



## **Diffuse VOCs degassing from the summit cone of Teide volcano, Tenerife, Canary Island, Spain**

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The Volatile Organic Compounds (VOCs) play an important role in the chemistry of the Earth's atmosphere, particularly the oxidizing capacity of the troposphere over the whole range of spatial scales. The main sources of VOCs emission to the atmosphere are due to man's activities and primarily related to (1) combustion processes, (2) production, treatment, storage, and distribution of fossil fuels, (3) application of volatile organic solvents and solvent-containing products, and (4) industrial production processes (Friedrich and Obermeier, 1999). Natural sources of VOCs to the atmosphere also occur (eg. volcanic activity, biological processes, forest fires, etc.), but these emissions are much lower than those related to man's activities. In spite of this fact, there is an increasing research interest to evaluate VOCs emission rates from natural sources. The aim of this study is to investigate VOCs emission rate through the surface environment of the summit cone of Teide volcano, where occurs the most obvious surface geothermal features at Tenerife island. A diffuse VOCs degassing survey was performed at summit cone of Teide volcano in the middle of August 2004 by means of 65 well distributed observation sites covering an area of  $0.6 \text{ Km}^2$ . Diffuse VOCs emission rates were estimated by multiplying  $\text{CO}_2$  efflux values times  $(\text{VOCs})_i/\text{CO}_2$  weight ratio at each sampling site. Soil  $\text{CO}_2$  flux measurements were performed according to the accumulation chamber method by using a portable NDIR spectrometer and a hand size PC. Soil  $\text{CO}_2$  efflux reached values up to from  $1.342 \text{ gm}^{-2}\text{d}^{-1}$ . Gas samples from the soil-air interface were collected for VOCs analysis inside the accumulation chamber by grab-sampling in  $400 \text{ cm}^3$  stainless-steel canisters. VOCs analysis of 34 components were carried out by means of GC/MS/MS. Most of the

observed VOCs components were aromatic compounds while halocarbons were not detected. Soil VOCs flux values were estimated by multiplying soil CO<sub>2</sub> flux times  $(VOCs)_i/CO_2$  weight ratio at each sampling site. Soil VOCs flux values ranged from 0 to 7,5  $mgm^{-2}d^{-1}$ . Most of the study area showed soil VOCs flux values from 0 to 0,1  $mgm^{-2}d^{-1}$ . Peak soil VOCs fluxes were mainly observed inside the crater of the summit cone where there is more fumarole degassing suggesting a clear input of VOCs components to the air by the volcanic-hydrothermal system. The total output of diffuse VOCs emission from the summit cone of Teide volcano was estimated about 19  $Kgy^{-1}$ , and 73,6

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