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Biogenic volatile organic compounds from marine and vegetation at the Eastern Mediterranean

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This study focuses on emission of biogenic volatile organic compounds (BVOCs) measurements at a coastal site in the Eastern-Mediterranean, using a proton transfer reaction time of flight mass spectrometer (PTR-ToF-MS). The measurements were performed in Ramat Hanadiv Nature Park, which includes mixed-Mediterranean vegetation combined with planted pine and cypress, during summer 2015 (July - October). The site is located about 4 km from the Eastern Mediterranean shore and about 120 meters above sea level, and also exposed to BVOC emission from nearby memorial garden, as well as anthropogenic VOCs. Complementary measurements included air-pollutants mixing ratio, meteorological data and vegetation characteristics and functioning. The Model of Emissions of Gasses and Aerosols from Nature version 2.1 (MEGANv2.1)[1] was applied to estimate the emission flux of BVOC from the nature park, according to the vegetation type, driven by in-situ measurements of meteorological parameters and specific site and vegetation characteristics. MEGANv2.1, together with positive matrix factorization (PMF) and relationship between measured meterological parameters and VOCs mixing ratios were used to verify the sources distribution of measured VOCs. Our measurements identified hundreds different ions during the campaign, and we focus here on few selected BVOCs, including dimethyl sulfide (DMS), isoprene, 2-Methyl-3-buten-2-ol (MBO) monoterpenes, acetone and acetaldehyde. We identified emission from the sea as a major source for DMS, with strong dependency on temperature. The analysis of isoprene+MBO (m/z=69.069+m/z=87.08) suggests a dominant marine source of isoprene, with relatively high mixing ratios of up to $\sim$9ppbv, which may be attributed to the high seawater temperature of the Levantine Basin. The fraction of marine source vs. terrestrial source increased in the order DMS $>$ isoprene $>$ monoterpene. Our observations further indicate high rates of BVOC emission from the memorial garden, pointing to enhancement of BVOCs emission by thinning.

Bibliography

1. Guenther, A. B. et al. The Model of Emissions of Gases and Aerosols from Nature version 2.1 (MEGAN2.1): an extended and updated framework for modeling biogenic emissions. Geosci. Model Dev 5, 1471–1492 (2012).