



Reactive organic species on natural dust

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The production of volatile organic compounds from the interaction between Saharan dust particles and seawater was investigated. For this a simple dust-seawater addition experiment was conducted in the laboratory, with subsequent analysis by GC-MS. 4 g of fine dust sample ($d < 0,063\text{mm}$, 4,7% Fe, 0,19% total carbon), collected from the region of Southern Algeria (Oued Tamrasset), was suspended in 10 ml of seawater, collected during the ship cruise (METEOR 55) and filtered to $0,2\ \mu\text{m}$, in 20 ml headspace vials, which were capped immediately after sample preparation. After shaking the samples for certain period, the gas phase was analysed for volatile organics with a purge and trap GC-MS (Tekmar LSC 2000/Varian Star 3400 cx/ Varian Saturn 2000). To test the production rates of volatile organics, the following different reaction times were chosen; 5 min, 20 min, 40 min, 1 hour, 24 hours, 48 hours and 72 hours.

About 15 different volatile organic compounds were produced through the interaction of dust sample with seawater. 8 of those compounds were quantified. The concentrations of methyl iodide (CH_3I) and methyl chloride (CH_3Cl) increased with the reaction time, giving the maximum amounts of 0,14 ng and 5,13 ng, respectively. There was negative correlation between concentrations of methyl chloride and toluene during 72 hours of measurement. And the concentrations of methylene chloride, trichloroethane, benzene, p-xylene and ethyl benzene increased till one hour period and then decreased with longer period.

We suggest that there is an abiotic halogenated organic compound production mechanism in seawater, which occurs when dust contacts seawater or when marine water vapour condenses on dust, analogous to those in soil.