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# A Global Modeling Study of the Year-to-year Variations in Tropospheric Ozone

**S. Koumoutsaris** and I. Bey

Laboratoire de Modélisation de la Chimie Atmosphérique
Polytechnique Fédérale de Lausanne (EPFL)
EPFL-ENAC-LMCA station 6
CH-1015 Lausanne, Switzerland
(simos.koumoutsaris@epfl.ch)

Observations during the last decades show a significant increase in tropospheric ozone ($O_3$) and its precursors and also a great amount of interannual variability. This paper presents a modeling study which goal is to examine the year-to-year variations in $O_3$ distributions over a 10-year period. We use a global model of tropospheric chemistry and transport driven by assimilated meteorology to conduct a simulation of the full Ox-NOx-hydrocarbon chemistry over the period 1988-1997. The interannual variability of several factors that affect $O_3$ distributions (such as dynamics, biomass burning emissions, fossil fuel and aircraft emissions, biogenic emissions, methane concentrations, over-head ozone columns) are accounted for in our simulations. Model results (i.e. $O_3$ distributions and monthly year-to-year anomalies) are evaluated with observations taken from the worldwide ozonesonde data network. We carried out several sensitivity simulations with one of the factors kept fixed in order to diagnose the relative contribution of different processes to the interannual variability of $O_3$. We find that events with the largest variability are associated with year-to-year variations in biomass burning emissions and meteorology. This paper will present and analyse several strong events that we find in our model over the study period.