



Temporal Variability of VOCs and Organic Particulate Matter in the Eastern Mediterranean

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In the summer of 2012 and winter of 2013, Volatile Organic Compound (VOC) concentrations were monitored at two cities in Greece by Proton Transfer Reaction Mass Spectrometry (PTR-MS). At the same time the organic particulate matter levels were measured by Aerosol Mass Spectroscopy. The urban background sites used were located in Athens and Patras two of the largest cities in the country.

During the summer anthropogenic compounds such as benzene (m/z 79), toluene (m/z 93), xylenes (m/z 107) and C9-aromatics (m/z 121) had similar diurnal patterns in both cities with the Athens mixing ratios being approximately 2 times higher than in Patras. Their concentrations peaked during traffic rush hour in both areas. Biogenic species such as Isoprene (m/z 69), MVK and MACR (m/z 71) had similar diurnal patterns and concentrations in both sites. On the other hand monoterpene (m/z 137) concentrations were higher in the Athens site, having also a distinctive spike during morning hours due to local emissions. Acetone (m/z 59), a VOC that originates both from biogenic and anthropogenic sources was approximately 2 times higher in Athens with a stronger anthropogenic contribution. The acetaldehyde (m/z 45) concentrations though were similar in both areas. No significant contribution from biomass burning was observed during this summer period, something confirmed by acetonitrile (m/z 42) time series.

The summer and winter VOC measurements were combined the organic aerosol composition (analyzed through PMF to provide the corresponding factors) to provide insights about the local secondary organic production and the primary sources of both. The ratios of the concentrations of the measured VOCs and the corresponding source estimates are compared with the local emissions.