Geophysical Research Abstracts, Vol. 8, 00629, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00629

Nested grid application of a global chemistry model over Europe and the Eastern Mediterranean

A. Protonotariou (1), Philippe Le Sager (2), M. Tombrou (1), C. Giannakopoulos (2)

(1)Department of Applied Physics, University of Athens, Greece, (2) National Observatory of Athens, Greece (aprot@phys.uoa.gr / Fax: +30-210-7295281 / Phone: +30-210-7276837)

This study examines the seasonal variability of tropospheric ozone and its precursors concentrations over Europe and the Eastern Mediterranean during 2001, using a modified version of the global three-dimensional chemical transport model GEOS-CHEM for our area of interest. Our approach employs a methodology identified as a one-way nested grid formulation to increase the horizontal resolution above the one adopted for the global scale. The nested grid methodology permits the treatment of chemistry over a particular region with relatively high horizontal resolution, while at the same time preserves the interaction of this region with the coarser global environment. The model is initially applied over the whole globe, including the nested domain. Then, results from the global simulation are used to drive the fine-resolution application using boundary conditions from the coarse resolution model, but not vice versa (one-way nesting).

Differences between results obtained using the 1^ox1^o nested grid and the 4^ox5^ocoarse grid are discussed. Long-term monitoring data at surface sites help to understand the role of anthropogenic and natural factors in controling the changes of the tropospheric chemical composition. Therefore, model calculations are compared to observations collected at the sampling station of Finokalia (35º 20'N, 25º 40'E) in the northern coast of Crete and with aircraft measurements collected during the Mediterranean Intensive Oxidant Study (MINOS) campaign conducted during July/August 2001 over the Eastern Mediterranean.

The nested-grid simulation results provide a notably better agreement with measurements in comparison to the coarse-grid results. The meteorological conditions that favor the formation of the plumes over the East Mediterranean and Greece during dif-

ferent seasons of the year are also examined. The spatial resolution adopted here for the nested-grid approach give a better insight to the meteorological features, which are primarily responsible for the spatial distribution of chemical species in comparison to the coarse grid.