, power station and refinery). The average flow of SO_2 and NO_2 was 144 $\pm$ 28 kg•h-1 and 28$\pm$9 kg•h-1 respectively for the thermo-electric power station located in the municipality of Candelaria. For the thermo-electric power station located in the southern part of Tenerife (municipality of Granadilla), the emission rates obtained were 142 $\pm$ 45 kg•h-1 and 109 $\pm$ 42 kg•h-1 respectively for SO_2 and NO_2. The highest emission rates were measured in Granadilla due to the greater production of electricity on Tenerife Island. Regarding the emissions from the refinery located in the capital of the island (Santa Cruz de Tenerife), during the entire study period, the concentrations detected were mostly below the limit of detection, but sometimes reached flow values up to 35 $\pm$ 7 kg•h-1 for SO_2 and 2 $\pm$ 0.8 kg•h-1 for NO_2. Such low results in the refinery are due to the fact that it is not currently working at full output, this the estimated emission rates only relate to the maintenance of fuels stored in its tanks.