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HO_x cycling during the Cyprus Photochemistry Experiment

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The eastern Mediterranean region is at the crossroads of different air masses, which have resided over different parts of Europe, Africa and Asia. The resulting concomitant influences of industrial emissions, biomass burning, oceanic emissions and desert dust strongly impact the pollution levels in this region. An intensive field measurement campaign (CYprus PHotochemistry EXperiment, CYPHEX-2014) was conducted in the north-west of Cyprus in the summer of 2014 to obtain a comprehensive understanding of the atmospheric chemistry and its subsequent impact on the air quality of this region. One of the key components of atmospheric chemistry is the hydroxyl radical (OH), the major gas phase oxidant in the troposphere, produced from the ubiquitous combination of water, sunlight and ozone. While the measurement of OH is extremely difficult due to its short lifetime and low concentration, its measurements are crucial to determine the fate and lifetime of major atmospheric pollutants, including greenhouse gases e.g. methane. The OH radicals along with the hydroperoxyl radicals (HO_2) initiate, participate and control almost all of the lower atmosphere's chemical pathways, including oxidation of hydrocarbons, formation of secondary organic aerosols and cycling between primary and secondary pollutants e.g. NO_x and O_3. While HO_x ($OH+HO_2$) recycling has been shown to keep up the oxidation capacity of the atmosphere in forested environments, measurements of OH and HO_2 during CYPHEX allowed us to investigate the buffering capacity of the atmosphere in the Eastern Mediterranean, under impact of pollution plumes from continental Europe and marine air masses from the Mediterranean. The self-cleaning capacity of the atmosphere over Cyprus and its subsequent impact on air quality will be discussed during the presentation.