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Tropospheric Enhancement of Ozone over the UAE

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We use the Global Environmental Multiscale – Air Quality (GEM-AQ) model to interpret the vertical profiles of ozone acquired with ozone sounding experiments at the meteorological site located at the Abu Dhabi airport. The purpose of this study is to gain insight into the chemical and dynamical structures in the atmosphere of this unique subtropical location (latitude 24.45N; longitude 54.22E). Ozone observations for years 2012 - 2013 reveal elevated ozone abundances in the range from 70 ppbv to 120 ppbv near 500–400 hPa during summer. The ozone abundances in other seasons are much lower than these values. The preliminary results indicate that summertime enhancement in ozone is associated with the Arabian anticyclones centered over the Zagros Mountains in Iran and the Asir and Hijaz Mountain ranges in Saudi Arabia, and is consistent with TES observations of deuterated water. The model also shows considerable seasonal variation in the tropospheric ozone which is transported from the stratosphere by dynamical processes. The domestic production of ozone in the middle troposphere is estimated and compared GEM-AQ model. It is estimated that about 40-50% of ozone in the UAE is transported from the neighbouring petrochemical industries in the Gulf region. We will present ozone sounding data and GEM-AQ results including a discussion on the high levels of the tropospheric ozone responsible for contaminating the air quality in the UAE.
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