SUPPORTING INFORMATION

Investigating the Heterogeneous Interaction of VOCs with Natural Atmospheric Particles: Adsorption of Limonene and Toluene on Saharan Mineral Dusts

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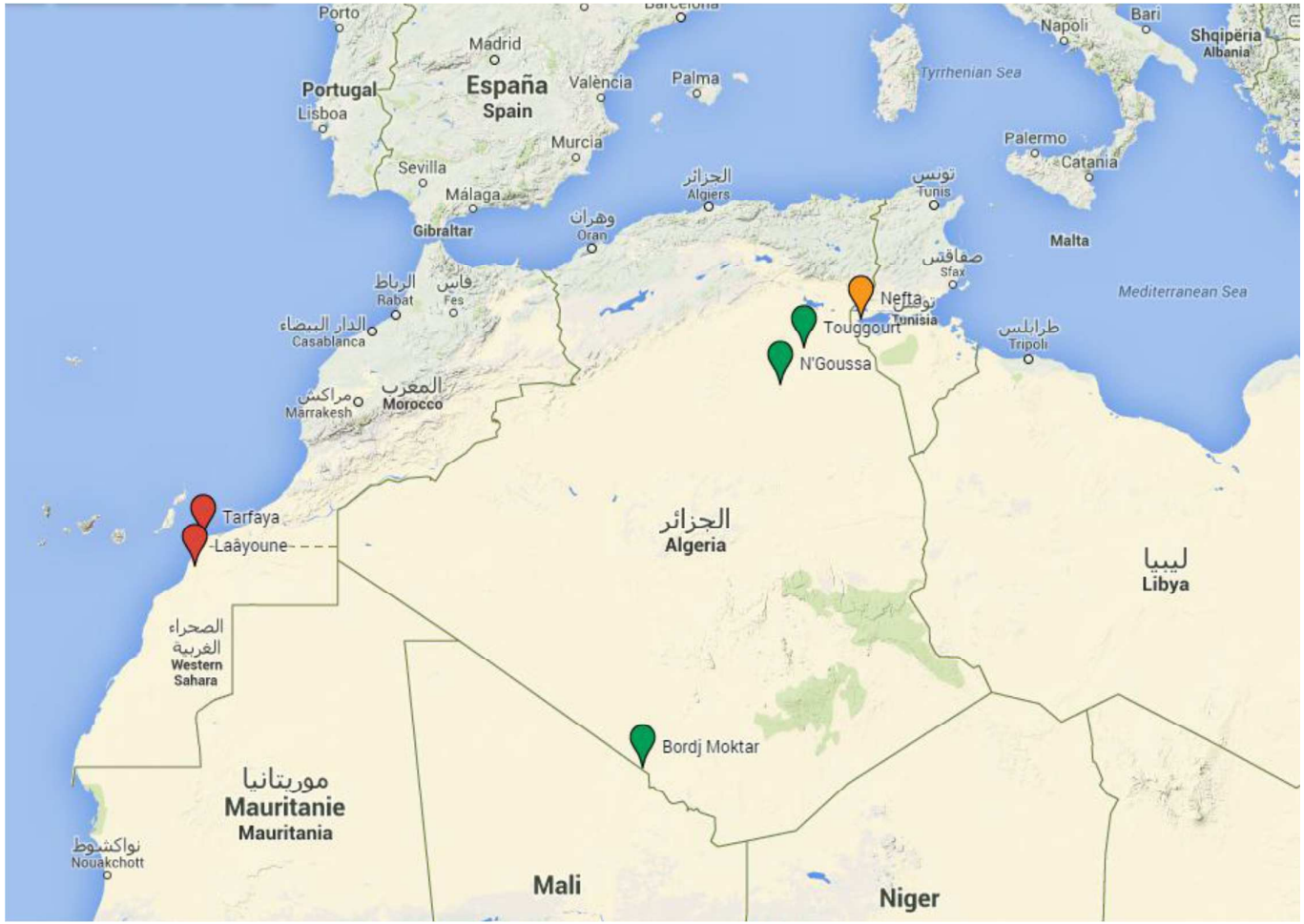
Number of pages (including this one): 3

Number of Figures: 1

Figure S1. Map displaying the collection points of Saharan mineral dust samples.



Calculation of theoretical monolayer coverage [1,2]

The theoretical monolayer coverage N_{cal} was calculated using the liquid density, ρ, and the molecular weight (MW), to approximate the radius of the molecules, r, assuming that they are spheres:

$$\frac{4}{3}\pi r^3 = \frac{MW}{\rho N_A}$$

where N_A is the Avogadro number. The liquid densities for limonene and toluene were 0.842 g cm^{-3} (taken at 20°C) and 0.865 (taken at 23°C) g cm^{-3}, respectively. Thereafter, N_{cal} is given by the expression:

$$N_{cal} = \frac{1}{\pi r^2}$$

The calculated values were 1.98×10^{14} molecule cm^{-2} for limonene and 2.63×10^{14} molecule cm^{-2} for toluene.

At this point it should be noted that experimentally, the molecules are not expected to pack together perfectly since the shape of the molecule and hindering interactions would render some of the active sites on the surface inaccessible. Thus, the experimental monolayer coverage would be assumed to be lower than the theoretical one. These calculations have to be understood as an estimate of which species get closer to monolayer coverage and could potentially form a multilayer on the dust surface upon adsorption.

References.

(1) Hudson, P. K.; Zondlo, M. A.; Tolbert, M. A. The Interaction of Methanol, Acetone, and Acetaldehyde with Ice and Nitric Acid-Doped Ice: Implications for Cirrus Clouds. *J. Phys. Chem. A* **2002**, *106*, 2882-2888.

(2) Diaz, L.; Liauw, C. M.; Edge, M.; Allen, N. S.; McMahon, A.; Rhodes, N. Investigation of Factors Affecting the Adsorption of Functional Molecules onto Gel Silicas: 1. Flow Microcalorimetry and Infrared Spectroscopy. *J. Colloid Interface Sci.* **2005**, *287*, 379-387.