



Characterisation of primary and secondary biogenic volatile organic compounds (BVOCs) in Corsica during the ChArMEx experiment, summer 2013

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Continuous measurements of reactive trace gases were performed in Cap Corse, the northern tip of Corsica Island during summer 2013 (12 July- 5 August) within the framework of ChArMEx (Chemistry-Aerosol Mediterranean Experiment)-CARBO-SOR. Primary BVOCs (isoprene and monoterpenes) and a number of secondary oxidation products (methyl vinyl ketone (MVK), methacrolein (MACR), pinonaldehyde, nopinone and formaldehyde among the others) were measured to study gas phase photo-oxidation processes of primary biogenic compounds in the lower troposphere. Primary BVOCs were found in relatively high concentrations with midday values ranging between 200-1200 ppt for isoprene, 100-350 ppt for α -pinene and 150-500 ppt for β -pinene and attributed to local emissions from the Corsican maquis. Primary BVOCs showed similar diurnal cycles with mixing ratios maximizing in the afternoon and minimizing in the early morning. MVK and MACR mixing ratios of 100-500 ppt were observed, exhibiting a diurnal variability similar to isoprene, their precursor VOC. Observed daytime ratios of (MVK+MACR)/Isoprene were used to assess the isoprene oxidation extent. The amount of isoprene that had reacted was quantified based on observed MVK and MACR mixing ratios and was used to estimate the amount of formaldehyde formed from isoprene oxidation. These experimentally derived estimates are supported by one-dimensional chemistry model simulations performed using a detailed isoprene chemistry mechanism. The contribution of BVOCs in the formation of secondary VOCs in Corsica is thus evaluated and discussed.