



Observations of ambient monoterpenes at a costal site in the East Mediterranean

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Biogenic Volatile Organic Compounds (BVOCs) affect the oxidizing capacity of the atmosphere since they react with hydroxyl radicals, nitrate radicals and ozone, and participate in ozone formation in the presence of sufficient amounts of nitrogen oxides. Moreover, BVOC oxidation products contribute to new particle formation and growth processes. While isoprene is emitted in the largest amount among BVOCs into the atmosphere, monoterpenes are also important for atmospheric chemistry. Tree species are responsible of the most BVOC emissions to the atmosphere but little is known about the contribution of shrub and long-range transport to the ambient BVOC concentrations. In the Mediterranean region monoterpene measurements are scarce and are limited in temporal and ecosystem coverage (forested areas). The present study presents long-term measurements of monoterpenes at a remote coastal site without tree vegetation under typical phrygana vegetation of Crete island in Greece.

Measurements took place (35°20'N, 25°40'E, 250m a.s.l) on the north east side of the island of Crete at the Finokalia monitoring station of the University of Crete (<http://finokalia.chemistry.uoc.gr>). Two intensive campaigns took place, one during spring (13/03-08/04/2014) and one during summer (19/06 – 04/08/2014). During each campaign diurnal cycles were measured collecting 9 samples per day (every two hours). In addition, one diurnal cycle per week has been measured since 13/10/2014. Off-line sampling took place in adsorption tubes, using stainless steel cartridges filled with Tenax TA for one hour at 200 ml/min flow rate. Samples were stored at 40C and analyzed within two days. The samples were after desorption by a Thermal Desorber were analyzed by a GC-FID system.

The most abundant monoterpenes were found to be Δ^3 -carene and limonene. Highest concentrations were observed during autumn when a clear diurnal cycle has been seen with maximum for both Δ^3 -carene and limonene at late afternoon. During summer, no clear diurnal variance was observed while in spring the cycle was weaker. The results are analyzed together with new particle formation observations at the Finokalia station to estimate possible links of BVOCs to the formation and growth processes of atmospheric particles in the area.