



Non-methane hydrocarbons over the Eastern Mediterranean during summer, measured from northwest Cyprus

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In summer 2014 the Cyprus Photochemistry EXperiment (CYPHEX) field campaign took place at an elevated (600m) measurement site in the north western part of Cyprus close (10 km) to the coast (35,96N, 32,4E) in order to investigate the photochemistry and air mass transport of the eastern Mediterranean. Non-methane hydrocarbons were measured with a commercial GC-FID (AMA instruments GmbH, Ulm, Germany) with a final dataset consisting of two weeks of continuous, hourly measurements for 10 NMHC. NMHCs are a class of volatile organic compounds (VOC) which are emitted by both anthropogenic and natural sources. Their predominant sink in the atmosphere is photochemically driven oxidation by OH radicals. Their atmospheric lifetimes, which range from a few days for more reactive compounds such as pentanes and butanes and up to a month for less reactive ones like ethane, make it possible to deduce photochemical histories and transport regimes from NMHC observations. Furthermore, in the presence of NO_x they are important precursors for tropospheric ozone.

Backward trajectories show that the airmasses reaching the measurement site had been influenced periodically by emissions from western continental Europe (France, Spain) that crossed the Mediterranean Sea and from eastern continental Europe (Greece and Turkey) more recently influenced by industrial emissions. Varying patterns in NMHC data delineates these two regimes very well, with aged western European air masses being characterized by low level ethane and with toluene and benzene being higher and more variable in plumes from eastern Europe. Additionally, atypical n-butane and i-butane ratios suggest a deviation from the expected predominant oxidation by OH, possibly indicating reaction with chlorine radicals (Cl). The dataset has been evaluated with respect to NMHC sources and oxidative history using different methods of approach.