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## A model study of ozone in the eastern Mediterranean free troposphere during MINOS (August 2001)

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**Abstract.** A coupled tropospheric chemistry-climate model is used to analyze tropospheric ozone distributions observed during the MINOS campaign in the eastern Mediterranean region (August, 2001). Modeled ozone profiles are generally in good agreement with the observations. Our analysis shows that the atmospheric dynamics in the region are strongly influenced by the occurrence of an upper tropospheric anti-cyclone, associated with the Asian summer monsoon and centered over the Tibetan Plateau. The anti-cyclone affects the chemical composition of the upper troposphere, where ozone concentrations of about 50 ppbv were measured, through advection of boundary layer air from South-East Asia. A layer between 4-6 km thickness was present beneath, containing up to 120 ppbv of ozone with substantial contributions by transport from the stratosphere and through lightning NO<sub>x</sub>. Additionally, pollutant ozone from North America was mixed in. Ozone in the lower troposphere originated mainly from the European continent. The stratospheric influence may be overestimated due to too strong vertical diffusion associated with the relatively coarse vertical resolution. The estimated tropospheric ozone column over the eastern Mediterranean is ~50 DU in summer, to which ozone from recent stratospheric origin contributes about 30%, ozone from lightning 13%, and from South-East Asia, North America and Europe about 7%, 8% and 14%, respectively, adding to a long-term hemispheric background of 25% of the column.

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