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Indirect evidence of chlorine atom concentration in the lower troposphere of the Eastern Mediterranean

C. Arsene (1,2), A. Bougiatioti (1) and N. Mihalopoulos (1)

(1) University of Crete, Department of Chemistry, ECPL, Voutes 71003, Heraklion, Greece,
(2) Al.I. Cuza University of Iasi, Faculty of Chemistry, 700506 Iasi, Romania
(carsene@chemistry.uoc.gr / +30-2810-545001)

Atmospheric Volatile Organic Compounds (VOCs) which predominantly consist of non-methane hydrocarbons (NMHCs) are regarded as trace gas species with a very important role in different photochemical processes, those leading to secondary organic aerosol formation (SOA) or those related to the effect on human health due to their accumulation to hazardous levels under certain conditions.

An important number of physico-chemical processes accounts for the variability of different NMHCs in the lower troposphere. Hydroxyl (HO) radicals are assigned as the most important oxidative species that play a crucial role in the sink of many NMHCs. However results from different studies suggest that chlorine atoms (Cl) may be as well of considerable importance for the chemistry of the troposphere and also that they may contribute to the enhancement of the oxidative capacity of the atmosphere.

We present here results from a long-term study on NMHCs observations conducted in the Eastern Mediterranean (Crete, Greece). Based on the relative variability of various NMHCs identified in a marine, urban and/or rural area indirect evidence has been obtained for the existence of high Cl atom concentrations in the lower troposphere of this region. Concentrations in Cl atoms as high as 5ŒE+04 # cm-3 have been derived by applying a basic kinetic concept to various logarithmic ratios of NMHCs concentrations and the seasonal distribution of the indirectly derived Cl atom shows a clear maximum over summer. The possible mechanisms responsible on the Cl atoms abundance in the area will be presented and the implications of these Cl levels to the oxidation capacity of the atmosphere will be discussed.