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Role of the NO_3 radicals in oxidation processes in the eastern Mediterranean troposphere during the MINOS campaign

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Abstract. During the MINOS campaign (28 July-18 August 2001) the nitrate (NO_3) radical was measured at Finokalia station, on the north coast of Crete in South-East Europe using a long path (10.4 km) Differential Optical Absorption Spectroscopy instrument (DOAS). Hydroxyl (OH) radical was also measured by a Chemical Ionization Mass-Spectrometer (Berresheim et al., 2003). These datasets represent the first simultaneous measurements of OH and NO_3 radicals in the area. NO_3 radical concentrations ranged from less than $3x10^7$ up to $9x10^8$ radicals· cm^{-3} with an average nighttime value of $1.1x10^8$ radicals· cm^{-3}.

The observed NO_3 mixing ratios are analyzed on the basis of the corresponding meteorological data and the volatile organic compound (VOC) observations which were measured simultaneously at Finokalia station. The importance of the NO_3 radical chemistry relatively to that of OH in the dimethylsulfide (DMS) and nitrate cycles is also investigated. The observed NO_3 levels regulate the nighttime variation of DMS. The loss of DMS by NO_3 during night is about 75% of that by OH radical during day. NO_3 and nitrogen pentoxide (N_2O_5) reactions account for about 21% of the total nitrate ($HNO_{3(g)}$+$NO^-_{3(g)}$) production.

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